2008

Masterplan and Masterplan Design Guidelines : 2008

Grangegorman Development Agency

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An Urban Quarter with an Open Future

The information that follows comprises the Masterplan and Masterplan Design Guidelines for the Grangegorman Site. It is the culmination of the Design Team’s work with consultation from user groups, governmental agencies and members of the community as well as review and approval from the Grangegorman Development Agency, (GDA). It was produced and reviewed during the design process from January 2008 until September 2008.

The Grangegorman Masterplan addresses the adjacent Broadstone site and neighbourhoods and in the process establishes a new city quarter framing a mix of public and institutional uses with a lively repertoire of urban places. The core property itself offers a flexible matrix of buildings and landscape, while preserving and enhancing the unique open spaces and historic resources of the site to benefit the Dublin Institute of Technology (DIT), the Health Services Executive (HSE), and the greater City community.

A memorable network of pedestrian paths weaves the new Quarter together with the City around it, creating a vital nexus of community within a “walkable” district. This weaving occurs in social and academic realms, in space and time, in historic and contemporary forms, and in the balance between buildings and landscape.

The Quarter as a whole enjoys a remarkable quality of geographic position and orientation within Dublin City. This masterplan for the Grangegorman site enhances this larger sense of place, taking advantage of the topographic character of the site to frame southerly views to the City skyline and to the Dublin Mountains.

DIT’s principal academic and support services activities and HSE’s main areas of service enjoy identity of place as well as beneficial adjacencies within the district Plan. New buildings are free to express the diversity of uses within a harmonious urban fabric.

The Primary School is located at a site boundary point that provides easy access to the residential street network. The Community Library is co-located with the DIT Library to produce a synergistic link between community library services and a specialist third level library, while promoting access and participation to higher education.

Student residences and social life are gathered along a major east-west urban procession, linking academic centres, recreation/sports facilities, and the public realm, and making the entire Quarter a place of vibrant activity.

Buildings support a clear definition of the street-quad-court structure of the Quarter, producing a legible pattern that enriches formal and informal sequences of movement. Buildings enclose a variety of internal gardens and sky-lit atria, giving the district a collection of distinct, discoverable places.

Two major activity centres—Upper Terrace at the Library and the Arts Centre / Student Hub—anchor a broad spectrum of social gathering places. Opportunities for social interaction occur at multiple scales: from grand places of arrival and movement, to streets and gardens, to cafés and amenities, to shared lounges and balconies within residential communities.

The urban transformation of the Grangegorman site extends into and through adjacent neighbourhoods, creating potential Gateway entrances at the North Circular Road, Prussia Street, Grangegorman Road Upper and Lower, and across the new Broadstone Development to Constitution Hill and Phibsborough Road. Stations for Dublin bus services and the future LUAS Green Line are incorporated, connecting the Quarter to Dublin’s metropolitan transit systems.
Reopening Grangegorman: a New Urban Quarter

The transformation of Grangegorman’s closed compound into an integral part of the life of the City is one of Grangegorman Development Agency’s highest goals. The proposed Masterplan envisions this new district—including any future Broadstone Development—as a primarily pedestrian precinct that is carefully served by public transit, surrounding streets, and an internal vehicular service network. Key features of the plan are access and options: many ways in and many ways through.

Mixed use also provides continuity, as activities that serve both student life and the public are layered through the academic core of the district. To the east, alongside Broadstone, the cultural offerings of the Arts Centre draw public participation. At the centre and west side of the campus, and closer to HSE’s public services, recreational facilities and open space encourage community as well as student use. At major gateways, such as The North Circular Gate and Broadstone Gate, commercial and academic uses are overlaid.

Reaching Out: Linking the Urban Context

The project is a major opportunity to enhance Dublin’s north inner city urban quality. The Masterplan connects existing urban landscape and introduces new resources north of the Liffey.

The Masterplan proposes an urban plaza and park at the Broadstone entry to the Quarter, extending the green space adjacent to Kings’ Inns to form a symbolic and civic marker. The site, being raised up, acts as a natural viewing area of Dublin’s urban fabric. The experience of driving or walking along Constitution Hill, from or to the City Centre, is now marked by a prominent open space that echoes Dubliners’ experience of the Phoenix Park and of the green squares which dot the City.

To the north, this new urban park reinforces the existing greenbelt pathway along Royal Canal Bank, past Blessington Street Basin, to connect with the Royal Canal at Mountjoy. To the east, across The North Circular Gate opens pedestrian access to and from Smithfield extending the existing City Arts’ activities northward.

The entry plaza at the Broadstone Development’s proposed LUAS station is configured to reinforce the pedestrian sequence into the urban spaces of the district.

Connecting the District: the Pedestrian Experience

To enhance the pedestrian realm, the Masterplan reasserts the continuity of the Grangegorman district. The east/west division of the site by the Grangegorman Upper and Lower Road is mediated by carrying a principal pedestrian sequence—St. Brendan’s Way—across the existing roadway. This broad crossing also serves to logically unifying existing buildings on the Record of Protected Structures into a central village of academic and student life. Access to limited areas of car parking is provided below the new terrace from Upper Grangegorman Road and from North Circular Road and Constitution Hill.

St. Brendan’s Way crosses the entire Quarter, giving public and student access to a series of academic and cultural centres, and is continuously activated by student residence halls, amenities and social spaces. As a pedestrian street, St. Brendan’s Way features a rich sequence of distinct spaces, opening and closing, with paved and landscaped surfaces, activated day/night uses, and a variety of building edges and profiles.

The urban quality of St. Brendan’s Way is complemented by a second lateral procession—Serpentine Walk—a meandering walk that traverses the site in two grand arches, giving a south-facing green edge to student residence halls. This “green procession” continues a linear landscape sequence that begins to the east with Royal Canal Bank and culminates in the district’s main sports and recreation park—The Fields.

These main east-west passages are crossed and extended by frequent fingers of north-south oriented green streets and sequences of courts, forming a loose, continuous grid of communication in the Quarter. Smaller meandering paths move at mid-block/mid-court intervals to trace intimate connections between outdoor rooms and gardens.

Gateway and Identity

Main gateway entrances offer front doors to the Quarter from surrounding streets. The North Circular Gate lies adjacent to a bus stop and provides an address for DIT and HSE. West Gate, a potential access point from Prussia Street, is coupled with a proposed commercial court and visually linked to the Church of The Holy Family. Broadstone Gate to the east offers entry from Phibsborough Road, Broadstone, the future Broadstone Station of the LUAS Line, and the re-established open park of Broadstone Green, across from the King’s Inns. In addition, Upper and Lower Grangegorman Gateways, which bookend Grangegorman Upper and Lower Road, provide gateways close to the centre. The design of these pedestrian and vehicular thresholds makes use of the existing stone walls, historic iron gates and contemporary markers where appropriate.

The Academic/Health Heart: Upper Terrace

At the academic core of the DIT Campus, Upper Terrace poses a dramatic belvedere looking south across The Fields. The Library’s information/study/ resource centre incorporates the historic Top House in a careful three-part composition of atria, courtyards, and new spaces, poised above the open green. The Upper Terrace provides a natural viewing platform for games and daily student life with the grand backdrop of the Dublin skyline and Mountains.

From the Upper Terrace down to The Fields, a tiered staiway/amphitheatre offers a venue for a variety of large-scale events, as well as a social ‘sun-catcher’ in fair weather.

Symbolically, the Upper Terrace and The Fields juxtapose the values of Knowledge and Action—the mutual benefits of scholarship, fellowship, and competitive achievement—which shine through DIT’s brief as central aspirations for this new Campus. Important campus buildings and uses are assembled in and around Upper Terrace, including the main library, lecture halls, faculty club, student centres, and administrative offices. This academic centre for DIT in turn has a strong connection via a major green pedestrian path to the health plaza immediately to the north at Library Square—the two linked centres thereby creating an overall “Academic/Health Heart” for the entire Grangegorman Quarter.
The Arts Centre: Inviting Campus and Community

At the eastern edge of the Quarter, Broadstone Gate leads quickly from Broadstone Place to a second focal point for the Quarter—the “Social/Cultural Heart”—where district and community life come together: the vibrant Arts Centre. Here a small piazza is framed by a pair of semi-enclosed wintergarden spaces—a café and restaurant with sheltered, indoor/outdoor dining to the north and a grand, weather-protected court of performance and exhibition halls to the south. The Arts Centre combines these popular venues with spaces for the Applied Arts and the Built Environment, allowing a broad range of public and pedagogical uses.

New Centres for Interactive Learning and Research

This Masterplan seeks to create modern, innovative facilities for both DIT and HSE, with a flexible, sustainable fabric of modular buildings. In a contemporary interpretation of traditional collegiate “quads,” the configuration of the buildings on the site frames a pattern of enclosed courtyards, open spaces and plazas, creating distinct forms with strong individual identities. From a common address along the North Circular Road, clear zones are distinguished for DIT and HSE. For HSE, three “Quads” gather related facilities: a northwest grouping is devoted to administrative functions and mental health facilities; a central quad for primary community health services; and a cluster to the northeast of supported housing apartments and a nursing home gathered around the old Laundry, re-cast as a dining/activity pavilion. This arrangement reflects our team’s recommendation to distribute HSE’s various programmes in order to enhance beneficial adjacencies for staff, residents, users and clients, rather than aggregating all functions in a single complex.

For DIT, the urban structure of the masterplan provides for its academic and research needs while maintaining and promoting identities through physical identity and landscaped courts and squares. These academic facilities are arranged across the site in a continuous array—Business, Tourism and Food, Science, Engineering, Built Environment and Applied Arts—and are complemented by the “Academic Heart” and “Social Hub” along with training centres, research centres, incubation space and science park activities.

The creation of a single campus with a major Academic Hub, central lecture spaces, a Social Hub, Student Hub and shared laboratories and catering facilities all promote and encourage interaction among staff and students of DIT.

The format of buildings, and the layout of district spaces they frame, emphasizes a modular flexibility of uses. Buildings have varying heights and stories—their massing determined by the goals of optimising views, daylight exposure, and relationship to the surrounding urban fabric and community. The most public/shared educational spaces—lecture halls, classrooms, workshops and studios—at the lower floors, and faculty suites, seminar and conference facilities, and departmental administration on upper floors. Throughout the plan, covered walks, courts, and glass-roofed galleries enhance internal communication and interaction. Multi-floor atriums present attractive public areas for social interaction and promote inter-floor communication. Relatively narrow building sections enhance daylight and views for all activities, in a format that can accommodate both laboratory and classroom patterns.

The GDA’s requirement for 30% expansion space for DIT is proposed to be distributed throughout the plan. This would enhance the opportunities for all departments to grow and evolve, while also allowing hybrid/interdisciplinary uses to grow up alongside existing ones.

Residence and Recreation: Student Life Along the Serpentine Walk

Two of the great benefits of DIT’s relocation to Grangegorman—housing on campus and high quality recreation and athletics—are exuberantly celebrated in the Masterplan. Student residences form two great arcs—called Serpentine Walk, which begin at Broadstone Gate to the east and sweep across the campus to the potential Prussia Street West Gate to the west as a continuous ribbon of 24-hour habitation convenient to every department and academic centre.

Having a varied, dynamic movement in heights, the student residence halls offer a range of housing formats from 6-bed and 3-bed apartments to private studio/office units. Ground level spaces for dining, social and study lounges, and related shops serve to activate the Serpentine Walk on the south side, and St. Brendan’s Way on the north side. A moving skyline and frequent vertical openings and breaks allow views and sunlight to penetrate.

Recreational spaces—indoor ball courts, swimming pool, fitness rooms and Gymnasiums—are laid out alongside the north edge of The Fields, one level below the Serpentine Walk. These exercise and sports rooms relate visually to external spaces and are south-by the Ha-Ha—a sectional dip at the upper edge of The Fields. The Fields provide for a range of playing fields and pitches for various sporting activities. Together with social and retail amenities located immediately above, this continuous spine of activity invites daily use by residents, commuting students and the public.

Enhancing Community Infrastructure and Facilities

The Masterplan strives to strengthen connections to the surrounding community. To this end, the Grangegorman Urban Quarter provides a rich, comprehensive range of community-related amenities while optimising community access to DIT and HSE facilities. HSE services will be convenient and accessible, while residents will have shared access to the sports facilities on the DIT campus.

In addition to the new Dublin Council Branch Library and Primary School, the Quarter proposes an array of lively social gathering places at multiple scales for the community, from smaller gardens and play spaces to landscaped walks and large public plazas at the two “hearts” of the district.

Adaptive Re-use: Celebrating Cultural and Historical Resources

The plan proposes the creation of important places adjacent to and around the buildings listed on the Record of Protected Structures. The Top House retains its prominent presence as a focus of the Library at Upper Terrace. Near the southern entrance lie the “Cultural Garden;” an axial space that looks toward the Clock Tower, flanks a central village that includes the Female House, the Male and Female Infirmaries, the Catholic Church, and the Former Penitentiary—all adapted to social activities such as the Student Union, Faculty Common, Faculty Club, and Bookstore. The Laundry Building is re-used as the new Day Service Facility for HSE. The unused Church of Ireland Chapel—re-used as a Recreational Club—presides over its own significant open space with an existing grove of trees. In the southeastern portion of the site, the Former Richmond Asylum building becomes an organising element for two DIT quads bordering two generous landscaped open spaces north and south of the building. We propose moving the historical gates to the Lower Grangegorman Gate to mark the new entry to the Quarter at this location.

For Broadstone, the Masterplan addresses the long-term possibility of an urban texture of mixed-use buildings along a grand north-south boulevard—the route of the future LUAS Green Line. The historic railway station and sheds are maintained as a central market hall and place of community, directly adjacent to the proposed LUAS station. To the south of Broadstone Place, an office complex edged Broadstone Green, possibly accommodating technology-oriented businesses in an extension of the mixed-use component of the Grangegorman Quarter.

To the south of the Arts and Built Environment Quads, a secondary entry gate links through to H.A.R.P./Smithfield and the north bank of the Liffey. The northward extension of Smithfield’s urban arts district is thus carried through to the new Arts Centre, enhancing Dublin’s inner city cultural resources.

To the east, a series of potential, hypothetical links to Prussia Street are proposed, each creating an opportunity for new development, with pedestrian and/or vehicular breaks in Grangegorman’s historic wall.

Environmental Sustainability: Flexible Fabric and Visible Systems

Sustainability for HSE and DIT involves three levels of interest: planning, design, and construction; operations and life-style; and educational outreach. The planning process development itself can begin to serve educationally by inviting discussion with users and community. The best of contemporary green building practice would be seen as a base-line for development of the Quarter. The Masterplan design can also serve to educate and encourage sustainable living by, for example, making infrastructure and natural systems visible and including experimental studies of systems within the Built Environment programme at DIT.

Beyond energy efficiency and climate responsiveness, buildings serve sustainability goals by offering lasting use—they age well. We imagine a contemporary fabric of modular, durable structures, with great attention to the quality of exterior and interior systems. The Masterplan encourages a diversity of architecture and guidelines will call for inventive use of a set of related systems and materials, giving the Quarter both visual harmony and long-term serviceability.

Grangegorman Landscape: Urban Choreography and Natural Systems

The natural heart of the Grangegorman landscape is The Fields, comprising a generous portion of the entire site. This gathering of parkland sports pitches with park-like groves of new and existing trees is framed by the Serpentine of student residence halls, and the protected wall to the south. Running and cycling paths entwine around the edges, linking the complementary qualities of sports fields, sheltering groves of trees, and distant views.

The district network of green boulevards and courtyard gardens forms a continuation of the main landscape elements of its greater North Dublin neighbourhood, such as Blessington Street park, linking the new Quarter development with its context. The primary sequences of St. Brendan’s Way and Serpentine Walk feature discrete places, terraces, and gardens, each with its own individual character. These are connected to smaller “landscape fingers” characterised by sequences of dense groups of trees, which appear to be situated randomly.

Site drainage is made visible as a living ecological system, using controlled watercourses and ponds. Quads and courtyards are also seen as discrete compositions: the courtyard of Applied Arts, for example, is fed by the hydrology system, and is thus a set of pavilions in a water garden. Landscape materials are based on retaining existing significant plantings where possible, augmented by the use of native species.

Transportation and Access

The Masterplan’s transportation strategy emphasizes sustainable modes of transport such as walking, cycling and public transport. The Quarter can be easily traversed in a 15-minute walk. Green Boulevards dominate the internal Quarter circulation and are designed to allow articulated paths for both pedestrians and cyclists, which will provide quality circulation environments in all seasons.

The Masterplan capitalises on the planned Luas Line D, which will connect the City Centre with the Maynooth rail line, and is likely to include a stop opposite Broadstone and another closer to North Circular Road, both of which will serve Grangegorman. The new Luas line will enable a connection to most of the Dublin-wide transport networks, including other Luas lines, suburban rail and QBC networks.

The Masterplan, via the Broadstone/Constitution Hill link, allows the projects to benefit from the proposed Metro North stops at Parnell Square and the Mater Hospital. These stops, within walking distance and also located at bus connection areas, will provide important links to the whole public transport network serving the greater Dublin area.

The provision of a bus access area as part of the Masterplan will greatly enhance the capacity and flexibility of the existing bus network, which already serves the periphery of the site with considerable levels of service. The conjunction of existing and future bus provision with the new Luas line, will create the conditions for the eastern access (via Broadstone) to become the main Gateway to the district.

Car access will be limited to encourage the use of sustainable transport modes, with car parking being provided at two main locations, accessed via North Circular Road and Constitution Hill/Grangegorman Road. The majority of car parking will be underground, but small numbers of surface car parking at key locations may be provided throughout.

Vehicular circulation within the site will be enabled in a manner that does not conflict with the general priority given to pedestrians and cyclists. A system of traffic cells is being designed with the flexibility of allowing through-routes at key locations that can be in place out-of-hours. Service vehicle circulation will generally be shared with pedestrians and cyclists, albeit subject to restrictions.
six themes for the city of dublin

The Dublin City Council has identified six themes which are considered important to the sustainable growth and development of the city. The Masterplan sets out a new vision for the Grangegorman site based on these six themes.

Economic Vision

The Masterplan develops Grangegorman as a vital economic resource and engine with a network of thriving spatial and sectoral clusters, a focus for educational talent and creative assets. Facilities for the Dublin Institute of Technology will be supplemented by a strong component of retail spaces, training centres, research centres, incubation spaces and science park facilities that will directly benefit the economic development of the community and greater Dublin region. This development will underpin Ireland as a knowledge economy. A strong relationship with shared facilities is envisioned between the DIT and the Health Service Executive, which will further provide and reinforce convenient and needed educational, healthcare services and related enterprise development spaces for the Grangegorman Urban Quarter and the surrounding community. Furthermore, the full development and implementation of the Masterplan will create a thriving impact for the community, providing tremendous long-term economic opportunities in regards to employment and management of the construction and operations of the future facilities in the Urban Quarter.

Social Vision

The Masterplan design reaches out to link the site with the immediate community, as well as Dublin's greater urban context, to create an Urban Quarter that is inviting and connected to the local and larger community. The overall “Green Fingers Landscape Concept” represents an open “hand” that reaches out to draw the community into the development. The Masterplan develops Grangegorman as a compact district with a network of sustainable “quadrangles” for the Dublin Institute of Technology and the Health Services Executive, providing a range of facilities that promote social inclusion. Student residences and social life are gathered along a major east-west urban procession linking academic centres, recreation/sports facilities and the public realm, making the entire Quarter a place of vibrant activity. The natural heart of the Grangegorman landscape is The Fields, comprising a generous portion of the entire site and providing a welcome, diverse range of sports pitches and other recreational activities. A Dublin City Council Branc Library and Primary School are included in the Masterplan in locations that easily serve the surrounding residential areas.

Cultural vision

A rich and diverse provision for cultural facilities is offered in the Grangegorman Urban Quarter, including performing arts centres, exhibition spaces and theatres, to encourage activities throughout the day and evening, and promote awareness of our cultural heritage. At the eastern edge of the Quarter, the Broadstone Gate leads quickly from Broadstone Place to the Arts Centre, where district and community life come together. This is one of two “hearts” envisioned for the Urban Quarter and will accommodate arts and culture/performance spaces for the larger public community to promote lively, evening uses. The northward extension of Smithfield’s urban arts district is thus carried through to the Grangegorman Quarter, enhancing Dublin’s inner city cultural resources. The Performing Arts Centre includes a Concert Hall, museum and art galleries.

Urban Form and Spatial Vision

The Masterplan creates a connected and legible urban quarter based on vibrant public spaces and active streets that provide a strong sense of identity and place. An urban plaza and park is envisioned at the Broadstone entry to the Quarter, extending the green space adjacent to Kings’ Inn to form a symbolic and civic marker for the entire city. To the west, this link continues through the site via the new pedestrian path, St. Brendan’s Way, potentially extending through to the Phoenix Park and connecting with the North Circular Road. To the south, the Lower Grangegorman Gate opens pedestrian access to and from the Smithfield area, extending the existing City Arts’ activities northward.

Movement Vision

The Masterplan takes full advantage of its proximity to Dublin City Centre, where transport networks already provide high levels of service. Rather than focusing on new transport links to serve the new population on site, the main aim of the Masterplan is to enable the seamless connection to the existing and future transportation networks. The emphasis is therefore put into the design of quality linkages from the site to the established city grid. The Masterplan also contributes directly to the increase of the quality and capacity of the bus network by providing a bus access area within its boundary. Perhaps the most important improvement with regards to Grangegorman will be the extension of the LUAS network from the City Centre to the Maynooth Line, which will include stations in close vicinity of the site.

Sustainable Vision

The Masterplan for the Grangegorman Urban Quarter seeks to create an environmentally sustainable Community within its neighbourhood and Dublin, as well as a sustainable demonstration project for the world. Sustainable strategies focus on three components that underpin the success of the regeneration of Grangegorman: social well being, economic viability, and environmental benefit. Building massing and form have been developed to respond appropriately to wind and solar paths, in order to ensure maximum sunlight exposure, reduce energy consumption, and incorporate generous green spaces to provide healthy views. The project includes provision to facilitate wind sheltering/protection and solar gain, as well as passive and active measures to harvest wind and cool breezes. Sustainable drainage systems are proposed to reduce water consumption and flooding. The development strengthens the site’s existing ecology and biodiversity, and incorporates sustainable urban drainage throughout the District. Rainwater will be collected as a source of grey water. The Masterplan maximises the use of recycled water while minimising the use of potable water by proposing appropriate landscape materials, and utilising sustainable urban drainage to increase ground water absorption.

The existing protected structures on the Grangegorman site will be re-used according to viable, adaptive re-use strategies that carefully consider each building’s structural condition, plan configuration, and architectural character. Regarding transport systems, the Masterplan promotes travel plans and a transport policy that encourage the use of public transport and promote walking and cycling. A rich sequence of pedestrian and bicycle paths is woven into the landscaped areas, providing access to all the spaces and buildings in the District. The whole Masterplan for the Grangegorman Urban Quarter has been designed for change and flexibility so that it may be easily adapted to meeting changing needs and requirements in the future.
community infrastructure benefits

The following elements of the Masterplan will contribute to the benefit of the surrounding community.

Education

The proposed consolidation of the currently disparate spaces of the Dublin Institute of Technology within one campus on the Grangegorman site will bring a tremendous educational benefit to the community. DIT’s goal is to create a world-class higher education campus that serves society by supporting the economic, social and cultural life of citizens and reflecting the evolving character of education. The campus will be student-centred and resourced to meet the multiple needs of the Institute’s current student population of 20,500 students with the potential to accommodate a further 2,000 full time students when completed, and a further potential increase of 30% in the decade ahead. These students range from undergraduate to postgraduate, research students, full-time, part-time, apprentice students, traditional school leavers, mature students, economically disadvantaged students, students with disabilities, international students and students studying junior music.

DIT provides a comprehensive range of outreach / access programmes to the community, and many local residents will be able to have convenient access to these strong educational opportunities, as well as the recreational and sports facilities offered on the campus.

Sports and Recreation

The community will have shared access to the sporting facilities being provided for DIT, including the sports fields, tennis and basketball courts, and other recreation areas in and around the open space of the Fields. This major public amenity accommodates three pitches for different sports—soccer, rugby, gaelic football, hockey, hurling—as well as informal gathering spaces. The location of the Fields on a slight rise in topography provides excellent southern sun exposure, while optimising panoramic views of the city skyline and the Dublin Mountains beyond. Jogging and walking paths weave around the sports fields.

Along the north edge of the Fields, the “Ha-Ha” landscape concept is proposed to take advantage of the natural higher slope of the site to accommodate large recreation and sports facilities underneath the plinth for the public promenade above. These sports facilities will relate visually to external spaces and include swimming pools and basketball courts. The Masterplan also provides a series of public gardens along the “green landscape fingers” of the Grangegorman Urban Quarter, including the proposed Cultural Garden facing the protected Clock Tower building.

Healthcare

A large part of the Grangegorman Urban Quarter will accommodate facilities for the HSE. These new buildings will provide convenient and needed healthcare services for the Grangegorman Urban Quarter and the surrounding community, including preventative health programmes and primary care services. Entry for the HSE will be from North Circular Road, Prussia Street and Grangegorman Road, reinforcing the interface with the community.

introduction
Public Access and Landscaping

The Masterplan design provides strong links with the immediate community as well as Dublin’s greater urban context. The “green fingers” landscape concept offers a rich sequence of pedestrian paths for the community to access the development. St. Brendan’s Way and the Serpentine Walk traverse through the site to connect it with the Grand Canal north to Mountjoy, and west toward Phoenix Park. A weaving network of north-south landscaped fingers provide access from North Circular Road through the development to the large sports amenities at the Fields.

The most important public access to the Grangegorman Urban Quarter is envisioned via the proposed future Broadstone Gate, extending directly beyond to Constitution Hill, Phibsborough Road, the King’s Inns and Henrietta Street, and south to the city centre. Public access at Broadstone Gate will be reinforced by the new LUAS station in front of Broadstone Terminal, while a second LUAS station at North Circular Road will improve public access at that location. Additional main public access routes are at North Circular Road and along Grangegorman Road and to the immediate south via Smithfield. Secondary, potential access points may be established along Prussia Street on the west side. The major urban path through the site is provided via the east-west St. Brendan’s Way, from Broadstone Gate, through the middle of the Grangegorman Quarter.

A series of lively social gathering spaces are planned throughout the site. Major public gathering spaces include the Library Square adjacent to the new DCC library, DIT’s Upper Terrace (the Quarter’s “academic heart”), the Arts Centre (the “social heart” of the district), and The Fields. Secondary gathering spaces are attached to the main pedestrian path from the north-east along the canal, through Broadstone Gate, and possibly connecting to Prussia Street to the west.

A strong pedestrian circulation network weaves through the site - both major landscape fingers as well as secondary crossing paths through building atria and lobbies.

Playgrounds

An array of play facilities will be provided throughout the Grangegorman Urban Quarter. The variety of locations identified as suitable include a school playground accommodated around the primary school at the junction of Grangegorman Upper, Rathdown and Ivy Avenue. Play spaces are provided in the “woodland” areas of the Fields, and an exercise trail/jogging path around the Fields, as well as in pocket parks in the other areas of the district. Play equipment for kids of different ages will vary in character—from natural to more modern in character. In addition, other playspaces are planned near and adjacent to circulation paths, arrayed in various locations around the DIT and HSE areas. Sculpture, landscape furniture landscape design, play equipment, and fountains will be creatively integrated in the playgrounds.

Dublin City Council Branch Library

The Masterplan allows for a DCC branch library to be connected to the main DIT library, so that both facilities can retain their administrative independence while sharing certain spaces and optimising efficiencies and services. This central location maximises community access to the branch library. Besides the strong link to DIT, the branch library is situated directly across from the vibrant “Library Square” for the district, along the proposed Ivy Avenue.
introduction

Primary School
A primary school for 400 pupils is located at the intersection of Grangegorman Upper, Rathdown Road and Ivy Avenue. This location at the edge of the development provides a strong connection to the community and optimises easy, convenient access for pupils and their guardians with the main entrance/drop-off area located off Rathdown Road. The configuration of the school ensures a safe and secure site, while enabling access to sports fields and facilities, and green spaces in the Grangegorman district.

Arts and Culture
One of the two “hearts” for the Urban Quarter will accommodate arts and culture/performance spaces for the larger public community to promote lively, evening uses. This zone is located toward the eastern edge, adjacent to Broadstone Gate to provide convenient access for people coming from Smithfield and King’s Inns/Henrietta Street. The Performing Arts Centre includes a Concert Hall and museum and as well as art galleries.

Security
The Masterplan optimises the potential for providing passive security measures wherever possible, by incorporating program elements and design features that promote 24/7 use by pedestrians, bus or car users. The proposed Ivy Avenue will accommodate limited service access during the day, with possible public vehicular access in the evening in order to provide potential for surveillance and “eyes” in the district. Certain areas will have gates for controlling access. Limited vehicular and service access is proposed on St. Brendan’s Way and Grangegorman Upper with pedestrian and cycle access prioritised.

Public Transportation
The Masterplan capitalises fully on the establishment of the new LUAS Line D on its eastern edge, bordering the Broadstone site. The design envisages two stations—one in front of the existing Broadstone Terminal building, and a second one near North Circular Road. The LUAS line will greatly improve public and community access to and from the site, connecting it to O’Connell Street to the southeast, and outlying parts of the city to the north.

New bus routes will be developed to improve access by public transportation to the Grangegorman Urban Quarter and surrounding areas. Increased public transport to and around the site will provide a positive community gain.
02_masterplan design concept
key masterplan principles

Two Hearts

The Masterplan provides two “hearts” for the Grangegorman Urban Quarter. These two major activity centres—Upper Terrace at the Library, and the Arts Centre to the east—anchor a broad spectrum of social gathering places. The Upper Terrace is designated as the “Academic/Health Heart,” while the Arts Centre is envisioned as the “Social/Cultural Heart.”

Quadrangles and Green Fingers

In a contemporary interpretation of traditional collegiate “quads,” the configuration of the buildings on the site frames a pattern of enclosed courtyards, open spaces and plazas, creating distinct forms with strong individual identities. Main east-west pedestrian connective passages are crossed and extended by frequent fingers of north-south oriented green streets and sequences of other courts, forming a loose, continuous grid of communication in the Quarter. Smaller meandering paths move at mid-block/mid-court intervals to trace intimate connections between outdoor rooms and gardens.

St. Brendan’s Way and the Serpentine Link

The east/west division of the site by the Grangegorman Upper and Lower Road is mediated by carrying a principal pedestrian sequence—St. Brendan’s Way—across the existing roadway. This broad crossing also serves to closely unite existing listed buildings into a central village of academic and student life. The urban quality of St. Brendan’s Way is complemented by a second lateral procession—Serpentine Walk—a meandering link that traverses the site in two grand arcs, giving a south-facing green edge to student residence halls.

Broadstone Gate / Link to King’s Inns & Henrietta Street

The Masterplan creates a grand urban plaza and park at the Broadstone entry to the Quarter, extending the green space adjacent to the King’s Inns to form a symbolic and civic marker.

Connecting to Smithfield and North Circular Road

To the west, the pedestrian link continues from the urban park through the site to connect with the North Circular Road, and extends through to the Phoenix Park to the southwest. To the south, the Lower Grangegorman Gate opens pedestrian access to and from the Smithfield area, extending the existing City Arts’ activities northward.

Ha-Ha Concept, Sports and Recreation and Utility Corridor

The natural heart of the Grangegorman landscape is The Fields, comprising a generous portion of the entire site. This gathering of parkland sports pitches with park-like groves of new and existing trees is framed by the Serpentine of student residence halls, and the historic wall to the south. The Ha-Ha sectional dip concept provides additional, internal sports facilities with direct visual connection to the external pitches. Running and cycling paths entwine around the edges, linking the complementary qualities of sports fields, sheltering groves of trees, and distant views. Along the north edge of this open space, the Masterplan utilises the “Utilidor” concept (walk-in-duct) to concentrate utility services in relation to St. Brendan’s Way.
spaces at the podium level are located one-half of a level above the ground elevation to allow natural daylight to enter all habitable spaces.

the two-level sports centre has been located in a high profile and unique location between the outdoor playfields and the academic heart of the quarter and will be daylit by using glass walls adjacent to a landscaped “ha-ha” (an angled sloping change in ground elevation).
1. landscape design masterplan
1. landscape design hard and soft landscape (excluding tree cover)
1. landscape design tree concept
1. simplified program adjacency diagram

Simplified view showing the generalised adjacencies between program elements within the masterplan.
1. ground level program adjacency diagram

Detailed view showing the adjacencies between program elements at the ground level of the masterplan.
1. upper level program adjacency diagram

Detailed view showing the adjacencies between program elements at a typical upper level of the masterplan.
The new Grangegorman Quarter creates inviting spaces for the community while maintaining connections to the site's past and linking together areas of the city.
1. view of the site from the north

A series of quadrangles and courtyards are linked by both urban and landscaped pathways to form a legible and interconnected area.
1. view from the DIT library

The Institute’s Library anchors one of the central hearts of the quarter. Its location creates an intellectual hub of activity at the intersections of several primary circulation routes and provides iconic views from the Upper Terrace and the Fields out to the city of Dublin and the mountains beyond.
1. view of the serpentine walk and the fields

The Serpentine Walk creates a curved landscaped pedestrian spine traversing the entire site providing a green alternative to the more urban character of St. Brendan's Way. This spine organises the student housing buildings and provides views of the Fields and city beyond.
St. Brendan's Way is one of the major circulation routes through the site that links together various programs and amenities as well as the overall site to the community.
1. view of the fields

The majority of the development is located on the northern portion of the site to maintain the existing landscape and open space to the south.
The Masterplan provides for a framework incorporating key principles, strategies and objectives to drive a vision of a sustainable, thriving quarter for the Dublin Institute of Technology, the HSE and the city. The urban structure of the Masterplan establishes a series of six academic centres for DIT and several distinct courtyards for HSE, each with individual physical identities of buildings and landscaped courts. These academic centres are arranged across the site in a continuous array: Business, Tourism & Food, Science, Engineering, Built Environment, and Applied Arts. In addition, the DCC Library and Primary School will provide key benefits for the community.

The format of the buildings, and the layout of the district spaces they frame, emphasise a modular flexibility of uses. Buildings vary in height and number of stories, with the most public/shared educational spaces—lecture halls, classrooms, workshops and studios—at the lower floors, and faculty suites, seminar and conference facilities, and departmental administration on upper floors.

**Design Principles**

There are three primary design principles that govern the organisation and character of the open spaces and buildings for the Grangegorman Urban Quarter: Connectivity, Collegiality and Cohesiveness. These three principles serve to establish consistency throughout the development of the Grangegorman site, and ultimately contribute to a unique identity for the district.

**Connectivity**

Both physical and visual connections are encouraged on the site to facilitate movement across the Quarter as well as to foster a sense of district unity. A contiguous network of interconnecting open spaces, including plazas, quadrangles, gardens and interconnecting passageways, serves to physically link buildings throughout the Quarter. This predominantly pedestrian landscape serves as an alternative to pavement circulation along vehicular streets and offers visual relief to the consistency of the surrounding street pattern. Connectivity is also achieved by establishing a matrix of sightlines that visually link district landmarks and focal points throughout the Quarter.

**Collegiality**

The Masterplan supports a hierarchy of communal spaces that encourage collective interaction among users. These spaces are organised around specific program clusters, orienting individuals in classrooms, laboratories, residences, offices and other facilities to larger communities within the respective Quarter neighborhoods. These communal spaces, in turn, are visually and physically connected to larger, more collective district spaces. These communal spaces also serve to reflect a favorable sign of Grangegorman academic, health services and research-oriented life to the surrounding area and community.

**Cohesiveness**

Cohesiveness is aimed at promoting visual consistency among architecture and landscapes within the masterplan’s control over the course of development of the Grangegorman Urban Quarter. Collectively, adjacent buildings maintain similarity by abiding to a prescribed massing and basic vertical organisation. All buildings conform to a range of specified materials and colours as well as a particular method of surface articulation. The district landscape also maintains cohesiveness through the consistent use of specific planting types, paving materials and lighting. Cohesiveness among buildings and open spaces enhances the legibility and identity of the entire Urban Quarter.
critical alignments

A network of established building lines determines the physical siting of buildings on the Grangegorman Urban Quarter. These building lines ensure that open spaces on the site are maintained during the course of development, and that the predetermined grid of view corridors and streets is preserved. The alignment of building edges contributes to the creation of a cohesive environment throughout the District.

Organising Axes

The fundamental organising ideas for the proposed Grangegorman Urban Quarter are depicted in this diagram. Development is organised around clear open spaces, pedestrian and service circulation systems. The primary organising axes—St. Brendan’s Way and the Serpentine Walk running east to west, and the north-south landscape fingers—establish the basic ordering system and provide a clear framework onto which each increment of development can be attached. These prominent axes will establish the identity of the Grangegorman Quarter, defined over time by each increment of development that fronts onto each spine.

Strong Quad Edges

Each Quad maintains perimeter building lines which determine the absolute limits for buildings located on that Quad. The Masterplan advocates that building along Quad perimeters strictly observe the building lines in order to create definitive edges along Quarter paths and open spaces, and ensure that adjacent buildings align throughout development. Furthermore, these lines contribute to the formation of significant open spaces such as Upper Terrace, Broadstone Gate and the Arts Centre.

Flexible Quad Interiors

Whereas building mass should strictly adhere to perimeter Quad lines, building edges that fall within the Quad interior maintain some flexibility to accommodate unanticipated programmatic needs. These zones of dimensional flexibility can occur along the edges of interior Quad courtyards and connective passageways.

The standards suggested by the Masterplan for building footprints and massing are based upon the basic functional requirements for each building type. The suggested size and location of academic and HSE buildings, for example, meets the basic height and width requirements for multiple-story classroom and healthcare buildings. These standards are subject to some variation, and change may be accommodated within specific zones in each Quad.
quadrangles

The open space network in the Grangegorman Urban Quarter is shaped by the places that buildings make and the pathways that connect those places. The inherent variety of places within the proposed District is designed to accommodate a wide variety of specific functional, aesthetic and recreational needs. The proposed network of open spaces also seeks to provide a common ground that links these specific needs and brings a broad range of academic, healthcare and community components together.

The “Critical Alignments” structure that establishes the development increments at Grangegorman, and accommodates the future quad build-outs, also sets in place the open space network and hierarchy throughout the District. Within each prototypical District build out “parcel,” a landscaped quadrangle is provided. The particular needs of specific faculties and users will allow for great variety in the expression and character of each open space.

Several quadrangles can form clusters of quads, and a shared open space once again marks the character and nature of this specific grouping. The expression of this larger space—for example, the Cultural Garden and the Library Square—addresses a broader cross-section of the Grangegorman Quarter and creates the common ground for the individual quads that make up each cluster.

At the overall scale, the quads are linked by the primary north-south and east-west axes that move through the site—St. Brendan’s Way, the Serpentine Walk, the north-south landscape fingers—as well as the grand plazas at Broadstone Gate, Arts Centre and Upper Terrace. These major axes and open spaces, primarily given over to pedestrian and light service circulation, are the ones that establish the most common ground for the entire District and could accommodate the strongest expression of Grangegorman’s character and identity.
view corridors

The pattern of view corridors through the site—both east-west and north-south—serves to connect the site to the surrounding natural and urban environment. In addition to providing strong guidelines and orientation for pedestrians by focusing views on prominent surrounding landmarks and natural features such as the Dublin Mountains, the King’s Inns, the Wellington Monument, the Jameson House, and the Fields, the corridors also help to break down the scale of the overall development to integrate the site into the existing urban fabric.

In counterpoint to the major east-west connections along St. Brendan’s Way and the Serpentine Walk, an array of north-south landscaped view corridors emerges, visually linking the Grangegorman Quarter from North Circular Road to the city and Dublin Mountains toward the south.

Where these view corridors cross major internal circulation spines or adjacent public streets, the intersection is celebrated and marked with a change in the hardscape and landscape design, or through the massing of adjacent buildings.
urban pedestrian zone and pathways

The Grangegorman Urban Quarter proposes a clear, strong urban pedestrian zone in order to achieve the following key urban design objectives:

- Strengthen a sense of character, identity and continuity for the District.
- Optimise the quality, adaptability and diversity of the public realm within the site.
- Create major connections to significant features in the surrounding urban fabric, including North Circular Road to the northwest, Broadstone Gate and King’s Inns to the east, and a possible link to Prussia Street to the west.
- Modulate the height and density of buildings along the pedestrian zone to relate to the scale of the buildings on the Record of Protected Structures as well as the existing buildings in the surrounding urban context.
- Reinforce a lively sequence of public spaces that are defined and enclosed by means of building mass, landscaping and planting to create a well-used, day-and-night District.
character of Ivy Avenue

The character of Ivy Avenue on the north and south sides has been created to optimise solar orientation and shape architectural identity. The north (south-facing) side is more open, incorporating generous landscaping and breaks in the building line, in order to maximise sunlight access into the quads and courtyards.

The south (north-facing) side is provided with a more solid street edge to strongly define the road and buildings along this edge.

South Facing Quads

In general, the Masterplan configures the DIT and HSE Quadrangles so that their varied program will fit with sensitivity and richness into the site. The buildings and open spaces are developed in close dialogue with the topography and the light.

Open spaces, public gathering areas, pedestrian paths, views and buildings are organised in relation to the movement of the land and access to sunlight. Given Dublin’s frequently cool and wet climate, orientation to the southern light and warmth is carefully shaped and enhanced for all of the important social gathering spaces—including the major public spaces (Upper Terrace, Library Square, St. Brendan’s Way, landscape finger parks) as well as the individual quad courtyards. The connection of buildings, open spaces with the environment and exposure to daylight enhances the specificity of this place and gives expression to the culture and community of the Grangegorman Urban Quarter.
masterplan principles

building heights

The massing strategy for the building heights is shaped by the needs of DIT and HSE, the response to sunlight and wind conditions, and by the relationship with the neighbouring buildings on the edges of the site. The massing steps up to be the densest and highest toward the major public opens space at Broadstone Gate, and steps down to be lower around the site boundaries in order to relate to the surrounding community.

While the buildings are generally between 2 and 8 floors bar the Broadstone area, the Masterplan proposes one high element located along the student housing curve at the edge of the Upper Terrace and the Fields. This landmark element serves as a “cathedral,” similar to various precedents around the world—a viewing tower for the public, at the top of student housing, to come and view the Grangegorman Urban Quarter and surrounding city, and establishing a “marker” to set the Grangegorman area in its urban context.

This strategy contributes to the cohesive appearance of the Grangegorman Urban Quarter, providing a measure of consistency and District identity that is simultaneously harmonious and distinct from the surrounding context.

The massing of buildings is defined by the expression of simple volumes that promote a basic level of conformity among adjacent buildings while accommodating a range of possible architectural solutions and building types. This approach also offers flexibility to accommodate unanticipated modifications in individual building programs and functions. Moreover, the clearly delineated edges of building volumes contribute to the formation of streets and positively shaped open spaces within the Grangegorman Urban Quarter.

Build-to lines and setback requirements will govern key alignments of all buildings on the Grangegorman Urban Quarter. These lines have been determined as defining major pedestrian paths and crucial view corridors for the entire development, in order to create a cohesive series of open spaces on the site.
The Masterplan enlarged plans show the number of stories allocated per building volume. The heights of these volumes will vary depending on the building type because building types generally require different floor-to-floor heights for various reasons. For example, housing units may have lower floor-to-floor heights than academic or institutional buildings for economic reasons. Laboratory and research buildings may need greater floor-to-floor heights to accommodate larger floor areas and raised floor or ceiling systems used for ventilation, gasses and other piping and lighting needs.

Building types such as Performance Venues, Sports Courts, Museums, Libraries, etc..., generally do not conform to specific floor-to-floor requirements because of their specialised nature but guidance can be given for some of the building types planned for the site.

- Laboratory and Research Buildings: 4.5 meters floor-to-floor max.
- Administrative and Office Buildings: 4.0 meters floor-to-floor max.
- General and Academic Buildings: 4.0 meters floor-to-floor max.
- Housing: 3.0 meters floor-to-floor max.

Several buildings planned for the site are located over a podium level that is situated halfway above and below grade. The podium level is typically 3 meters above the adjacent grade and is sometimes pulled away from the building to allow natural daylight to enter habitable spaces.

Some buildings may have a higher (5 meter) floor-to-floor height at the top floor to accommodate special uses such as conference spaces. Setbacks are encouraged at the ground and top levels for rain protection and view balconies as well as to add rhythm and modulation to the building facades. All buildings on the site have a ground floor-to-floor height of 5 meters to accommodate large area public uses, retail and restaurant spaces and to introduce a level of aesthetic consistency and horizontal datum.
higher elements

In general, the building heights in the Grangegorman Urban Quarter have been set between 4 and 6 storeys to respond appropriately to the education and health uses which they will provide and to relate to the surrounding Dublin city context. At the edges of the district, these building heights step down to be lower, particularly along the North Circular Road and Grangegorman Upper Road.

An important strategy in the Masterplan provides three special places with increased heights to create a strong identity for the Grangegorman Urban Quarter. These three higher elements have been positioned in central locations to give the district a distinctive presence when viewed from around the site and the city. Their locations have been selected to ensure that they would not have a direct impact on the existing residential neighbourhoods.

The Campanile

The most prominent element, the “Campanile,” is located along the student housing curve on the north edge of the Fields, at the Upper Terrace, to give expression to this significant public space and establishing a “marker” to set the Grangegorman area in its urban context. Inspired by the numerous slender towers and spires in Dublin, this 15-storey landmark provides an elevated viewpoint for the public, while also helping to orientate users and pedestrians within the Quarter itself. This “campanile” typology can be found in various other urban and campus settings around the world.

Student Housing

The student housing buildings are set in a series of curves along St. Brendan’s Way and Serpentine Walk to define the northern edge of the Fields. They step up and down between 4 and 8 storeys to offer a compelling image when viewed from the city, providing a dynamic sense of movement much like the natural landscape. These buildings reinforce the curved geometry to shape a vibrant street realm along the spine of St. Brendan’s Way and Serpentine Walk for pedestrians and users, ensuring that these spaces will be socially activated.

Broadstone Gate

The massing of buildings on the Grangegorman Urban Quarter steps up toward the major entry gateway, transport hub and public open space at Broadstone Gate. The buildings in this location strengthen the identity of the public-oriented spaces accommodated in this area, including the Science & Industry Centre, DIT Research Center, and HSE administration. Ranging between 5 and 12 storeys, with the highest elements at 10 and 12 storeys, the buildings create an appropriate, significant urban marker that relates effectively to the greater city in this historically prominent location—especially with regard to the future LUAS line and stations nearby.
Roofscapes & Service Courts

The roofs of buildings and other large hard-surface courts are often prominently visible from surrounding taller buildings, particularly in the DIT and HSE areas. These areas should therefore be considered as a building façade with respect to all new building projects, and must be given appropriate design consideration, with particular attention to the treatment of mechanical systems and exposed elements. Green grass sod roofing should also be used whenever feasible.

Rooftop Mechanical Screening

Approximately one-third of a typical lab or research building is devoted to rooftop mechanical equipment and exhaust stacks. Despite required setbacks that decrease the visible mass of the rooftop equipment, the visual impact of the exhaust stacks is still significant. In order to minimise the visibility of undesirable mechanical equipment, the Masterplan advocates that exhaust stacks should be clustered whenever possible and collectively screened within a series of simple forms.

Each building should have an organised and screened appearance for all rooftop equipment from prominent viewing angles, resulting in a collection of simple rooftop forms.
Colours and materials play a significant role in creating a cohesive image for the Urban Quarter, while lending distinctive identities to various parts of the District. A harmonious palette of colours and materials is developed from the existing Dublin context, the local climate, as well as the design guidelines established for the Grangegorman development. The use of special accent colours and materials is reserved for areas of specific articulation such as important structures, gateways and entries.

- The overall palette of appropriate colours and materials has been selected to respond to the site’s Dublin setting. The materials and colours are intended to look appealing and work well with the specific Irish climate and light. Materials are envisioned to be durable and have a good appearance over time, particularly in regard to the two significant conditions of Dublin’s weather—abundant wet, and limited sunlight, particularly during the winter months.

- Materials are also inspired by precedents of historical buildings in the city. The Georgian brick and stone buildings have kept their engaging appearance despite their age. Having similar materials for the Grangegorman Urban Quarter will link the new District into the urban fabric of the city.

- The Masterplan strives to balance individuality and harmony in terms of colours and materials. While the Masterplan seeks to provide flexibility to the different architects in future phases to design the buildings, it recognizes the importance of achieving an harmony and integrity for the entire Grangegorman Quarter. For example, different faculties within DIT as well as the HSE could have individual identities within an overall unified character.

Brick, Stone and other materials

Where brick is used, the buildings on the Grangegorman Urban Quarter will have exterior brick in warm, rich, ochre-like colours that best reflect the light. The selection and application of larger brick or stone panels may be considered. The use of intense red, grey and dark brick colours will be discouraged.

The major public, iconic buildings including those located in the two “hearts” (Upper Terrace and Arts Centre), Broadstone Gate, North Circular Route and other gateways may contain stone elements to provide a more substantial character. The stone material will be a gray-green stone similar to Irish marble. For example, the buildings entries can be distinguished with textured stone panels.

In addition to an overall primary palette of brick and stone, some secondary materials including metal and concrete panels may be considered for the building envelope, on a case-by-case basis.

Windows and Glazing

The windows will help to define the desired vertical and horizontal expression, and distinguish the solid and transparent areas of each building. At night, they will stand out as the visible and prominent features of the buildings.

Secondary Materials for Building Envelope

Other secondary materials may be considered for selected buildings. These will be reviewed and approved on a case-by-case basis, and will be subjected to the same quality control measures as the primary materials, in order to ensure the highest-possible standards.

- Glazed wall.
- Framed panel system.
- Stone cladding.
- Combination of brick and concrete.
- Architectural terra-cotta.
- Metal cladding.
- Point-fixed glazing.
- Pre-cast concrete panels.
Along the major urban path of St. Brendan’s Way, a strong sense of urban connection, vitality and lifestyle will be promoted, with prominent areas of ground-level glazing, arcades and canopies to activate the street edges for pedestrians. The exterior material for buildings along St. Brendan’s Way will have an overall lighter colour in order to maximise exposure to daylight.

The two hearts of the Quarter, Upper Terrace and Arts Centre / Student Hub and the special buildings surrounding them will be given the most significant colours and materials. The Arts Centre will have warmer, brighter and more intense colours to reflect their more public, friendly and informal character. Buildings at the Upper Terrace academic heart will have overall lighter and cooler colours to reflect their more elegant and formal status. Stone, metal and large expanses of glass are suggested as the predominant materials in these areas.

The courtyard and associated buildings within each Quad will have their own identity, based on the use and faculty accommodated. Individual entries and passageways within the courts can be more intensely coloured, symbolic of the vibrancy of the activity within, yet related to the overall palette of colours and materials for the buildings. The basic material is brick in an ochre colour but the openings and gateways will have accent colours, using the precedent of colourful doorways on Georgian buildings around the city. The portions of accent colours are limited to only the areas around openings and entryways.

The exterior materials for the buildings within the HSE zone will be characterised by a softer and warmer palette of colours that are appropriate for health-related facilities. In addition to enhancing an engaging and inviting atmosphere for the HSE, these warmer tones will help in the psychological healing and therapeutic processes of the users and clients of HSE.

The colour and material palette for the open spaces and buildings along the Serpentine Walk and North-South landscape fingers is developed in close response to the landscape design of these major “Green” areas within the Masterplan. The buildings in these areas will carry a textured material to provide a background complementary to the strong, distinctive landscape elements in these locations.

As a major focus of educational, healthcare and community life in North Dublin, the Grangegorman Urban Quarter will be distinguished by primary access points for pedestrian, vehicular and transit traffic at the periphery of the site. Several primary potential gateways provide entrances and serve the east, northwest and southwest edges of the District. Specific landscape and architectural strategies mark these gateways, enhancing their legibility to pedestrian and vehicular traffic, as well as the surrounding communities.
Sustainable Materials

The building materials for the future Grangegorman Quarter will be selected according to the highest sustainable standards, in order to protect local ecosystems, conserve natural resources and energy, reduce building operation costs, enhance asset value and profits, promote superior indoor air quality, foster increased occupant health and productivity, and ensure long-term serviceability for the buildings. Following are the key aspects of a sustainable strategy for materials:

High quality

• Select materials that have low life-cycle costs and require low maintenance, optimizing the concept of “reduce-reuse-recycle” to help create buildings that have long and useful lives.

High performance

• Select materials that respond to Dublin’s climate and natural context in a way that conserves resources and energy, and minimizes the emission of heat and pollutants.

Healthy

• Enhance indoor environmental air quality, including use of non-toxic, low volatile organic compound (VOC) materials for paints, carpets, adhesives, etc.; elimination of CFC’s, HCFC’s, and Halons; and permanent air monitoring systems.
• Implement an indoor air quality management plan during construction.

Environmentally responsible

• Select the use of recycled, recyclable materials and renewable resources whenever possible.
• Promote the use of healthy materials from local sources.
• Use woods for interior applications from certified sources.

Carefully processed

• Incorporate accepted sustainability standards in the manufacturing, transportation, fabrication and installation of the materials.
• Review materials for their use of non-renewable resources during their production, transport to the site and construction.
• Waste during the construction and operation of buildings should be reduced to a minimum and recycled.

Flexible

• Enhance adaptability and durability by adopting a flexible approach to building technology with the goal of ensuring 50- to 100-year buildings. Ensure that building detailing, systems and materials selections represent the very best building practices.
• Select materials that will accommodate low cost re-configuration in interior applications.
accessibility, security and safety

Accessibility

The Grangegorman Urban Quarter will be guided by the following principles regarding overall universal accessible design, site and building features:

• Maximise the ability of all potential users—particularly regarding issues of age, mobility, visually or hearing impaired—to enter the site, move around, enter the buildings and use the facilities.

• Design buildings to be logical, simple and obvious to use; to fit into and, where possible, improve surrounding movement networks; to link roads, footpaths and public spaces though and across the site.

• Ensure that building access is clearly and easily identifiable for visitors who may be unfamiliar with the area, and for persons of all abilities.

• Ensure that the movement network supports convenient, safe and appropriate travel, including good and safe principles with regard to the road and pathway design.

• Promote the use of cutting-edge technologies to achieve wayfinding strategies.

• Provide adequate access for emergency services.

• The proposed pedestrian paths throughout the Quarter will provide a good surface for wheelchair users, and roads will be free from kerbs to optimise access.

• Provide external sign-posting/way-finding elements that address the needs of persons with disabilities.

• Design internal way-finding to be effective, safe and efficient whilst minimising disorientation.

• Adopt best practice provisions regarding building and external spaces design (e.g. BS 8300:2001 or other standards/guidance).

• At all stages of the project, fulfil and exceed requirements stated in all relevant current and future regulations regarding accessibility, including up-to-date Accessibility Audits.

Security and Safety

A major goal of the Grangegorman Masterplan is to provide a safe environment at all times for students, clients, users, employees and visitors, by optimising the following measures:

• Ensure that the authorities and officers responsible for safety and security on the Grangegorman Urban Quarter are sensitive to the community.

• Strengthen existing cooperative relationships with the local police and fire protection personnel, public transport personnel, etc...

• Assist local authorities with public safety programs and public emergency response services at and near Grangegorman facilities.

• Implement strategies for optimising passive observation, openness and clear lines of vision, including the adoption of good urban design solutions and the use of CCTV cameras.

• Provide adequate security methods, including exterior lighting, particularly in parking and recreational areas, in order to enhance a safe environment on all Grangegorman sites. These security methods should be designed in a manner which is sensitive to the surrounding communities.

• Support local efforts to increase fire and security protection, especially in communities that may have a high incidence of crime.

Anti-social behaviour

• Implement all appropriate measures regarding police protection, DIT/HSE administrative policy, community involvement and other regulations in order to discourage and reduce all forms of anti-social behaviour as much as possible—including behaviour associated with drug abuse and the excessive consumption of alcoholic beverages.

• To ensure safety and security for all pedestrians, provide sufficient street lighting throughout the District and surrounding streets.

• Provide special anti-graffiti coating on ground and wall surfaces in the pedestrian paths and gathering areas. Should graffiti occur anywhere, remove it as soon as possible to optimise ease of removal and to discourage “copycat” graffiti.

• Select sturdy materials in areas of high pedestrian traffic.

• Provide one or more designated skateboarding area(s) or park(s) within the site on an artificial surface, in order to minimise damage and accidents from skateboarding.

• Implement “smart” design solutions in the hardscape and landscape areas as appropriate to prevent and discourage skateboarding, including the following: Use natural stone for surface materials and street furniture to create irregular surfaces, rounding off the edges of street furniture and kerbs, etc...
conservation overview: new uses for protected structures

The Masterplan has been developed with ongoing architectural and conservation input to the overall vision, layout and use strategy in addition to more focused and specific input on the significant protected buildings and structures. Thus, for example, St. Brendan’s Way can be read as a new extension to the important early 19th-century spine of the City which ran from Dublin Castle on the south of the River, through Grattan Bridge (the eastern most river crossing at this time) along Capel Street to Bolton Street/Dorset Street and, leading off this into Henrietta Street—the street of mini-palaces home to the political and financial elite of the period—culminating at Gandon’s King’s Inns. This new extension will connect this historic spine with Broadstone and run east-west through the Grangegorman lands to a possible connection at Prussia Street, integrating many of the important protected buildings along its route.

At the outset of the Masterplan preparation and following site visits and review of previously prepared reports, a number of conservation objectives were developed to provide the following Conservation Strategy for the Masterplan:

• To establish and articulate the protected, social, urban and architectural values of Grangegorman and to ensure these are suitably incorporated within the overall Masterplan. As such, it is important to understand the historic significance of the site from the earliest development of the city and its environs, through to its more known and recent history of institution.

• To integrate the protected structures of significance within the Masterplan in a manner which ensures that they contribute to the generation of spaces and places—both in terms of physical layout and character.

• To identify uses for the protected buildings which are compatible with their spatial layout, which will ensure full and useful occupancy and which will allow this important heritage to make a dynamic contribution to the cultural and functional character of this evolving urban quarter.

• To identify opportunities where history—in built and memory form—can influence the Masterplan in a way which enhances sense of place and, in so doing, enables distinctiveness of place and identity.

• To establish strategies for repair, intervention, adaptation and extension to the protected structures. These will include general and specific strategies and will also include approaches and objectives for upgrading of historic structures for increased thermal efficiency and other initiatives to achieve the Masterplan Brief objectives for greater energy efficiency and sustainable development.

• To ensure that the integration of historic / protected and new built form and landscape achieves an overall coherence and integrity both at the level of the Masterplan and the individual buildings.
1. Connolly Norman House (St. Dympna’s)
   This two-story house was built in 1905 as the home of the Director of the hospital. Like all buildings to remain on the site it is listed on the Record of Protected Structures (RPS) of the Dublin City Council. The building will be converted to function as a small administrative space for the mental health program of the HSE.

2. The Male Ward (Top House)
   This three-story structure was built in 1870 as the male wards of the Richmond Lunatic Asylum. It will be incorporated as a portion of the DIT Library.

3. The Laundry Building
   Single story structure built in 1895. It will be converted into offices for the HSE and a Day Facility for the residents on the HSE site and elderly members of the surrounding community.

4. The Mortuary
   Single-story building built in 1900. It will be converted into administrative offices for either the GDA or DIT and may function as a Visitor Orientation Centre.

5. The Female House
   Built in 1870 to house the female population of the hospital. It is proposed that it will house portions of the Student Services for DIT and help form a hub of student services and activities.

6. The Male Infirmary
   The Male Infirmary was built in 1850. The proposed use is a multi-faith place of worship.

7. Roman Catholic Church
   The existing Roman Catholic Church will remain as a Catholic Church.

8. The Female Infirmary
   Built in 1850. It is proposed that it will be converted into a DIT bookstore and café.

9. Church of Ireland Chapel
   This building was constructed in 1860. It has been unused and was de-consecrated in the 1990’s. This single volume space is planned to be used as a gallery or exhibition space.

10. The Richmond Penitentiary (Clock Tower building)
    Built in 1814 and is one of the oldest buildings on the site. The building is scheduled to be used as faculty and teaching space for DIT, probably for the Faculty of the Built Environment.

11. The Richmond Lunatic Asylum (Lower House)
    Three-story structure built in 1810. It will be restored and converted into a space that could serve a variety of research or office uses including perhaps a portion of the Science and Industry Centre.
Conservation general guidelines

The following guidelines are general and will apply to both new build and existing building projects within the Grangegorman site.

Use

Within the Masterplan there is a general objective to encourage uses which promote public access to protected structures. Uses should also be considered in terms of their impact on the protected structure. Some uses will require significant alteration of plan form, or demanding services and infrastructure installation which involve considerable intervention and which may result in considerable loss of architectural significance.

A well accepted principle of conservation is that the original use is the most appropriate use. This may not always be possible and new uses, if appropriate, can add value to a protected structure. Thus, uses which are complimentary and can energise the historic structure, should be favoured over inappropriate uses which can destroy the particular qualities which make a building important.

Setting

The new development will significantly alter the existing setting of the protected structures. New buildings, additions and public realm/landscaping works should be planned and designed in such a way as to enhance the architectural and spatial quality of the setting of the protected structure. This should include views to and from the protected structures at ground and upper floor levels. In the siting of new buildings and the design of additions, the changes to natural light, sun, shade, wind and any other micro-climate conditions should be such as to avoid any negative impact on the qualities, character and fabric of the protected structures, both externally and internally.

Interventions and Additions

There is considerable guidance policy available on this aspect, in particular the DoEHGL Architectural Heritage Protection Guidelines for Planning Authorities which is now a statutory guidance document. However, the following points are particularly relevant to the likely projects to be carried out within the Grangegorman Masterplan area.

Informed intervention: Successful interventions and additions arise from a good understanding of a structure and the aspects which make it significant. This requires up front research, analysis and the ability to interpret. It is recommended that a well informed approach be taken in preparing design proposals for alterations, interventions and additions. It is also recommended that either the lead architect is experienced and skilled in conservation and adaptation of historic buildings or that such expertise is embedded in the design process from the outset to completion. A considerable amount of research has already been carried out on this site and Design Teams should be given copies of the available documentation, existing buildings surveys and historic drawings, illustrations and photographs as part of the project briefing documentation.

Scale: In developing proposals for additions to the protected structures, these should address the particular scale of the existing building. This does not necessarily mean that the additions/extension should be similar in scale to the existing buildings, but that there should be a coherent relationship between the form, massing and proportion of the existing building and any additions.

Plan Form: The original plan form and physical envelope of the existing protected structure should be legible following any intervention.

Retention of original/historic fabric: Interventions should, so far as is practicable retain as much original/historic fabric as possible and where fabric is to be removed it should be re-used on site or, where this is not feasible, an appropriate reuse elsewhere should be identified. Designs and planning applications should demonstrate how impact on the historic fabric will be minimised.

Junctions between new and old: New extensions and additions should engage with the historic buildings. Junctions between new and old should relate to primary architectural features of the historic buildings.

New basements adjacent to existing buildings: A number of basements are proposed under the new development. Where these may be close to, or abutting, existing buildings and structures, these require to be back/related in a manner which does not comprise the structural integrity and weathering of the protected structures and any design proposals/planning application should include sufficient details to show how this will be achieved.

Sustainability objectives

It has been stated that the most sustainable building is the already existing building, due primarily to its embodied energy. Value needs to be taken into account in any sustainability audits for new developments which include existing buildings. The cultural heritage value – collective memory, associations, etc – also contribute to the social sustainability of place and needs to be included in any sustainability assessments.

Appropriate initiatives to improve the energy efficiency of existing buildings should be implemented. The approaches to upgrading will depend on the condition and significance of the internal and external fabric, however there are many ways in which energy efficiency can be achieved without compromising the architectural heritage value. It is important that compatible materials and techniques are used, for example hygroscopic insulants where upgrading, breathable external walls. As the historic buildings will form part of a larger development, centralised energy centres, e.g., district heating systems using renewable energy sources, could also serve existing buildings and thus minimise impacts on historic buildings. There are a number of emerging guidance documents addressing the appropriate adaptation and treatment of historic buildings to reduce carbon emissions and dependence on non-renewable energy sources. Designers and specifiers should seek advice from the DoEHGL Architectural Heritage Advisory Unit on the appropriateness of such guidance and have due regard accordingly.

Monitoring and Maintenance

Maintenance plans should be provided for all protected structures as part of planning applications. This should include provision for monitoring condition both in advance of any refurbishment/redevelopment works and during the ongoing lifetime of the building. Where current building condition is causing deterioration of structure and fabric, appropriate protection measures, temporary or permanent, should be put in place subject to necessary approval by agreement with the planning authority (for example by way of Section 5 Declaration of Exemption).

Principles for removal, or partial removal of existing buildings and structures

All structures should be fully recorded in photographic and drawing format prior to demolition/partial demolition. Copies of these records should be lodged with GDA, Dublin City Archives and with the Irish Architectural Archive. Proposals and methodologies for dismantling and reuse of sound elements should be submitted as part of planning applications.

Planning submission requirements for existing buildings

Where significant intervention, alteration and/or addition is proposed, there should be a sufficient level of detail submitted with any planning application to allow a full assessment of the proposals. In addition to the proposal drawings, the information to be submitted should clearly show the existing situation and demonstrate – in drawing and text form, the rationale behind the proposal and how any new works relate to and are informed by the existing architecture. This rationale should also include outline material specification and outline scope of works.

Building Repairs

While the adaptation of the buildings to be retained will require intervention and alteration to meet specific use requirements, a considerable portion of the works involved will require repairs to historic structure and fabric. This work should be carried out in line with the following principles for the repair of historic structures.

The works shall have due regard to the Department of Environment, Heritage and Local Government Conservation Guidelines and current conservation principles and techniques.

The extent and scale of works to the buildings will be carried out in a manner sympathetic to the intrinsic quality and architectural significance of the structure.

Retain and repair authentic architectural structure and fabric. Respect for the existing integrity of the building should be a priority, and works should always be carried out with full reference to historical authenticity.

All existing fabric which is sound is to be protected. Generally a minimum interventionist approach should be taken with an emphasis on repair, with replacement only of decayed or missing parts, rather than outright replacement.

Repairs and alterations shall be carried out without attempt to disguise or artificially age, but shall also be carried out so that they are sympathetic with the architectural and aesthetic integrity of the building, or building element.

All existing features and decorative work to be retained will be protected during the works. Any addition, whether reconstruction or repair, is to be implemented in a manner which will not damage existing fabric or features, and will not obtrude existing authentic work. In as far as possible, repairs should take place in situ.

Materials used for repairs should be compatible with and, in as far as is possible, match the historic materials. Work to be carried out using traditional or appropriate methods and natural materials. The aim is to use natural and traditional materials in preference to synthetic materials which will, in general, be avoided.

Salvage materials shall only be used where of proven provenance and will only be used in a manner that will not confuse the understanding or appreciation of the historic structure. As a general principle it will be the intention to salvage and re-use all sound material arising from modifications or removal, where feasible and appropriate.

Loose debris/rubbish resultant from the works will be removed from the building and disposed of in accordance with waste management disposal requirements of the Local Authority. This operation should be supervised to ensure no important building fabric is removed.

Reversibility or substantial reversibility shall be a guiding principle to repair, alterations and additions to protected structures. As genuine reversibility cannot always be appropriately applied it should not be used to justify inappropriate interventions in these instances.
masterplan principles

existing historical wall

- high walls
- high walls with metal fences
- low walls
- low walls with metal fences
- walls with metal fences and brick/stone piers

entrances

blocked-up entrances/arches

grangegorman an urban quarter with an open future
executive summary
adaptive re-use of historical wall

new opening locations

modified walls

masterplan principles

grangegorman an urban quarter with an open future

executive summary
Because of the private and singular use as a hospital over a long period of time, the Grangegorman site stands out with its extensive and mature landscape and green spaces. The site remains one of the last large-scale landscaped areas within the urban fabric of Dublin.

The Masterplan maintains as much of the existing landscape characteristics as possible by leaving the existing fields to the south relatively untouched and by altering the building footprints where possible to save existing healthy and mature trees and landscaping. As with the existing protected structures that will remain on the site, the existing landscaping makes the site unique and creates a bridge to the past.

The new landscape concepts for the site can be organised into the broad categories noted in the diagrams to the left. (These concepts are explained in greater detail within the Masterplan Details section of this document.) In addition to creating new and unique spaces within the Masterplan, the landscape concepts help connect the historic site into the urban fabric of the city as well as connect the landscape path from the Royal Canal and Mountjoy area in the north with Phoenix park to the west—creating a linked park-like pathway through the urban density of the city.
The development of the Grangegorman Quarter is based on the international best practices of environmental sustainability. Early, sustainable masterplanning decisions will be augmented by the requisite governmental requirements and best practices and decisions of the designers of the individual buildings.

At the masterplanning level, buildings have been located and oriented to take advantage of natural daylight, reducing the need for artificial light. Building widths vary but narrow widths have been chosen wherever possible to further ensure the penetration of natural light into the interior spaces. Courtyards generally open to the south to prevent the overshadowing of exterior landscaped space by buildings. The buildings have been located densely on the northern portion of the site, allowing the existing open space to the south to remain a naturally landscaped space. The open playfields have been linked to a more regional chain of open spaces allowing people and wildlife to find a natural system of pathways through the urban density of the city.

One of the major goals of the environmental sustainability strategy is to minimise energy demand and carbon emissions by creating an energy plan that allows the Grangegorman development to become a zero carbon development by 2050. Therefore the energy plan for the Grangegorman development prepares for an eventual 100% renewable energy supply.

The basis of the initial energy plan is subdivided into two components: a site wide energy plant as well as an individual renewable energy plant for each building block. All heating, and a portion of the electricity, will be generated from a centralised combined heat and power (CHP) plant using biofuels and distributed to individual buildings. The individual buildings will provide hot water from hot water solar collectors located on the roofs of each building.

Additional energy producing and energy saving principles, standards and requirements have been introduced through this narrative. But while technology dependent concepts such as power generation from biofuel use and high visibility strategies such as wind turbines and photovoltaics have been considered for the plan, there are also other important energy and water saving principles that are based in sensible and sensitive early planning in the Masterplan.

There are also environmental sustainability principles that relate to the quality of life the building inhabitants and neighbors should enjoy, such as indoor air quality, view corridors, noise reduction, pollution reduction, traffic reduction, and conservation of natural and cultural heritage resources. Some of these issues have been addressed in detail throughout the Grangegorman Masterplan and Masterplan Design Guidelines and the remainder have been detailed within this section. In addition to the energy supply goal, several key environmental sustainability principles have been developed for the project at the masterplanning stage.
sensible urban density and linking natural pathways

The 73 acres site has been walled off from the city since the nineteenth century and is one of the largest undisrupted pieces of land in Dublin. It was important to maintain the existing healthy landscape elements, especially the large open fields to the south of the site by planning most of the new construction to the north of the site and creating an urban but sensibly dense design.

The River Liffey, Phoenix Park and the Canal are all important natural resources for the city. Linking these currently unconnected landscape pathways with the new Grangegorman Quarter strengthens the entire infrastructure, providing landscaped pathways for pedestrians and wildlife through the dense urban fabric of Dublin.

natural daylight, ventilation and wind protection

The design of the building footprints, heights and layouts have been developed to allow maximum daylight to enter buildings, minimise overshadowing of each other and of landscaped areas and to minimise excessive wind.

preservation of existing natural and cultural heritage

There are currently twelve buildings on the site that have been listed on the Dublin Record of Protected Structures. The re-use and re-purposing of all but one of these existing buildings not only conserves the embodied energy used in their initial construction and saves the energy that would be used to replace them, but helps create a connection to the past history of the site. Wildlife habitats and existing mature healthy landscaping have been studied and steps undertaken for conservation.

transportation strategies

The Masterplan design encourages pedestrian movement over vehicular use. The concept prevents the general public from traversing the site in automobiles and allowing other vehicles to enter the quarter only via a “shared surface” pavement where vehicles are subservient to pedestrians. The design has been oriented to promote strong connections to public transportation such as existing bus routes and the proposed LUAS line at the Broadstone Gate.

water management

Water retention strategies such as swales and holding ponds have been designed to reduce runoff into the city system. This runoff has been incorporated into landscape features such as the water rill located in front of the Sports Centre. In addition, permeable surfaces have been incorporated in the outdoor public areas to allow water to return naturally to the aquifer below.

Renewable, long-lasting and environmentally safe building materials

The Masterplan encourages the use of recycled and renewable building materials through the various energy efficiency and environmental sustainability standards that it is under the authority of. Using renewable construction materials prevents pollution and waste generation, creates new recycling industries and reduces landfill disposal and expansion. Using low VOC paints, formaldehyde free adhesives, and other safer building materials creates high indoor air quality and promotes greater health and efficiency for the occupants.

energy efficiency and sustainability standards

Each individual building shall achieve a Building Energy Rating (BER) of at least A3 based on 2008 asset rating system, which corresponds to an Energy Performance Coefficient (EPC) of not greater than 0.50 compared to 2008 Building Regulations. This BER shall be calculated using a permitted Irish National calculation methodology for Commercial buildings, being NEAP/iSBEM, or approved Building Simulation software.
what is SPeAR?

Arup Consulting Engineers (Arup) were commissioned by the Grangegorman Development Agency to undertake a sustainability appraisal for the development at Grangegorman.

The sustainability of the development proposals was appraised using the Sustainable Project Appraisal Routine (SPeAR®) framework developed by Arup. SPeAR® allows the sustainability of a plan, project or product to be appraised and illustrated graphically. This assessment allows optimisation of the key elements of sustainability; environmental, social, economic and natural resource use.

The objectives of applying SPeAR® to the development proposals are to:

- Provide an evaluation of the sustainability of the development proposals to demonstrate their sustainability credentials;
- Assist in the decision-making process by assessing the strengths and weaknesses of the proposals, and highlighting opportunities to improve performance during design, construction and operation.

The results of the appraisal are outlined in the diagram on the next page. The SPeAR diagram is ‘read’ like a dartboard; the closer an indicator segment is to the centre the better. Red suggests weaknesses in terms of sustainable performance, orange outlines compliance with standards, while the greens reflect strengths in performance.

Behind the diagram is a series of detailed worksheets, with over 120 sub-indicators of social, economic, natural resource and environmental performance. Information shown on the SPeAR diagram is a direct reflection of the quality of information available at the time of data collection, which is used to complete worksheets.

Future Opportunities

- A Code of Construction Practice should be specified to manage potential air quality impacts during the construction phase.
- Ensure transport associated with the development continues to be addressed to minimise potential impacts on local air quality.

Commitment should be given to initiatives outlined in the Mobility Management Plan.

To ensure that the appraisal is robust the status of all indicators is achieved by consensus with the professional team. This approach means that the findings of the appraisal are the result of consideration of all factors in deciding the ranking allocated to each indicator. The four sectors of SPeAR are not weighted.

Appraisal Results

The following section sets out the key strengths which emerged from the appraisal and some of the future opportunities to continue to improve the sustainability performance of the proposals.

The sustainability appraisal of the development proposals was based on the information available for the current masterplanning stage, August 2008. It should be recognised that the SPeAR assessment is a live document that can be updated at future stages of Masterplan development, and facilitates tracking of improvements in sustainability performance as the scheme progresses.

Environmental: Key Strengths

- Reuse of a brownfield city centre site which is designated for redevelopment.
- Development of a new urban quarter that will include a diverse mix of uses.
- Intention that the development minimises energy demand and carbon emissions and can become a zero carbon development by 2050.
- Mobility Management Plan anticipated for implementation.
- Implementation of SUDS (Sustainable Drainage System) e.g. rainwater harvesting, green roofs.
- The implementation of SUDS will enhance and augment existing habitats.
- There is potential to create new feeding routes for wildlife and enhance local microclimate along green fingers of open space.
- Masterplan proposals include comprehensive landscape plan.
- Conservation strategy describes principles and guidelines for repairing, reuse, intervention and adaptation of buildings.
- Flexibility built into design and Masterplan so as to ensure long-term viability of buildings and the site.
- Sustainability technology options outlined in energy strategy.
- Aspiration that buildings will have a reasonable building lifetime.
- Aspirational plan to develop Environmental Management System (EMS) to ISO14001 standard.
- Limited number of car parking spaces to be provided.

Social: Key Strengths

- A consultation strategy has been established by GDA for the development of the site and prior to the GDA being set up, DIT had carried out consultation since 2002.
- Intention to manifest the history of the current site and DIT’s history.
- Continued work of DIT’s Community Links Programme with an increased focus on the Dublin 7 area.
- HSE will cater for current and future health and social care needs of the local population and for the clients of the mental health facility currently on site.
- Community will have managed access to sporting facilities provided by DIT.
- The development will provide a leisure facility which will be open to the wider community.
- DIT’s facilities and services will be consolidated in one location.
- Improved connectivity of the site with the surrounding area.
- Strong emphasis on pedestrian and cycle networks.
Future Opportunities

- Continue to actively consult with key stakeholders during the detailed planning stages and construction phase.
- Develop Purchasing Policy for the development dealing with the use of locally and sustainably sourced materials. Consider inclusion of targets for ethical and fair trading.
- Ensure that an access strategy is implemented to manage community access to sporting facilities.
- The detailed design phase should commit to designing play areas in line with the National Play Policy, Ready Steady Play.
- DIT and HSE should continue their close liaison to ensure that their individual communities integrate as planned on site.
- Ensure that the objectives of the Mobility Management Plan are implemented.
- Ensure appropriate access for physically impaired people is incorporated into the detailed design phase and exceeds beyond legal compliance.
- The consultation strategy for the construction and operational phase should be reviewed and adapted annually to reflect any changing needs of stakeholders.
- Daylight studies should be undertaken at detailed design phase to ensure that all units and living spaces proposed have an acceptable standard of daylight.
- Continue to consult internally with DIT and HSE regarding the detailed design phase as future occupiers of the site.
- The main contractor will be required to demonstrate strong Health and Safety management credentials.
- Healthy living should be promoted by DIT & HSE in various forms from healthy meal options to raising awareness of health problems.

Economic

- Commitment to an Environmental Management System will ensure that water monitoring of the operation phase is undertaken.
- The following measures could be implemented which will help reduce water consumption:
  - Spray Water Taps:
  - Dual Flush WCs
  - Water Metering
  - Water Mains Leak Detection
- A Waste Management Plan should be produced for the construction phase of the development. This should meet the requirements of the DoEHLG Best Practice Guidelines on the Preparation of Waste Management Plans for Construction & Demolition Projects.
- A study should be undertaken to quantify an appropriate size for the compostor proposed on site to ensure it adequately meets the requirements for the quantity of compostable waste produced by both DIT and HSE.
- The detailed design phase should ensure ongoing design development which considers designing out waste.
- A strategy should be undertaken to develop waste management policies and procedures for the operation of the development.
- A disposal strategy for DIT and HSE’s existing equipment should be considered.
- Opportunities for electricity generation using solar photovoltaic cells and wind turbines are to be explored.

Natural Resources

- Series of initiatives proposed for responsible use of materials.
- Design will employ Sustainable Drainage Systems (SUDS) in the design and operation of the new quarter.
- Overall aim of the development is minimise energy demand and carbon emissions and can become zero carbon by 2050.
- Energy strategy is aspirational but explores some effective techniques for ensuring energy efficiency of the new development.
- Centralised CHP Plant together with solar heating which is proposed for heating and hot water.
- A feasibility study is underway on the potential of geothermal heat sources.
- Healthy living should be promoted by DIT & HSE in various forms from healthy meal options to raising awareness of health problems.

Future Opportunities

- Detailed design phase should commit to all initiatives relating to use of materials as outlined in the Masterplan.
- Material specification for the development could incorporate the requirements of BREEAM or LEED.
- There should be a focus on the use of locally sourced and/or renewable materials with low environmental impact where possible.
public art

It is important for the future Grangegorman Urban Quarter to include high-quality public art elements that can help to reinforce a connection with the soul, spirit and culture of the place.

Public art can also help to provide wayfinding and landmarks for users, as well as create an identity for courtyards, gateways and other significant spaces and buildings within the overall District. The range of public art can include the following:

- Individual art pieces and sculptures
- Sculpture garden
- Art walk
- Temporary installations
- Art work involving lighting
- Digital arts and film
- Live art

Guidelines:

- Promote contemporary and experimental art.
- Be international.
- Be culturally diverse.
- Reflect the history of the site, DIT and the surrounding community.
- Promote inclusiveness and participation.
- Reflect a balance of disciplines and art forms.

Implementation Strategy:

- The review, funding, selection and commissioning process of public art work or artist will follow the provisions given in the most current “Per Cent for Art Scheme” program or any other relevant public art program being implemented at that time.
- DIT Students, Graduates and local community artists will be considered and given an opportunity to propose works for the site.
- The Masterplan Design Team will be available for the review and selection process of any artwork and artist connected to the Grangegorman Urban Quarter.
- The existing tunnel under Lower Grangegorman is proposed to be a future “gallery passage” hosting permanent and/or temporary exhibitions on various topics including the history of the Grangegorman site, DIT or HSE.
The quality and intensity of light, as well as the rhythm and pattern created by the placement of fixtures, will contribute to the overall aesthetic character and sense of unity and identity for the Grangegorman Urban Quarter. In daylight, the appearance of the fixtures themselves will have an aesthetic impact as part of the overall public realm. Therefore, lighting levels and fixtures must be carefully designed and selected. The overall lighting strategy will be defined by the following hierarchy of four lighting types:

- **Major Pedestrian Path**
  As the major pedestrian route, St. Brendan’s Way will have strong, glowing lighting as a continuous feature. Elements of featured lighting and flood lighting can be used along its entire length.

- **Plaza**
  The two “hearts” of the project—Upper Terrace and Arts Centre / Student Hub—will be distinguished by the brightest and most intense lighting, as appropriate for these large open public plazas. These major spaces can also be enhanced by featured lighting and flood lighting.

- **Courtyard**
  Each of the various courtyards and other open spaces will require focused lighting. This can be achieved in a more flexible, specific and articulated manner, in order to create a special ambience for each space.

- **Secondary Pedestrian Path**
  Secondary pedestrian routes such as the “Green Fingers” and other connecting paths will require adequate lighting for safety, but no strong pattern of lights is desired.

In addition, the lighting of the new development will strive to deliver the following key objectives:

- To the greatest extent possible, the power for all lighting fixtures will be supplied by sustainable means such as photovoltaic panels.

- Create a District that is lively and well used both day and night.

- Provide a safe, secure and accessible environment for pedestrians and other users.

- Avoid disruptive glare and spill-over lighting to sensitive residential areas.

- In appropriate locations, LED lighting will be used to offer distinctive effects as part of an energy efficient lighting strategy.

- The lighting design will be closely integrated with the design of the landscape and urban spaces to create a clear and legible hierarchy of light levels and effects.

- The covered canopies and rain protection elements will form an important element of the lighting strategy. They will be well-lit to create a strong definition to the edges of the spaces as well as a means of orientation for users.

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**Executive Summary**

**Site Lighting**

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**Masterplan Principles**

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**Grangegorman**

**An Urban Quarter with an Open Future**
identity, graphics, and wayfinding

Grangegorman Identity

The joining of DIT and HSE, two distinct identities with complementary yet diverse functions, in one location should be seen as a unique opportunity for making Grangegorman a memorable place. The identity for Grangegorman needs to be defined and communicated in a visually coherent way. This includes gateways and entrances; environmental and wayfinding graphics such as street signs, maps, directories, and information kiosks; exterior and interior building signage; as well as print and online/interactive media. The approach for Grangegorman’s visual identity is to celebrate the importance of this historic site while embracing new technologies and media. Traditional and permanent signage along the major public pathways contrasts with signage and wayfinding that embraces new technologies and electronic media throughout the quadrangles to reflect the innovative spirit of the place.

Historical Timeline and Memory

Along St. Brendan’s Way, a historical timeline gives visitors and students a sense of the importance of the history of the site and the place. The timeline acts as an interactive journey where old and new are celebrated. Irish language, culture, and public artwork could also be incorporated along the path. The timeline also acts as identification of important buildings on the Record of Protected Structures and shows the location of buildings that were removed or renovated, with their original uses.

Information Nodes

Creating the Masterplan for the new Grangegorman Urban Quarter provides the opportunity to plan and design for the multitude of inevitable streetscape receptacles, devices and clutter used by people in their everyday lives, and organise and locate these items in a clear, coherent and rational way. Litter and recycle receptacles, campus maps, post boxes, information kiosks, shuttle or bus stops, public notice display areas, and newspaper boxes are all some of the items pedestrians come in contact with, usually in a haphazard way, everyday. Pre-planning the organization and location of these and other items throughout the Quarter provides the opportunity not only to create a clean and clear streetscape but also provide small landmark structures or nodes at key points within the Quarter creating helpful way-finding devices. The shelters would provide some of the daily services required by the pedestrian traversing the Quarter. Creating a type of “one-stop” shop for these types of services at rational and intuitive locations throughout the Quarter would create efficiencies in litter and mail pick-up, newspaper and public notice posting, etc. as well as visually enhance the pedestrian experience and add to the cohesive design of the Quarter as a whole.

Digital Technology

Grangegorman could showcase new advances and techniques in digital technology. Digital signage has the advantage of being adaptable, to change and update information quickly. Digital signage can improve safety and be more sustainable in terms of resources such as having to reprint signage. It can have an interactive quality that traditional signage cannot and it can express that Grangegorman is a new vibrant quarter. The deftly combined use of the permanence that traditional signage can express (carved in stone / cast in metal) and the quickly changing and ephemeral qualities of digital technology can help express the quality of Grangegorman as a place linked to the past and looking toward the future.
rain protection

The major pedestrian paths—particularly the east-west connection (St. Brendan’s Way) and the north-south link from North Circular Road to the Fields—are enhanced by a variety of climate-protection elements. These elements are closely integrated into either the fabric/design of the buildings themselves, or the proposed landscape spaces, as follows:

• The sheltering elements are placed at strategic locations along these routes to define an “implied path” for pedestrians, while also providing climate protection as arcades or covered passageways.

• At certain key locations, including the Main Library and the Art Centre / Student Hub, these elements would create semi-acclimatised outdoor spaces that are attached to prominent buildings. These “outdoor rooms” would serve as active, animated social spaces that encourage and invite interaction by pedestrians.

• Prominent arcades around these designated spaces will help to integrate adjacent buildings, visually connecting one building to another. Moreover, the consistent expression of arcades and canopies throughout the development fosters cohesiveness and strengthens the Quarter’s image.

• The arcades and canopies along the edges of the Serpentine Walk, the Arts Centre / Student Hub and Broadstone Gate also enliven the row of retail shops at the ground floor.

• At other locations, climate-protection elements would form arcades and canopies in a contemporary interpretation.

• Tree canopies are also used as sheltering features, to reduce the amount of rainwater in various places along the pedestrian paths.

• In terms of materials, glazed canopies and light structures are proposed to achieve a cohesive architectural language and to allow sunlight to filter through to the pedestrian spaces below.


**transportation elements**

**Pedestrian and bicycling networks**

The Masterplan is designed with a dense and attractive pedestrian and cycle network. This is considered to be one of the most important principles, as it will enable the necessary conditions to encourage high levels of pedestrian and cycle journeys to and from the site and the desired quality of the public realm that will ensure its attractiveness and therefore, will contribute towards longer dwell times, hence minimising the impact of peak travel.

**Permeability**

In order to achieve the maximum integration with the existing urban grid surrounding the site, as well as the best possible access to the public transport networks, the site will be designed to provide the best possible permeability across its boundaries. The pedestrian network plan to the left depicts the proposed internal pedestrian network and its linkages with the wider urban grid. The walk distances are significantly optimised, resulting in a walking catchment diagram which is closer to an “as-the-crow-flies” catchment.

**Bicycle parking**

Generous provision of cycle parking will be provided in the Masterplan. Secure parking associated with underground car parking to be used by users that require longer periods of parking is provided. This element of cycle parking will be associated with facilities such as showers and lockers, as appropriate. On-street “banks” of cycle parking, possibly covered, located in visible locations near the highest attractors of trips (Library, Faculties, and Sports), and dispersed clusters (4 to 20 spaces) of on-street cycle parking, to maximise access to all buildings and facilities is planned for. These are located in the vicinity of the main building entrances and visible from the main pedestrian thoroughfares.

**Road hierarchy**

The development will have an internal network of links serving different functions, with different character and typology. Certain sections of the network will have limited access for vehicles but there will not be links within the internal network that will be primarily vehicular.

The Primary Road Link is the existing Grangegorman Road, which bisects the site. Grangegorman Road will be the only available through-route for external traffic and it will be traffic-calmed by means of a shared surface section opposite the clock tower building and the intersection with St. Brendan’s Way.

Secondary Links through the site include Ivy Avenue, the access to the car park and set-down areas from Constitution Hill at Broadstone Gate, as well as servicing and maintenance roads along the periphery of the site and along the Ha-Ha. These Secondary Links are for limited traffic mainly related to servicing, maintenance, disabled access, and possibly taxi and ‘out-of-hours’ access. Limited on-street car parking can be accommodated on Ivy Avenue. The character of the Secondary Links is predominantly pedestrian space shared with occasional vehicular traffic. Generally the shared surfaces would be flush, but with clear delineation of carriageway space. Occasional variations to the horizontal alignment will be included to add to traffic calming effect.
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Tertiary Links through the site (in terms of vehicles) include St. Brendan’s Way and adjacent ‘driveable’ surfaces. These links are for limited traffic mainly related to servicing, maintenance, disabled access, and possibly taxi. Vehicular access to these links are to be limited to ‘out-of-hours’. Their character is predominantly pedestrian space shared with very limited vehicular traffic and flush shared surfaces, with minimal delineation of carriageway space.

Emergency access is provided in accordance with the appropriate regulations. The majority of the linear spaces, both streets and landscaped areas, are designed to accommodate occasional emergency movements, enabling the highest level of vehicular penetration.

Vehicular Traffic Calming

The movement network for the site is designed in a manner which prioritises pedestrians over motorised traffic. However, accessibility for cars, service vehicles, etc., will mean that, at a number of points within the site and times of the day, these will be in conflict with pedestrians. The inevitable conflict between pedestrians and vehicular traffic will be mitigated at key locations by traffic calming measures that may range from junction treatment to the overall design of the link. Traffic calming forms part of the masterplanning design, rather than being retro-fitted after construction.

Links throughout the development are designed in a way that will not preclude usage by all types of vehicles. However, a system of traffic cells has been designed to avoid the site being used by general city traffic. Traffic Cells prevent vehicles from travelling through and across an area to “shortcut” another route. The only exception will be Grangegorman Road, which is presently a through route for general traffic. This is the most effective measure to discourage unnecessary vehicular traffic through the site, whilst enabling suitable access to all locations.

Shared surfaces are effective elements of traffic calming, as they enable the re-balance of priority towards pedestrians along roads or across sections of roads. There are different levels of integration between pedestrian and vehicular movement within shared surfaces. These range from areas with no distinction between car and pedestrian spaces, to streets where car are kept separate from pedestrian-only spaces by means of physical barriers (generally bollards). A solution in between both of the above is the visual delineation of car-only space by means of different materials and/or colours, often using the drainage channels as a subtle physical delineation. The concept of a shared surface is that drivers will recognise that they are circulating through a pedestrian area with clear indication of the limits of their circulation space, and therefore will adopt lower speeds. The whole of St. Brendan’s Way is considered a shared surface, including the section where it crosses Grangegorman Road. The level of integration applied varies along its length, with the development’s two “hearts” being the most suitable to have the least segregation between the modes, perhaps with no clear demarcations at all. The remaining sections should include some type of visual delineation of the vehicular space, but built-to-purpose physical obstacles such as bollards should be avoided, so as to reinforce the “non-road” character of the space.

Vehicular Parking

The amount of car parking spaces takes into consideration the impact of car trips on the adjacent road network. Also, specific issues to be taken into account with regards to the quantum of parking are related to the variety of uses and times when the car parking may be required. For example,
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Provision needs to be made for usage of the site outside the normal working days, such as evenings and weekends, when the availability of public transport is lower. In addition, there is a need to avoid car parking overspill onto neighbouring residential areas, by not keeping car parking numbers within the site to an unsustainable minimum. Approximately 1,000 car parking spaces can be provided within the site. This quantity is purely indicative at this stage and will be heavily influenced by the physical capacity to be accommodated within the present Masterplan proposals.

The vast majority of car parking is accommodated underground, with direct access from the external road network and not via the campus itself. In addition, a number of on-street car parking spaces are provided at locations throughout the site. These will be additional to the residential car parking already provided along Grangegorman Road and Rathdown Road, and is intended to provide a convenience dimension to the car access strategy, and will be able to include part of the disabled car parking requirements.

Sustainable travel enabled by location and design

The site occupies one of the largest undeveloped sites within Dublin City Centre. Its location close to the city centre provides the passive conditions for the maximisation of sustainable travel patterns. The benefits are twofold: It provides density of uses, especially residential, within walking and cycling distance from Grangegorman. And it provides proximity to the most of the public transport network, which are concentrated in the city centre. This will enable the maximisation of the bus, LUAS and rail mode shares.

The Masterplan has been designed with a strong focus on pedestrian movements, which guarantees the conditions for walking trips to be encouraged. The design entails a number of restrictions to traffic movements, such as a system of traffic cells, which will contribute to the creation of excellent quality pedestrian and cycling environments throughout the Campus.

A limited quantum of car parking is to be provided within the Campus, as a further measure to guarantee the minimum impact of traffic on the internal public realm, as well as on the adjacent road network. A provision of 1,000 car parking spaces is seen as appropriate for a variety of uses ranging from primary health care to higher education, and including offices, retail and a primary school.

The internal roads where traffic is allowed for convenience purposes are designed to a standard that will discourage speeding and through-movements. Limited traffic and on-street car parking are considered as elements that, if correctly managed, will enhance the quality of some of the spaces throughout the Campus by adding to the activity mix at street level.

Provided with a dense network of pedestrian links, the district can be easily traversed in a 10 to 15 minute walk. Green boulevards dominate the internal circulation and are designed to allow articulated paths for both pedestrians and cyclists, which will provide quality circulation environments in all seasons.

The location of attractors and generators of walking journeys, as well as landmarks within the Campus has been considered so as to provide a coherent, legible and permeable movement pattern that will enable the desired maximum activity and quality of the public realm.

The Masterplan’s emphasis is therefore on the design of quality linkages from the site to the established city grid, in addition to the high quality public realm within the site.
Proposed public transport infrastructure

**Transport 21**

There are various different transport proposals planned in Transport 21 that will improve access to the site as shown in the accompanying diagramme to the left. Within the local vicinity of the site, Metro North and the Luas Line D will directly improve rail services providing high capacity public links to the site. Following is a brief outline of the Transport 21 Strategy infrastructure proposals:

**Metro**

Metro North will connect the town of Swords to Dublin City Centre (St. Stephen’s Green) via Dublin Airport as shown in the map on page E-4. This major piece of transport infrastructure is due to be complete in 2013. Metro North will operate underground, surface and elevated tracks with 15 stops available between City Centre and the Airport, including two (Parnell Square and Mater) that are located within reasonable walking distance (approx. 1.4km and 2km, respectively) from the site. Assuming pedestrian connectivity from Constitution Hill and an access on North Circular Road, it is predicted that the site can be reached on foot in 14 minutes from Parnell Square station and 19 minutes from the Mater station.

**Luas**

**Line BX**

This line extension provides connection between the two existing Luas lines, thereby enhancing the connectivity to the City Centre for citywide commuters. A Railway Order submission for line BX is planned in 2009, according to the RPA.

**Line D**

This extension of line BX towards Liffey Junction via Broadstone is still in design stage. This Line will directly serve Grangegorman and is considered to be the single most important public transport infrastructure to serve the site in the future. The improved connectivity of the site brought about by a Luas stations in its immediate vicinity will enable a substantial share of trips to be accommodated by the Luas. This line is expected to have two stations within the immediate catchment of the Grangegorman Campus: one adjacent to the Broadstone building; and another further north, either at the northern side of the present Bus Eireann depot, or in the vicinity of North Circular Road. Both, but especially the former, will provide the development with an excellent level of accessibility by Luas.

**Luas Green Line and Red Line extensions**

The extensions of the Green and Red lines to Bray (the line to Cherrywood is currently under construction) and Saggart will significantly increase that catchments that will avail of a direct connection to the city centre, and with line D, to Grangegorman itself.

**Line F**

Luas line F connects the City Centre and Lucan providing an alternative rail access into the City Centre from the western suburbs. It has to be noted that this line will provide a connection to line BX and D, as well as to Metro West. This project is scheduled for completion in 2013.
**Other Rail Improvements**

**Rail Interconnector**

The Interconnector is due for completion in 2015 is a planned link connecting the existing Northern Line to the lines running out from Heuston Station. It is envisaged that this public transport system would eliminate the existing city centre capacity constraints owing to its higher capacity and more frequent services.

**Kildare Line upgrade**

This project involves quadrupling of critical section of track between Cherry Orchard and Hazelhatch on the Heuston-Kildare line, along with ancillary works such as signalling and station developments. A key objective is to accommodate a peak hour service pattern of four commuter, four regional and four intercity services. Heuston Station lies approximately 20 minutes walking from Grangegorman.

**Navan Rail Line**

The project is carried out in two phases. Phase 1 involves reopening 7.5km of railway line running off the Maynooth line, at Clonsilla, to the M3 interchange at Pace, near Dunboyne scheduled for completion in 2010. Phase 2 provides connection to Navan and projected to complete by 2015. With Luas Line D in place and the proposed interchange between these two rail lines at Broombridge, Grangegorman would benefit from the increased catchment provided by the Navan line.

**Bus Improvements**

**Quality Bus Network**

The QBN Office carries out a permanent assessment of the needs for improvement to the QBC network and the existing QBCs are being upgraded on a regular basis throughout the city. With regards to sections of the QBN that are relevant to Grangegorman, the QBN Office has revealed that work on QBC along Old Cabra Road is to start before the Summer of 2008 and that further bus priority improvements along Manor Street and Stoneybatter are also planned.

**Traffic Management in Greater Dublin Area (GDA)**

This provision includes the construction of QBCs, cycle paths, improved pedestrian facilities and traffic management support systems under Transport 21 program. Capital funding for traffic management measures in the GDA is provided through the DTO Traffic Management Grants, in support of its overall transportation strategy. Projected completion is 2015.

**Other Bus Improvements**

Development of Bus Services in GDA (Dublin Bus): This program is part of Transport 21 and is aimed at expanding the bus network in the Dublin area. Also a target of 60% is set to achieve as an increase in passenger carrying capacity through new and replacement bus acquisition by the year 2015.

New services are introduced under Transport 21 program to enhance Bus Eireann services to customers on city and commuter services. A total of 235 vehicles are to be procured in 2007 and 2008 as part of this program. Bus Eireann intends to improve its present interurban services to Dublin, including substantial frequency and quality enhancements of services along the N2 and N3 corridors.

**Walking and bicycling environment**

**Pedestrian network**

The majority of the road network in the vicinity of the site is provided with adequate pedestrian facilities, including signalised pedestrian crossings across the main roads, such as Constitution Hill, North Circular Road and Prussia Street. However, the present site’s accessibility on foot is limited by its impermeable layout, with only access to the external walking network via Grangegorman Road.

Grangegorman is, at present, cut off from Dublin City Centre by the Broadstone site and a number of adjacent properties such as the Haven House Hostel, off North Brunswick Street. To the west, the site’s wall forms an effective barrier to connections toward the Stoneybatter and Hanlon’s Corner areas.

**Site Accessibility on Foot**

The diagramme to the left shows how accessible the Grangegorman site will be by showing walking distances to existing and future transport stations and stops as well as other important facilities within the vicinity. Various walking routes are shown from Grangegorman. The Luas stops on the Red line to the south of Grangegorman are all within 15 minutes walking distance from Grangegorman via a number of walking routes. Heuston Station, one of Dublin’s most important stations where may rail services terminates is approximately 20 minutes walk from Grangegorman, while Connolly Station (another important station of Dublin) is within 30 minutes walking distance.

New stations planned on the Metro North Line including the Mater and Parnell Square Stations will be located within 15 minutes walking distance from the site. Also, the Broadstone North and South Stations on the proposed Luas Line D will be located adjacent, on the door step of the Campus.

**Cycle facilities**

Cycle infrastructure within the vicinity of Grangegorman is as good as any other within Dublin. Cycle lanes are provided on strategic routes such as on North Kings Street and there are also a shared bus/cycle lane on Constitution Hill and portions of North Circular Rd.

Cycle infrastructure is constantly being improved within Dublin. Dublin City Council are implementing the Dublin City Strategic Cycle Network programme aimed at providing an extensive and integrated cycle route network for the City.
04_masterplan_details
executive summary

The Health Service Executive (HSE) has recognised the tremendous opportunity to address the barriers of isolation, institutionalisation and stigma through the redevelopment of the Grangegorman site and facilities. The Masterplan fully capitalises on this opportunity to create a wonderful new treatment environment with secure, therapeutic, fit-for-purpose facilities that are an integral part of a vibrant mixed-use urban community. The design achieves a less institutionalised environment to create a more comfortable, familiar atmosphere for service users, allow for more interaction between the healthcare facilities and the surrounding community and contribute to the overall quality of life in the Grangegorman Urban Quarter. The Masterplan responds to the challenge of creating a mixed-use healthcare environment on the large scale of Grangegorman by using principles of innovative facility design and creative environmental planning.

Hierarchy of Open Spaces

The HSE component of the Grangegorman Urban Quarter has been designed in consideration of the most current and updated research on healthcare environments and user needs. Whilst it is important to recognise the requirement of providing a safe and therapeutic environment for those who need the security of an institutional environment, many mental healthcare facilities operate cohesively in ordinary neighbourhoods. Many of the facilities operated by the HSE are located within traditional community settings. Other successful mental healthcare environments, integrated with a mix of institutional, residential, commercial and community uses, are being planned and built across Europe and around the world.

A clear hierarchy of open spaces has been established with the following objectives:

- **Provide** a series of secure, safe “healing gardens” with a range of active, passive and weather-protected recreation spaces, while allowing for a variety of open space sizes and varying degrees of security.
- **Promote** a safe environment inside and outside, day and night.
- **Incorporate** a mix of activities and uses that can be shared with the community.
- **Promote** a well-defined public realm with windows and doors facing the street.
- **Avoid** having “no-go” areas.
- **Provide** well-lit streets, walkways and buildings.
- **Ensure** that front doors face onto public streets to provide “eyes on the street.”
- **Ensure** logical way-finding.

1. view of the HSE from north circular road

One of the Key Principles of the Masterplan is the need for a strong connection from the site to North Circular Road. The Primary Care facilities form a central backdrop to an urban plaza accessed from North Circular Road.
An Innovative and Cohesive Campus for the HSE

The Health Service Executive (HSE) elements of the Grangegorman Masterplan are designed to achieve a number of key principles:

- Integration of the HSE accommodation with the surrounding local community that it primarily serves and with the new DIT community.
- Provision of privacy and dignity for clients or building users of HSE.
- Convenience and effectiveness of operation for HSE staff.
- Achieving a legible and understandable public domain.
- Providing a range of outdoor spaces from secure to completely open, appropriate to the needs of patients and clients.
- Careful gradation of building heights from domestic scale up to medium-rise.

The topology of the site, the permeability of the boundaries, the brief of the HSE, and the adjacency of local communities all contribute to logically locating the majority of HSE accommodation to the north of the site. In turn this locates HSE accommodation near to the new circulation spines of St. Brendan’s Way and Serpentine Walk and within a short walk of the open parkland areas to the south. The HSE administrative and clinical support services offices have been located near the Broadstone end of the site in an appropriately more office-oriented area and easily accessible from the city centre, the new LUAS link and other public transport.

The design diagram lays out a central north-south circulation spine giving direct access to the most public parts of the accommodation. Mirroring the key concepts of the Masterplan, there is both a landscaped and more urban, part-atrium route. These circulation spaces will be public domain. They connect the North Circular Road to Library Square with its café and library, and are near the more public Primary Care facilities.

Spreading outwards from this spine along a new wooded walkway, the other facilities are grouped around courts with progressively increasing levels of privacy and seclusion. These courts all have their own geometry and character offering clearly legible places.

The most westerly court is devoted to mental health with the Psychiatric Intensive Care unit located at the most secluded end, complete with its secure garden.

The laundry building on the Record of Protected Structures will be converted to serve as offices and the Day Service Facility for the HSE. Its accessibility from Grangegorman Upper Road, and the scale and flexibility of the construction of this building make it suitable for this kind of re-use.

Several HSE Housing developments are located to the east of the Primary Care facilities. Open courtyards and landscaped paths characterise the spaces around these buildings. The proximity of the Primary School to the east provides the opportunity for cross-generational interaction.
The Health Services Executive is organised around a series of landscaped quadrangles in the same manner as the Masterplan as a whole. The Primary Care facilities are considered to be the most publicly accessed spaces and have been centrally located at the core of the HSE area. Radiating out westward and eastward, the program spaces are organised to provide incrementally greater degrees of privacy and security befitting their uses and the sensitivity of the clients or building users. Most of the Mental Health program for the HSE is located to the west. The Intensive Care unit is considered to require the most privacy and is located near the existing Grangegorman wall with secure courtyards to the east bordering the main courtyard space for the Mental Health quadrangle. The Rehabilitation and Respite Care program has been situated in north-south oriented buildings, some of which can be organised in townhome-type supported housing for residents with greater independence. The Primary Care facilities are bordered to the north by an urban plaza facing North Circular Road and to the south is Library Square - a major urban plaza designed as an active and inviting space. The two plazas are linked by a major gateway into the Grangegorman Quarter that starts at North Circular Road and continues south to the Upper Terrace and The Fields.
HSE supported housing and day center facility

Several low-rise housing structures surround the Laundry building bordered by courtyards, gardens and pathways. The open plan of the former Laundry building will become a centre of activity when converted to its new use as offices and a day centre. The day centre is a place for residents of the health campus and of the surrounding community to come and share meals and participate in group activities. The existing openness of the interior spaces and existing overhead skylights will allow natural daylight to enter new open-office type spaces. A drop-off area is located to the north and a small park borders the day centre on the south side. A small urban plaza is located to the south-east where tables and chairs will be situated to provide outdoor seating on sunny days.

The various housing buildings to the west of the Day Centre form a major formal courtyard. To the west of these buildings is one of the green finger parks that traverse the site from North Circular Road southward to The Fields. The juxtaposition of the semi-private courtyard space and the more public green finger park will give residents various levels of opportunity to interact with the community.
Primary School

The Primary School is designated to have 16 classrooms with ancillary special education rooms. The site within the Masterplan was chosen for its easy accessibility from Grangegorman and Rathdown Roads and its separation but adjacency to the DIT and HSE buildings. The school's location would benefit from the parks and playspaces designed throughout the new Quarter and pupils would have access to the playfields to the south. A drop off is located near the main school entrance for pupils, staff and community access. There is currently an excess of under-utilised road space at the intersection of these two streets and it is suggested that this unused space could be added to the site footprint for the Primary School. The school's General Purpose Room has a separate entrance from Ivy Avenue that could provide after hours access for school gatherings and functions.
the business school, DIT library and the upper terrace

The western-most core area of the Grangegorman Quarter has been termed the Academic and Health “heart” of the quarter. It is comprised of the DIT main library, Central Learning Classrooms, and the Upper Terrace to the south.

The Upper Terrace poses a dramatic belvedere looking south across The Fields. The Library’s information/study/resource centre incorporates the historic Top House in a careful three-part composition of atria, courtyards, and new spaces, poised above the open green. The Upper Terrace provides a natural viewing platform for games and daily student life with the grand backdrop of the Dublin skyline and Mountains. From the Upper Terrace down to The Fields, a tiered stairway/amphitheatre offers a venue for a variety of large-scale events, as well as a social ‘sun-catcher’ in fair weather and offers access to the sports centre below.
The Masterplan provides each of the DIT academic areas with a defined space with a distinctive identity while organising them to contribute to the overall cohesive image and vision for the Quarter. In addition, the design of the programmatic space adjacencies recognise the necessary cross-disciplinary interactions that take place.

These three academic areas form three separate, similar, but distinctive quadrangles that primarily open to the south providing access to St. Brendan’s Way and the Cultural Garden. The south-facing courtyards allow a greater degree of direct sunlight to fall on the outdoor landscaped spaces and support St. Brendan’s Way as a primary circulation route through the campus. A north-south oriented atrium space connects the Engineering school to parts of the DIT Research Centre and Commercial Laboratories via a series of bridges.
The Student Support Services are grouped as a student “hub” and located in a high profile, easily accessible campus location as part of the cultural-social “heart” of the Grangegorman Quarter. St. Brendan’s Way, the major circulation route through the site, passes between the grouping of protected buildings that, in addition to several new facilities, will comprise the majority of Student Support Services. This hub of student services is complemented by various retail shops, restaurants, cafes and DIT catterias along St. Brendan’s Way and is located between the Student Housing to the south and the academic departments to the north—a literal and figurative bridge between the two aspects of student life.

The Built Environment department has its own distinctive courtyard and also occupies the Richmond Penitentiary (Clock Tower building) that will be renovated and expanded. The Clock Tower is seen as a major iconic link from the history of the site to the future of the University and has been given the space required to appreciate the landmark by the design of the Cultural Garden directly opposite it. The Cultural Garden is conceived as a place of reconciliation, celebration and commemoration of the new and protected buildings as well as the past and future uses—a means of marking a significant process of transformation.
The Cultural Garden is an axial space that looks toward the Clock Tower providing an uninterrupted view of this protected structure, and flanks other protected buildings that will be adapted to student social activities.

The Cultural Garden is conceived as a place of reconciliation, celebration and commemoration of the new and protected buildings as well as the past and future uses—a means of marking a significant process of transformation.
Grangegorman Road currently bisects the site. The character of the portion of road through the site will be altered using traffic calming and shared surface concepts to provide a pedestrian dominant space that knits together the two portions of the site.

1. view of grangegorman road looking south

The portion of Grangegorman Road through the site will be treated with a different materiality than the rest of the road relating more to the character of St. Brendan’s Way than a city street. The existing protected stone wall will be substantially retained but may be altered in some places to create more open and inviting spaces.
The facilities dedicated to the Faculty of Applied Arts (FoAA), including the proposed Arts Centre, comprise the second half of the cultural-social “heart” of the Grangegorman quarter. The Arts Centre is envisioned to be a showplace for the artistic creations of the music, drama, art, design and media departments of the Institute and a destination venue for the community and the city of Dublin. The quadrangle dedicated to the Applied Arts department is dominated by a recital hall, a future performance venue and an art gallery—all partially contained within a glazed atrium wintergarden space.

In addition to opening northward to the pedestrian traffic on St. Brendan’s Way, the location for the arts centre was chosen due to its public access and prominence near the Broadstone Gate with its access to the proposed LUAS light rail line, taxis and bus routes. The Applied Arts quad is also accessed from Grangegorman Road and a drop-off for the creche is provided and underground parking garage is located below grade.
St. Brendan’s Way and the Serpentine Walk are key design principles considered to be required for the successful implementation of the Masterplan. Both are major organisational and circulation paths through the site but with differing character. The urban quality of St. Brendan’s Way is complemented by the landscaped nature of the Serpentine Walk—a meandering link that traverses the site in two grand arcs, giving a south-facing green edge to student residence halls. The Serpentine Walk is to be a link in the landscape path from the Grand Canal and the Phibsborough/Mountjoy area to the north through the Grangegorman site and out to Phoenix Park to the west. In addition, the Serpentine Walk acts as a collector for several of the north-south oriented “green finger” landscape parks that bring people into the site from the edges of the quarter via a serene park-like setting.

The diagram to the left shows a size comparison between St. Brendan’s Way and Dublin’s popular and much travelled and understood pedestrian way—Grafton Street.
landscape design: st. brendan’s way

The design for St. Brendan’s Way strives to provide a high quality of surface materials, street furniture, lighting, and a significant planting concept in order to establish a clear understanding of the importance and hierarchy of this very public open space. Paving materials include a warm natural stone in various colours to provide an engaging, almost painterly character. Spacious clusters of street furniture and sculpture along the pedestrian zone provide places for pedestrians to meet, sit down and observe the vibrant life in the District. Carefully selected lighting will give St. Brendan’s Way effective and expressive illumination at night.

Overall, St. Brendan’s Way has a harmonious character in scale, colours and materials. Existing trees have been integrated into the landscaping concept throughout. The Masterplan intends to keep the site vehicle free as much as possible. Due to the traffic and access requirements, there will be shared uses on circulation paths, but these will be clearly prioritised for pedestrians and cyclists. Vehicular use will be limited and controlled. No road markings or signs will be provided, in order to prioritise pedestrians and ensure slow vehicular traffic.
1. view of library square and the top house looking south toward the DIT library

Library Square will provide a public space that activates a central portion of the site bringing people together from the HSE buildings, DIT and the Public City Library. A view corridor from North Circular Road, past the protected portion of the DIT Library and out over the Fields will create an important link through the site.

2. view of St. Brendan's Way and the Wellington monument looking southwest

Breaks through the student housing buildings along the Serpentine Walk provide views out from the site and allow daylight to penetrate and cross St. Brendan's Way.
student housing

Providing student accommodations within the boundaries of the Institute will create a lively and energetic place for learning and living. By locating the Student Housing along the spine of the Serpentine Walk, the housing does not become segregated to the periphery of the Institute and in addition creates opportunities for interaction all through the site along St. Brendan’s Way and the Serpentine Walk. The best views of the city and the mountains are from the housing where much of the indoor living and socialising of the students will happen.

The quality of construction and the overall architectural expression of the Student Housing will be important due to its prominent location within the masterplan and its high-profile view from the surrounding city.
The Grangegorman Science Park is envisioned as a major hub of intellectual capital on campus and a place where knowledge is created and transferred to enterprise, and where the latest developments in education, research and scholarly activity take place. It will be a place of true networking and collaboration between professionals and students in academia and leaders in science research, business and industry.

The Science and Industry Centre shares space at one of the most prominent locations of the site. The Broadstone Gate is a major linkage between the Grangegorman Quarter and the city and the design and construction of the buildings at this gateway will become one of the new identities for the Dublin Institute of Technology. In addition to the practicality of the location due to its proximity to the proposed LUAS light rail line, taxis and bus routes on Constitution Hill and the location of underground parking, the Science and Industry Centre is located to act as a figurative bridge between academic culture and the business of the city.
The quadrangles or courtyards will be physically and conceptually connected to each other with an expressive, harmonious design using plants, surface materials, street furniture and lighting that create a cohesive identity. In addition, the courts will maintain individual identities not just through the architectural organisation of the spaces but by the design and types of plantings used.

The surface materials of the quadrangles are predominantly permeable to allow rainwater runoff to percolate back into the aquifer below and not be introduced into the city’s drainage system. A drainage system with retention spaces for rainwater runoff during flood conditions has also been introduced into the design. This system allows the water to circulate in a visible drainage network as a “living system.” The water will be collected in swales and flows from the north-west portion of the site in visible swales, through the green finger parks to the Ha-Ha. After heavy rainfall, a water cascade can be seen descending down into the retention canal of the Ha-Ha. Another water feature, a water-garden, has been designed at the lowest elevational point on the site at the southern-most quadrangle.
The Cultural Garden is a green connection between the academic/health heart and the cultural heart of the Grangegorman site. Parts of the garden reflect the history of the site and features a range of spaces for contemplation, gathering and relaxing.

The design of the Cultural Garden provides a clearing to the east with the density of trees increasing toward the west. Lawn pitches which slope down to the middle of the garden is the dominating character. Because of the grades of the lawn, they are faced by little walls and stairs which invite pedestrians to sit down and rest. The Cultural Garden will have the character of a “hortus conclusus” (an enclosed Medieval garden) in the east part, with water features to provide a calming accent. Due to this character the planting concept is more formal. A sequence of hedges creates various “green chambers.” Toward the west, the Cultural Garden opens to St. Brendan’s Way and has a more urban character.
landscape design: green finger parks and ivy avenue

In addition to being main circulation routes through the Quarter, the “green finger” parks have a high ecological value. They provide a connection from a main city route – North Circular Road to Phoenix Park – into the site. The plants consist of native species (especially shrub berries and other feeding plants for song birds), and the existing large, healthy trees are integrated into the finger parks as well. Furthermore, the finger parks improve the microclimatic conditions on the site by increasing humidity, creating air cooling lanes, wind breaking, and improving air quality by reducing fine dust in the air.

The finger parks incorporate several main pedestrian access routes into the Quarter, with small play spaces and play stations arrayed throughout. Various kinds of seating areas to meet and to contemplate will also be arranged.
Because the Grangegorman Hospital occupied the site for such a long period of time, the walled-in site remained one of the last undisturbed open spaces within the city of Dublin. One of the major concepts of the new development for the site was to maintain to the greatest extent possible the existing open space to the south of the site but also serving as parkland recreational space.

Dedicated for the most part to sports related activities but also serving as parkland and recreational space, The Fields occupy an advantageous location for views from the Serpentine Walk, Upper Terrace and Student Housing. The location allows prevailing winds from the south to travel through the site and provide natural ventilation (similar to some of the reasons the site was originally chosen as a hospital).
Play is considered vital to childhood development. In addition to the obvious physical health benefits to children, unstructured, informal opportunities for playing promote childhood creativity and independence, create therapeutic opportunities to relieve physical and emotional stress, and improve social and peer relationships. Over time, changes in the built environment have created less child-friendly surroundings by increased traffic and reduced public open space to play and explore. This is in addition to more hours of children’s days being pre-planned and free time becoming more sedentary with video games and the internet.

The Masterplan has designated several areas for the possible development of children’s playspaces. The majority of the playspaces have been located at the southern end of the site where much of the mature existing landscaping and fields will remain. The playspaces are intended to be easily accessible to children of different age groups, be safe and secure, and be suitable for both able bodied and disabled children.

Several reference documents should be consulted during the design of the playspaces including: the Ireland National Play Policy from the National Children’s Office, the Play Space Guidelines for the Dublin Docklands Development Authority, and the Dublin City Council Play Policy.
landscape design: HSE

The HSE Health Gardens form a series of garden areas accessible to users, clients, caregivers and staff. Integrating principles of ecological design and medical research on human wellness, these "restorative gardens" are designed to meet the physical, psychological, and social needs of patients and their caregivers. The health benefits of these gardens, however, extend beyond the garden walls to include the wider institution, the surrounding communities, and the living landscape.

The Health Garden areas act as pathfinder elements within an enhanced healing environment incorporating innovative landscape design, sensitive lighting and exterior artwork throughout the HSE healthcare campus. The design of the courtyards, whilst providing facilities to users, clients, staff and visitors, also acknowledge the privacy and dignity issues associated with adjacent facilities. The courtyards and gardens provide significant social areas for people to meet and talk, with plenty of seating in these spaces as well as the paths and planting beds. They also provide pleasant views from within the gardens as well as from the surrounding developments. Special attention have been paid to making the gardens accessible to people with limited mobility. Seating areas have been designed to provide quiet areas where one can sit and reflect with some privacy.
strategy for the broadstone gate

The Masterplan envisions an urban design strategy for the development of Broadstone Gate that will create a prominent public realm and entrance to both the Grangegorman and Broadstone sites. The plan would provide a strong image and a tremendous economic benefit for both properties. Shown are several possible interim stages of development culminating in a long-range plan that would eventually help to knit together the landscaped path extending from the Canal and the Mountjoy area to the north, through the Broadstone and Grangegorman sites and continuing westward to Phoenix Park.

1. broadstone gate phase 1
A continuation of the major link along St. Brendan’s Way is established to Constitution Hill, providing pedestrian access and limited vehicular access to and from the site. The current bus depots for Dublin Bus and Bus Éireann would remain in place on top of the Broadstone plinth. This Stage will also accommodate a new, interim bus terminal.

2. broadstone gate phase 2
In Phase 2, a LUAS light rail line is constructed and a new station is added at the Broadstone site. The historic station and surrounding site hold the opportunity to be developed and benefit from the increased activity created by the Grangegorman Quarter. The Phase 1 pedestrian access path can be strengthened and expanded, forming a generous urban plaza animated with retail and restaurant/café spaces.

3. broadstone gate phase 3
In Phase 3, the existing bus depots and terminus are moved below grade (under the plinth), in order to accommodate a mixture of retail, commercial, mixed use and residential spaces above and on the plinth. In this way, CIE would be able to keep the existing bus facilities while optimising the development potential of their property.

broadstone gate phase 3
Using the Broadstone Gate as one of the major entrances into the Grangegorman site is one of the key principles of the Masterplan. This link is an extension of the historic pathway through the city, from Dublin Castle and along Henrietta Street and through the King’s Inns.
The extension of the LUAS light rail is considered one of the most important public transportation initiatives supporting the Grangegorman site. A grade-separated crossing over Constitution Hill will minimise the impact of traffic and a new train stop in front of the historic Broadstone Station will bring people to a major entrance to the site at the Broadstone Gate.
grangegorman
an urban quarter with an open future

masterplan and
masterplan design guidelines
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An Urban Quarter with an Open Future

The information that follows comprises the Masterplan and Masterplan Design Guidelines for the Grangegorman Site. It is the culmination of the Design Team’s work with consultation from user groups, governmental agencies and members of the community as well as review and approval from the Grangegorman Development Agency, (GDA). It was produced and reviewed during the design process from January 2008 until September 2008.

The Grangegorman Masterplan addresses the adjacent Broadstone site and neighbourhoods and in the process establishes a new city quarter framing a mix of public and institutional uses with a lively repertoire of urban places. The core property itself offers a flexible matrix of buildings and landscape, while preserving and enhancing the unique open spaces and historic resources of the site to benefit the Dublin Institute of Technology (DIT), the Health Services Executive (HSE), and the greater City community.

A memorable network of pedestrian paths weaves the new Quarter together with the City around it, creating a vital nexus of community within a “walkable” district. This weaving occurs in social and academic realms, in space and time, in historic and contemporary forms, and in the balance between buildings and landscape.

The Quarter as a whole enjoys a remarkable quality of geographic position and orientation within Dublin City. This masterplan for the Grangegorman site enhances this larger sense of place, taking advantage of the topographic character of the site to frame southerly views to the City skyline and to the Dublin Mountains.

DIT’s principal academic and support services activities and HSE’s main areas of service enjoy identity of place as well as beneficial adjacencies within the district Plan. New buildings are free to express the diversity of uses within a harmonious urban fabric.

The Primary School is located at a site boundary point that provides easy access to the residential street network. The Community Library is co-located with the DIT Library to produce a specialist third level library, while promoting access and participation to higher education.

Student residences and social life are gathered along a major east-west urban procession, linking academic centres, recreation/sports facilities, and the public realm, and making the entire Quarter a place of vibrant activity.

Buildings support a clear definition of the street-quad-court structure of the Quarter, producing a legible pattern that enriches formal and informal sequences of movement. Buildings enclose a variety of internal gardens and sky-lit atria, giving the district a collection of distinct, discoverable places.

Two major activity centres—Upper Terrace at the Library and the Arts Centre / Student Hub—anchor a broad spectrum of social gathering places. Opportunities for social interaction occur at multiple scales: from grand places of arrival and movement, to streets and gardens, to cafés and amenities, to shared lounges and balconies within residential communities.

The urban transformation of the Grangegorman site extends into and through adjacent neighbourhoods, creating potential Gateway entrances at the North Circular Road, Prussia Street, Grangegorman Road Upper and Lower, and across the new Broadstone Development to Constitution Hill and Phibsborough Road. Stations for Dublin bus services and the future LUAS Green Line are incorporated, connecting the Quarter to Dublin’s metropolitan transit systems.
Reopening Grangegorman: a New Urban Quarter

The transformation of Grangegorman's closed compound into an integral part of the life of the City is one of Grangegorman Development Agency's highest goals. The proposed Masterplan envisions this new district—including any future Broadstone Development—as a primarily pedestrian precinct that is carefully served by public transit, surrounding streets, and an internal vehicular service network. Key features of the plan are access and options: many ways in and many ways through.

Mixed use also provides continuity, as activities that serve both student life and the public are layered through the academic core of the district. To the east, alongside Broadstone, the cultural offerings of the Arts Centre draw public participation. At the centre and west side of the campus, and closer to HSE's public services, recreational facilities and open space encourage community as well as student use. At major gateways, such as The North Circular Gate and Broadstone Gate, commercial and academic uses are overlaid.

Reaching Out: Linking the Urban Context

The project is a major opportunity to enhance Dublin's north inner city urban quality. The Masterplan connects existing urban landscape and introduces new resources north of the Liffey.

The Masterplan proposes an urban plaza and park at the Broadstone entry to the Quarter, extending the green space adjacent to Kings' Inns to form a symbolic and civic marker. The site, being raised up, acts as a natural viewing area of Dublin's urban fabric. The experience of driving or walking along Constitution Hill, from or to the City Centre, is now marked by a prominent open space that echoes Dubliners' experience of the Phoenix Park and of the green squares which dot the City.

The entry plaza at the Broadstone Development's proposed LUAS station is configured to reinforce the pedestrian sequence into the urban spaces of the district.

Connecting the District: the Pedestrian Experience

To enhance the pedestrian realm, the Masterplan reasserts the continuity of the Grangegorman district. The east/west division of the site by the Grangegorman Upper and Lower Road is mediated by carrying a principal pedestrian sequence—St. Brendan's Way—across the existing roadway. This broad crossing also serves to closely unite existing buildings on the Record of Protected Structures into a central village of academic and student life. Access to limited areas of car parking is provided below the new terrace from Upper Grangegorman Road and from North Circular Road and Constitution Hill.

St. Brendan's Way crosses the entire Quarter, giving public and student access to a series of academic and cultural centres, and is continuously activated by student residence halls, amenities and social spaces. As a pedestrian street, St. Brendan's Way features a rich sequence of distinct spaces, opening and closing, with paved and landscaped surfaces, activated day/night uses, and a variety of building edges and profiles.

The urban quality of St. Brendan's Way is complemented by a second lateral procession—Serpentine Walk—a meandering walk that traverses the site in two grand arcs, giving a south-facing green edge to student residence halls. This “green procession” continues a linear landscape sequence that begins to the east with Royal Canal Bank and culminates in the district's main sports and recreation park—the Fields.

These main east-west passages are crossed and extended by frequent fingers of north-south oriented green streets and sequences of courts, forming a loose, continuous grid of communication in the Quarter. Smaller meandering paths move at mid-block/mid-court intervals to trace intimate connections between outdoor rooms and gardens.

Gateway and Identity

Main gateway entrances offer front doors to the Quarter from surrounding streets. The North Circular Gate lies adjacent to a bus stop and provides an address for DIT and HSE. West Gate, a potential access point from Prussia Street, is coupled with a proposed commercial court and visually linked to the Church of The Holy Family. Broadstone Gate to the east offers entry from Phibsborough Road, Broadstone, the future Broadstone Station of the LUAS Line, and the re-established open park of Broadstone Green, across from the King's Inns. In addition, Upper and Lower Grangegorman Gates, which bookend Grangegorman Upper and Lower Road, provide gateways close to the centre. The design of these pedestrian and vehicular thresholds makes use of the existing stone walls, historic iron gates and contemporary markers where appropriate.

The Academic/Health Heart: Upper Terrace

At the academic core of the DIT Campus, Upper Terrace poses a dramatic belvedere looking south across The Fields. The Library’s information/study/residence centre incorporates the historic Tee House in a careful three-part composition of atria, courtyards, and new spaces, poised above the open green. The Upper Terrace provides a natural viewing platform for games and daily student life with the grand backdrop of the Dublin skyline and Mountains.

From the Upper Terrace down to The Fields, a tiered stairway/amphitheatre offers a venue for a variety of large-scale events, as well as a social ‘sun-catcher’ in fair weather.

Symbolically, the Upper Terrace and The Fields juxtapose the values of Knowledge and Action—the mutual benefits of scholarship, fellowship, and competitive achievement—which shine through DIT’s brief as central aspirations for this new Campus. Important campus buildings and uses are assembled in and around Upper Terrace, including the main library, lecture halls, faculty club, student centres, and administrative offices. This academic centre for DIT in turn has a strong connection via a major green pedestrian path to the health plaza immediately to the north at Library Square—the two linked centres thereby creating an overall “Academic/Health Heart” for the entire Grangegorman Quarter.
The Arts Centre: Inviting Campus and Community

At the eastern edge of the Quarter, Broadstone Gate leads quickly from Broadstone Place to a second focal point for the Quarter—the “Social/Cultural Heart”—where district and community life come together: the vibrant Arts Centre. Here a small piazza is framed by a pair of semi-enclosed wintergarden spaces—a café and restaurant with sheltered, indoor/outdoor dining to the north and a grand, weather-protected court of performance and exhibition halls to the south. The Arts Centre combines performing arts venues with spaces for the Applied Arts and the Built Environment, allowing a broad range of public and pedagogical uses.

New Centres for Interactive Learning and Research

This Masterplan seeks to create modern, innovative facilities for both DIT and HSE, with a flexible, sustainable fabric of modular buildings. In a contemporary interpretation of traditional collegiate “quads,” the configuration of the buildings on the site frames a pattern of enclosed courtyards, open spaces and plazas, creating distinct forms with strong individual identities.

From a common address along the North Circular Road, clear zones are distinguished for DIT and HSE. For HSE, three “Quads” gather related facilities: a northwest grouping is devoted to administrative functions and mental health facilities; a central quad for primary community health services; and a cluster to the northeast of supported housing apartments and a nursing home gathered around the old Laundry, re-cast as a dining/activity pavilion. This arrangement reflects our team’s recommendation to distribute HSE’s various programmes in order to enhance beneficial adjacencies for staff, residents, users and clients, rather than aggregating all functions in a single complex.

For DIT, the urban structure of the masterplan provides for its academic and research needs while maintaining and promoting identities through physical identity and landscaped courts and squares. For HSE, the “Social Hub” and “Social Hub” along with training centres, research centres, incubation space and science park activities.

The creation of a single campus with a major Academic Hub, central lecture spaces, a Social Hub, Student Hub and shared laboratories and catering facilities all promote and encourage interaction among staff and students of DIT.

The format of buildings, and the layout of district spaces they frame, emphasizes a modular flexibility of uses. Buildings have varying heights and stories—their massing determined by the goals of optimising views, daylight exposure, and relationship to the surrounding urban fabric and community. The most public/shared educational spaces—lecture halls, classrooms, workshops and studios—at the lower floors, and faculty suites, seminar and conference facilities, and departmental administration on upper floors. Throughout the plan, covered walks, courts, and glass-roofed galleries enhance internal communication and interaction. Multi-floor atriums present attractive public areas for social interaction and promote inter-floor communication. Relatively narrow building sections enhance daylight and views for all activities, in a format that can accommodate both laboratory and classroom patterns.

The GDA’s requirement for 30% expansion space for DIT is proposed to be distributed throughout the plan. This would enhance the opportunities for all departments to grow and evolve, while also allowing hybrid/interdisciplinary uses to grow up alongside existing ones.

Residence and Recreation: Student Life Along the Serpentine Walk

Two of the great benefits of DIT’s relocation to Grangegorman—housing on campus and high quality recreation and athletics—are exuberantly celebrated in the Masterplan. Student residences form two great arcs—called Serpentine Walk, which begin at Broadstone Gate to the east and sweep across the campus to the potential Prussia Street West Gate to the west as a continuous ribbon of 24-hour habitation convenient to every department and academic centre.

Having a varied, dynamic movement in heights, the student residence halls offer a range of housing formats from 6-bed and 3-bed apartments to private studio/family units. Ground level spaces for dining, social and study lounges, and related shops serve to activate the Serpentine Walk on the south side, and St. Brendan’s Way on the north side. A moving skyline and frequent vertical openings and breaks allow views and sunlight to penetrate.

Recreational spaces—indoor ball courts, swimming pool, fitness rooms and Gymnasiums—are laid out alongside the north edge of The Fields, one level below the Serpentine Walk. These exercise and sports rooms relate visually to external spaces and are south-lit by the Ha-Ha—a sectional dip at the upper edge of The Fields. The Fields provide for a range of playing fields and pitches for various sporting activities. Together with social and retail amenities located immediately above, this continuous spine of activity invites daily use by residents, commuting students and the public.

Enhancing Community Infrastructure and Facilities

The Masterplan strives to strengthen connections to the surrounding community. To this end, the Grangegorman Urban Quarter provides a rich, comprehensive range of community-related amenities while optimising community access to DIT and HSE facilities. HSE services will be convenient and accessible, while residents will have shared access to the sports facilities on the DIT campus.

In addition to the new Dublin Council Branch Library and Primary School, the Quarter proposes an array of lively social gathering places at multiple scales for the community, from smaller gardens and play spaces to landscaped walks and large public plazas at the two “hearts” of the district.

Adaptive Re-use: Celebrating Cultural and Historical Resources

The plan proposes the creation of important places adjacent to and around the buildings listed on the Record of Protected Structures. The Top House retains its prominent presence as a focus of the Library at Upper Terrace. Near the southeast entry the “Cultural Garden,” an axial space that looks toward the Clock Tower, flanks a central village that includes the Female House, the Male and Female Infirmaries, the Catholic Church, and the Former Penitentiary—all adapted to social activities such as the Student Union, Faculty Common, Faculty Club, and Bookstore. The Laundry Building is re-used as the new Day Service Facility for HSE. The unused Church of Ireland Chapel—re-used as a Recreational Club—presides over its own significant open space with an existing grove of trees. In the southeastern portion of the site, the Former Richmond Asylum building becomes an organising element for two DIT quads bordering two generous landscaped open spaces north and south of the building. We propose moving the historical gates to the Lower Grangegorman Gate to mark the new entry to the Quarter at this location.
**Urban Partnerships: Broadstone, H.A.R.P., Smithfield, and Prussia Street**

For Broadstone, the Masterplan addresses the long-term possibility of an urban texture of mixed-use buildings along a grand north-south boulevard—the route of the future LUAS Green Line. The historic railway station and sheds are maintained as a central market hall and place of community, directly adjacent to the proposed LUAS station. To the south of Broadstone Place, an office complex edges Broadstone Green, possibly accommodating technology-oriented businesses in an extension of the mixed-use component of the Grangegorman Quarter.

To the south of the Arts and Built Environment Quads, a secondary entry gate links through to H.A.R.P./Smithfield and the north bank of the Liffey. The northward extension of Smithfield’s urban arts district is thus carried through to the new Arts Centre, enhancing Dublin’s inner city cultural resources. To the east, a series of potential, hypothetical links to Prussia Street are proposed, each creating an opportunity for new development, with pedestrian and/or vehicular breaks in Grangegorman’s historic wall.

**Environmental Sustainability: Flexible Fabric and Visible Systems**

Sustainability for HSE and DIT involves three levels of interest: planning, design, and construction; operations and life-style; and educational outreach. The planning process development itself can begin to serve educationally, by inviting discussion with users and community. The best of contemporary green building practice would be seen as a base-line for development of the Quarter. The Masterplan design can also serve to educate and encourage sustainable living by, for example, making infrastructure and natural systems visible and including experimental studies of systems within the Built Environment programme at DIT.

Beyond energy efficiency and climate responsiveness, buildings serve sustainability goals by offering lasting use—they age well. We imagine a contemporary fabric of modular, durable structures, with great attention to the quality of exterior and interior systems. The Masterplan encourages a diversity of architecture and guidelines will call for inventive use of a set of related systems and materials, giving the Quarter both visual harmony and long-term serviceability.

**Grangegorman Landscape: Urban Choreography and Natural Systems**

The natural heart of the Grangegorman landscape is The Fields, comprising a generous portion of the entire site. This gathering of parkland sports pitches with park-like groves of new and existing trees is framed by the Serpentine of student residence halls, and the protected wall to the south. Running and cycling paths entwine around the edges, linking the complementary qualities of sports fields, sheltering groves of trees, and distant views.

The district network of green boulevards and courtyard gardens forms a continuation of the main landscape elements of its greater North Dublin neighbourhood, such as Blessington Street park, linking the new Quarter development with its context. The primary sequences of St.Brendan’s Way and Serpentine Walk feature discrete places, terraces, and gardens, each with its own individual character. These are connected to smaller “landscape fingers” characterised by sequences of dense groups of trees, which appear to be situated randomly.

**Transportation and Access**

The Masterplan’s transportation strategy emphasizes sustainable modes of transport such as walking, cycling and public transport. The Quarter can be easily traversed in a 15-minute walk. Green Boulevards dominate the internal Quarter circulation and are designed to allow articulated paths for both pedestrians and cyclists, which will provide quality circulation environments in all seasons.

The Masterplan capitalises on the planned Luas Line D, which will connect the City Centre with the Maynooth rail line, and is likely to include a stop opposite Broadstone and another closer to North Circular Road, both of which will serve Grangegorman. The new Luas line will enable a connection to most of the Dublin-wide transport networks, including other Luas lines, suburban rail and QBC networks.

The Masterplan, via the Broadstone/Constitution Hill link, allows the projects to benefit from the proposed Metro North stops at Parnell Square and the Mater Hospital. These stops, within walking distance and also located at bus connection areas, will provide important links to the whole public transport network serving the greater Dublin area.

Car access will be limited to encourage the use of sustainable transport modes, with car parking being provided at two main locations, accessed via North Circular Road and Constitution Hill/Grangegorman Road. The majority of car parking will be underground, but small numbers of surface car parking at key locations may be provided throughout.

Vehicular circulation within the site will be enabled in a manner that does not conflict with the general priority given to pedestrians and cyclists. A system of traffic cells is being designed with the flexibility of allowing through-routes at key locations that can be in place out-of-hours. Service vehicle circulation will generally be shared with pedestrians and cyclists, albeit subject to restrictions.
six themes for the city of dublin

The Dublin City Council has identified six themes which are considered important to the sustainable growth and development of the city. The Masterplan sets out a new vision for the Grangegorman site based on these six themes.

Economic Vision

The Masterplan develops Grangegorman as a vital economic resource and engine with a network of thriving spatial and sectoral clusters, a focus for educational talent and creative assets. Facilities for the Dublin Institute of Technology will be supplemented by a strong component of retail spaces, training centres, research centres, incubation spaces and science park facilities that will directly benefit the economic development of the community and greater Dublin region. This development will underpin Ireland as a knowledge economy. A strong relationship with shared facilities is envisioned between the DIT and the Health Service Executive, which will further provide and reinforce convenient and needed educational, healthcare services and related enterprise development spaces for the Grangegorman Urban Quarter and the surrounding community. Furthermore, the full development and implementation of the Masterplan will produce a thriving impact for the community, providing tremendous long-term economic opportunities in regards to employment and management of the construction and operations of the future facilities in the Urban Quarter.

Social Vision

The Masterplan design reaches out to link the site with the immediate community, as well as Dublin’s greater urban context, to create an Urban Quarter that is inviting and connected to the local and larger community. The overall “Green Fingers Landscape Concept” represents an open “hand” that reaches out to draw the community into the development. The Masterplan develops Grangegorman as a compact district with a network of sustainable “quadrangles” for the Dublin Institute of Technology and the Health Service Executive, providing a range of facilities that promote social inclusion. Student residences and social life are gathered along a major east-west urban procession linking academic centres, recreation/sports facilities, and the public realm, making the entire Quarter a place of vibrant activity. The natural heart of the Grangegorman landscape is The Fields, comprising a generous portion of the entire site and providing a welcome, diverse range of sports pitches and other recreational activities. A Dublin City Council Branch Library and Primary School are included in the Masterplan in locations that easily serve the surrounding residential areas.

Cultural Vision

A rich and diverse provision for cultural facilities is offered in the Grangegorman Urban Quarter, including performing art centres, exhibition spaces and theatres, to encourage activities throughout the day and evening, and promote awareness of our cultural heritage. At the eastern edge of the Quarter, the Broadstone Gate leads quickly from Broadstone Place to the Arts Centre, where district and community life come together. This is one of two “hearts” envisioned for the Urban Quarter and will accommodate arts and cultural/performance spaces for the larger public community to promote lively evening uses. The northward extension of Smithfield’s urban arts district is thus carried through to the Grangegorman Quarter, enhancing Dublin’s inner city cultural resources. The Performing Arts Centre includes a Concert Hall, museum and art galleries.

Urban Form and Spatial Vision

The Masterplan creates a connected and legible urban quarter based on vibrant public spaces and active streets that provide a strong sense of identity and place. An urban plaza and park is envisioned at the Broadstone entry to the Quarter, extending the green space adjacent to Kings’ Inns to form a symbolic and civic marker for the entire city. To the west, this link continues through the site via the new pedestrian path, St. Brendan’s Way, potentially extending through to the Phoenix Park and connecting with the North Circular Road. To the south, the Lower Grangegorman Gate opens pedestrian access to and from the Smithfield area, extending the existing City Arts’ activities northward.

Movement Vision

The Masterplan takes full advantage of its proximity to Dublin City Centre, where transport networks already provide high levels of service. Rather than focusing on new transport links to serve the new population on site, the main aim of the Masterplan is to enable the seamless connection to the existing and future transportation networks. The emphasis is therefore put into the design of quality linkages from the site to the established city grid. The Masterplan also contributes directly to the increase of the quality and capacity of the bus network by providing a bus access area within its boundary. Perhaps the most important improvement with regards to Grangegorman will be the extension of the LUAS network from the City Centre to the Maynooth Line, which will include stations in close vicinity of the site.

Sustainable Vision

The Masterplan for the Grangegorman Urban Quarter seeks to create an environmentally sustainable Community within its neighbourhood and Dublin, as well as a sustainable demonstration project for the world. Sustainable strategies focus on three components that underpin the success of the regeneration of Grangegorman: social well being, economic viability, and environmental benefit. Building massing and form have been developed to respond appropriately to wind and solar paths, in order to ensure maximum sunlight exposure, reduce energy consumption, and incorporate generous green spaces to provide healthy views. The project includes provision to facilitate wind sheltering/protection and solar gain, as well as passive and active measures to harvest wind and cool breezes. Sustainable drainage systems are proposed to reduce water consumption and flooding. The development strengthens the site’s existing ecology and biodiversity, and incorporates sustainable urban drainage throughout the District. Rainwater will be collected as a source of grey water. The Masterplan maximises the use of recycled water while minimising the use of potable water by proposing appropriate landscape materials, and utilising sustainable urban drainage to increase ground water absorption.

The existing protected structures on the Grangegorman site will be re-used according to viable, adaptive re-use strategies that carefully consider each building’s structural condition, plan configuration, and architectural character. Regarding transport systems, the Masterplan promotes travel plans and a transport policy that encourage the use of public transport and promote walking and cycling. A rich sequence of pedestrian and bicycle paths is woven into the landscaped areas, providing access to all the spaces and buildings in the District. The whole Masterplan for the Grangegorman Urban Quarter has been designed for change and flexibility so that it may be easily adapted to meeting changing needs and requirements in the future.
community infrastructure benefits

The following elements of the Masterplan will contribute to the benefit of the surrounding community.

**Education**

The proposed consolidation of the currently disparate spaces of the Dublin Institute of Technology within one campus on the Grangegorman site will bring a tremendous educational benefit to the community. DIT’s goal is to create a world-class higher education campus that serves society by supporting the economic, social and cultural life of citizens and reflecting the evolving character of education. The campus will be student-centred and resourced to meet the multiple needs of the Institute’s current student population of 20,500 students with the potential to accommodate a further 2,000 full time students when completed, and a further potential increase of 30% in the decade ahead. These students range from undergraduate to postgraduate, research students, full-time, part-time, apprentice students, traditional school leavers, mature students, economically disadvantaged students, students with disabilities, international students and students studying junior music.

DIT provides a comprehensive range of outreach / access programmes to the community, and many local residents will be able to have convenient access to these strong educational opportunities, as well as the recreational and sports facilities offered on the campus.

**Sports and Recreation**

The community will have shared access to the sporting facilities being provided for DIT, including the sports fields, tennis and basketball courts, and other recreation areas in and around the open space of the Fields. This major public amenity accommodates three pitches for different sports—soccer, rugby, Gaelic football, hockey, hurling—as well as informal gathering spaces. The location of the Fields on a slight rise in topography provides excellent southern sun exposure, while optimising panoramic views of the city skyline and the Dublin Mountains beyond. Jogging and walking paths weave around the sports fields.

Along the north edge of the Fields, the “Ha-Ha” landscape concept is proposed to take advantage of the natural higher slope of the site to accommodate large recreation and sports facilities underneath the plinth for the public promenade above. These sports facilities will relate visually to external spaces and include swimming pools and basketball courts. The Masterplan also provides a series of public gardens along the “green landscape fingers” of the Grangegorman Urban Quarter, including the proposed Cultural Garden facing the protected Clock Tower building.

**Healthcare**

A large part of the Grangegorman Urban Quarter will accommodate facilities for the HSE. These new buildings will provide convenient and needed healthcare services for the Grangegorman Urban Quarter and the surrounding community, including preventative health programmes and primary care services. Entry for the HSE will be from North Circular Road, Prussia Street and Grangegorman Road, reinforcing the interface with the community.
Public Access and Landscaping

The Masterplan design provides strong links with the immediate community as well as Dublin’s greater urban context. The “green fingers” landscape concept offers a rich sequence of pedestrian paths for the community to access the development. St. Brendan’s Way and the Serpentine Walk traverse through the site to connect it with the Grand Canal north to Mountjoy, and west toward Phoenix Park. A weaving network of north-south landscaped fingers provide access from North Circular Road through the development to the large sports amenities at the Fields.

The most important public access to the Grangegorman Urban Quarter is envisioned via the proposed future Broadstone Gate, extending directly beyond to Constitution Hill, Phibsborough Road, the King’s Inns and Henrietta Street, and south to the city centre. Public access at Broadstone Gate will be reinforced by the new LUAS station in front of Broadstone Terminal, while a second LUAS station at North Circular Road will improve public access at that location. Additional main public access routes are at North Circular Road and along Grangegorman Road and to the immediate south via Smithfield. Secondary, potential access points may be established along Prussia Street on the west side. The major urban path through the site is provided via the east-west St. Brendan’s Way, from Broadstone Gate, through the middle of the Grangegorman Quarter.

A series of lively social gathering spaces are planned throughout the site. Major public gathering spaces include the Library Square adjacent to the new DCC library, DIT’s Upper Terrace (the Quarter’s “academic heart”), the Arts Centre (the “social heart” of the district), and The Fields. Secondary gathering spaces are attached to the main pedestrian path from the north-east along the canal, through Broadstone Gate, and possibly connecting to Prussia Street to the west.

A strong pedestrian circulation network weaves through the site - both major landscape fingers as well as secondary crossing paths through building atria and lobbies.

Playgrounds

An array of play facilities will be provided throughout the Grangegorman Urban Quarter. The variety of locations identified as suitable include a school playground accommodated around the primary school at the junction of Grangegorman Upper, Rathtdown and Ivy Avenue. Play spaces are provided in the “woodland” areas of the Fields, and an exercise trail/jogging path around the Fields, as well as in pocket parks in the other areas of the district. Play equipment for kids of different ages will vary in character—from natural to more modern in character. In addition, other playspaces are planned near and adjacent to circulation paths, arrayed in various locations around the DIT and HSE areas. Sculpture, landscape furniture landscape design, play equipment, and fountains will be creatively integrated in the playgrounds.

Dublin City Council Branch Library

The Masterplan allows for a DCC branch library to be connected to the main DIT library, so that both facilities can retain their administrative independence while sharing certain spaces and optimising efficiencies and services. This central location maximises community access to the branch library. Besides the strong link to DIT, the branch library is situated directly across from the vibrant “Library Square” for the district, along the proposed Ivy Avenue.
Primary School

A primary school for 400 pupils is located at the intersection of Grangegorman Upper, Rathdown Road and Ivy Avenue. This location at the edge of the development provides a strong connection to the community and optimises easy, convenient access for pupils and their guardians with the main entrance/drop-off area located off Rathdown Road. The configuration of the school ensures a safe and secure site, while enabling access to sports fields and facilities, and green spaces in the Grangegorman district.

Arts and Culture

One of the two “hearts” for the Urban Quarter will accommodate arts and culture/performance spaces for the larger public community to promote lively, evening uses. This zone is located toward the eastern edge, adjacent to Broadstone Gate to provide convenient access for people coming from Smithfield and King’s Inns/Henrietta Street. The Performing Arts Centre includes a Concert Hall and museum and as well as art galleries.

Security

The Masterplan optimises the potential for providing passive security measures wherever possible, by incorporating program elements and design features that promote 24/7 use by pedestrians, bus or car users. The proposed Ivy Avenue will accommodate limited service access during the day, with possible public vehicular access in the evening in order to provide potential for surveillance and “eyes” in the district. Certain areas will have gates for controlling access. Limited vehicular and service access is proposed on St. Brendan’s Way and Grangegorman Upper with pedestrian and cycle access prioritised.

Public Transportation

The Masterplan capitalises fully on the establishment of the new LUAS Line D on its eastern edge, bordering the Broadstone site. The design envisages two stations—one in front of the existing Broadstone Terminal building, and a second one near North Circular Road. The LUAS line will greatly improve public and community access to and from the site, connecting it to O’Connell Street to the southeast, and outlying parts of the city to the north.

New bus routes will be developed to improve access by public transportation to the Grangegorman Urban Quarter and surrounding areas. Increased public transport to and around the site will provide a positive community gain.
02_masterplan design concept
key masterplan principles

**Two Hearts**
The Masterplan provides two “hearts” for the Grangegorman Urban Quarter. These two major activity centres—Upper Terrace at the Library, and the Arts Centre to the east—anchor a broad spectrum of social gathering places. The Upper Terrace is designated as the “Academic/Health Heart,” while the Arts Centre is envisioned as the “Social/Cultural Heart.”

**Quadrangles and Green Fingers**
In a contemporary interpretation of traditional collegiate “quads,” the configuration of the buildings on the site frames a pattern of enclosed courtyards, open spaces and plazas, creating distinct forms with strong individual identities. Main east-west pedestrian connective passages are crossed and extended by frequent fingers of north-south oriented green streets and sequences of other courts, forming a loose, continuous grid of communication in the Quarter. Smaller meandering paths move at mid-block/mid-court intervals to trace intimate connections between outdoor rooms and gardens.

**St. Brendan’s Way and the Serpentine Link**
The east/west division of the site by the Grangegorman Upper and Lower Road is mediated by carrying a principal pedestrian sequence—St. Brendan’s Way—across the existing roadway. This broad crossing also serves to closely unite existing listed buildings into a central village of academic and student life. The urban quality of St. Brendan’s Way is complemented by a second lateral procession—Serpentine Walk—a meandering link that traverses the site in two grand arcs, giving a south-facing green edge to student residence halls.

**Broadstone Gate / Link to King’s Inns & Henrietta Street**
The Masterplan creates a grand urban plaza and park at the Broadstone entry to the Quarter, extending the green space adjacent to the King’s Inns to form a symbolic and civic marker.

**Connecting to Smithfield and North Circular Road**
To the west, the pedestrian link continues from the urban park through the site to connect with the North Circular Road, and extends through to the Phoenix Park to the southwest. To the south, the Lower Grangegorman Gate opens pedestrian access to and from the Smithfield area, extending the existing City Arts’ activities northward.

**Ha-Ha Concept, Sports and Recreation and Utility Corridor**
The natural heart of the Grangegorman landscape is The Fields, comprising a generous portion of the entire site. This gathering of parkland sports pitches with park-like groves of new and existing trees is framed by the Serpentine of student residence halls, and the historic wall to the south. The Ha-Ha sectional dip concept provides additional, internal sports facilities with direct visual connection to the external pitches. Running and cycling paths entwine around the edges, linking the complementary qualities of sports fields, sheltering groves of trees, and distant views. Along the north edge of this open space, the Masterplan utilises the “Utilidor” concept (walk-in-duct) to concentrate utility services in relation to St. Brendan’s Way.
1. podium level plan
Spaces at the Podium Level are located one-half of a level above the ground elevation to allow natural daylight to enter all habitable spaces.

2. below grade level plan
The two-level Sports Centre has been located in a high profile and unique location between the outdoor playfields and the academic heart of the quarter and will be daylit by using glass walls adjacent to a landscaped “ha-ha” (an angled sloping change in ground elevation).
1. landscape design masterplan
1. landscape design hard and soft landscape (excluding tree cover)
1. Landscape Design Tree Concept
1. simplified program adjacency diagram

Simplified view showing the generalised adjacencies between program elements within the masterplan.
1. ground level program adjacency diagram

Detailed view showing the adjacencies between program elements at the ground level of the masterplan.
1. upper level program adjacency diagram

Detailed view showing the adjacencies between program elements at a typical upper level of the masterplan.
masterplan design concept

architecture

an urban quarter with an open future
The new Grangegorman Quarter creates inviting spaces for the community while maintaining connections to the site’s past and linking together areas of the city.
A series of quadrangles and courtyards are linked by both urban and landscaped pathways to form a legible and interconnected area.
grange gorman an urban quarter with an open future

architecture
The Institute’s Library anchors one of the central hearts of the quarter. Its location creates an intellectual hub of activity at the intersections of several primary circulation routes and provides iconic views from the Upper Terrace and the Fields out to the city of Dublin and the mountains beyond.
The Serpentine Walk creates a curved landscaped pedestrian spine traversing the entire site providing a green alternative to the more urban character of St. Brendan's Way. This spine organises the student housing buildings and provides views of the Fields and city beyond.
St. Brendan’s Way is one of the major circulation routes through the site that links together various programs and amenities as well as the overall site to the community.
1. view of the fields

The majority of the development is located on the northern portion of the site to maintain the existing landscape and open space to the south.
masterplan design concept
03_masterplan principles
grangegorman masterplan principles

The Masterplan provides for a framework incorporating key principles, strategies and objectives to drive a vision of a sustainable, thriving quarter for the Dublin Institute of Technology, the HSE and the city. The urban structure of the Masterplan establishes a series of six academic centres for DIT and several distinct courtyards for HSE, each with individual physical identities of buildings and landscaped courts. These academic centres are arranged across the site in a continuous array: Business, Tourism & Food, Science, Engineering, Built Environment, and Applied Arts. In addition, the DCC Library and Primary School will provide key benefits for the community.

The format of the buildings, and the layout of the district spaces they frame, emphasise a modular flexibility of uses. Buildings vary in height and number of stories, with the most public/shared educational spaces—lecture halls, classrooms, workshops and studios—at the lower floors, and faculty suites, seminar and conference facilities, and departmental administration on upper floors.

Design Principles

There are three primary design principles that govern the organisation and character of the open spaces and buildings for the Grangegorman Urban Quarter: Connectivity, Collegiality and Cohesiveness. These three principles serve to establish consistency throughout the development of the Grangegorman site, and ultimately contribute to a unique identity for the district.

Connectivity

Both physical and visual connections are encouraged on the site to facilitate movement across the Quarter as well as to foster a sense of district unity. A contiguous network of interconnecting open spaces, including plazas, quadrangles, gardens and interconnecting passageways, serves to physically link buildings throughout the Quarter. This predominantly pedestrian landscape serves as an alternative to pavement circulation along vehicular streets and offers visual relief to the consistency of the surrounding street pattern. Connectivity is also achieved by establishing a matrix of sightlines that visually link district landmarks and focal points throughout the Quarter.

Collegiality

The Masterplan supports a hierarchy of communal spaces that encourage collective interaction among users. These spaces are organised around specific program clusters, orienting individuals in classrooms, laboratories, residences, offices and other facilities to larger communities within the respective Quarter neighborhoods. These communal spaces, in turn, are visually and physically connected to larger, more collective district spaces. These communal spaces also serve to reflect a favorable sign of Grangegorman academic, health services and research-oriented life to the surrounding area and community.

Cohesiveness

Cohesiveness is aimed at promoting visual consistency among architecture and landscapes within the masterplanner’s control over the course of development of the Grangegorman Urban Quarter. Collectively, adjacent buildings maintain similarity by abiding to a prescribed massing and basic vertical organisation. All buildings conform to a range of specified materials and colours as well as a particular method of surface articulation. The district landscape also maintains cohesiveness through the consistent use of specific planting types, paving materials and lighting. Cohesiveness among buildings and open spaces enhances the legibility and identity of the entire Urban Quarter.
A network of established building lines determines the physical siting of buildings on the Grangegorman Urban Quarter. These building lines ensure that open spaces on the site are maintained during the course of development, and that the predetermined grid of view corridors and streets is preserved. The alignment of building edges contributes to the creation of a cohesive environment throughout the District.

**Organising Axes**

The fundamental organising ideas for the proposed Grangegorman Urban Quarter are depicted in this diagram. Development is organised around clear open spaces, pedestrian and service circulation systems. The primary organising axes—St. Brendan's Way and the Serpentine Walk running east to west, and the north-south landscape fingers—establish the basic ordering system and provide a clear framework onto which each increment of development can be attached. These prominent axes will establish the identity of the Grangegorman Quarter, defined over time by each increment of development that fronts onto each spine.

**Strong Quad Edges**

Each Quad maintains perimeter building lines which determine the absolute limits for buildings located on that Quad. The Masterplan advocates that building along Quad perimeters strictly observe the building lines in order to create definitive edges along Quarter paths and open spaces, and ensure that adjacent buildings align throughout development. Furthermore, these lines contribute to the formation of significant open spaces such as Upper Terrace, Broadstone Gate and the Arts Centre.

**Flexible Quad Interiors**

Whereas building mass should strictly adhere to perimeter Quad lines, building edges that fall within the Quad interior maintain some flexibility to accommodate unanticipated programmatic needs. These zones of dimensional flexibility can occur along the edges of interior Quad courtyards and connective passageways.

The standards suggested by the Masterplan for building footprints and massing are based upon the basic functional requirements for each building type. The suggested size and location of academic and HSE buildings, for example, meets the basic height and width requirements for multiple-story classroom and healthcare buildings. These standards are subject to some variation, and change may be accommodated within specific zones in each Quad.
quadrangles

The open space network in the Grangegorman Urban Quarter is shaped by the places that buildings make and the pathways that connect those places. The inherent variety of places within the proposed District is designed to accommodate a wide variety of specific functional, aesthetic and recreational needs. The proposed network of open spaces also seeks to provide a common ground that links these specific needs and brings a broad range of academic, healthcare and community components together.

The “Critical Alignments” structure that establishes the development increments at Grangegorman, and accommodates the future quad build-outs, also sets in place the open space network and hierarchy throughout the District. Within each prototypical District build out “parcel,” a landscaped quadrangle is provided. The particular needs of specific faculties and users will allow for great variety in the expression and character of each open space.

Several quadrangles can form clusters of quads, and a shared open space once again marks the character and nature of this specific grouping. The expression of this larger space—for example, the Cultural Garden and the Library Square—addresses a broader cross-section of the Grangegorman Quarter and creates the common ground for the individual quads that make up each cluster.

At the overall scale, the quads are linked by the primary north-south and east-west axes that move through the site—St. Brendan’s Way, the Serpentine Walk, the north-south landscape fingers—as well as the grand plazas at Broadstone Gate, Arts Centre and Upper Terrace. These major axes and open spaces, primarily given over to pedestrian and light service circulation, are the ones that establish the most common ground for the entire District and could accommodate the strongest expression of Grangegorman’s character and identity.
view corridors

The pattern of view corridors through the site—both east-west and north-south—serves to connect the site to the surrounding natural and urban environment. In addition to providing strong guidelines and orientation for pedestrians by focusing views on prominent surrounding landmarks and natural features such as the Dublin Mountains, the King’s Inns, the Wellington Monument, the Jameson House, and the Fields, the corridors also help to break down the scale of the overall development to integrate the site into the existing urban fabric.

In counterpoint to the major east-west connections along St. Brendan’s Way and the Serpentine Walk, an array of north-south landscaped view corridors emerges, visually linking the Grangegorman Quarter from North Circular Road to the city and Dublin Mountains toward the south.

Where these view corridors cross major internal circulation spines or adjacent public streets, the intersection is celebrated and marked with a change in the hardscape and landscape design, or through the massing of adjacent buildings.
The Grangegorman Urban Quarter proposes a clear, strong urban pedestrian zone in order to achieve the following key urban design objectives:

- Strengthen a sense of character, identity and continuity for the District.
- Optimise the quality, adaptability and diversity of the public realm within the site.
- Create major connections to significant features in the surrounding urban fabric, including North Circular Road to the northwest, Broadstone Gate and King’s Inns to the east, and a possible link to Prussia Street to the west.
- Modulate the height and density of buildings along the pedestrian zone to relate to the scale of the buildings on the Record of Protected Structures as well as the existing buildings in the surrounding urban context.
- Reinforce a lively sequence of public spaces that are defined and enclosed by means of building mass, landscaping and planting to create a well-used, day-and-night District.
masterplan principles

building heights

The massing strategy for the building heights is shaped by the needs of DIT and HSE, the response to sunlight and wind conditions, and by the relationship with the neighbouring buildings on the edges of the site. The massing steps up to be the densest and highest toward the major public opens space at Broadstone Gate, and steps down to be lower around the site boundaries in order to relate to the surrounding community.

While the buildings are generally between 2 and 8 floors bar the Broadstone area, the Masterplan proposes one high element located along the student housing curve at the edge of the Upper Terrace and the Fields. This landmark element serves as a ‘campanile,’ similar to various precedents around the world—a viewing tower for the public, at the top of student housing, to come and view the Grangegorman Urban Quarter and surrounding city, and establishing a “marker” to set the Grangegorman area in its urban context.

This strategy contributes to the cohesive appearance of the Grangegorman Urban Quarter, providing a measure of consistency and District identity that is simultaneously harmonious and distinct from the surrounding context.

The massing of buildings is defined by the expression of simple volumes that promote a basic level of conformity among adjacent buildings while accommodating a range of possible architectural solutions and building types. This approach also offers flexibility to accommodate unanticipated modifications in individual building programs and functions. Moreover, the clearly delineated edges of building volumes contribute to the formation of streets and positively shaped open spaces within the Grangegorman Urban Quarter.

Build-to lines and setback requirements will govern key alignments of all buildings on the Grangegorman Urban Quarter. These lines have been determined as defining major pedestrian paths and crucial view corridors for the entire development, in order to create a cohesive series of open spaces on the site.
The Masterplan enlarged plans show the number of stories allocated per building volume. The heights of these volumes will vary depending on the building type because building types generally require different floor-to-floor heights for various reasons. For example, housing units may have lower floor-to-floor heights than academic or institutional buildings for economic reasons. Laboratory and research buildings may need greater floor-to-floor heights to accommodate larger floor areas and raised floor or ceiling systems used for ventilation, gasses and other piping and lighting needs.

Building types such as Performance Venues, Sports Courts, Museums, Libraries, etc... generally do not conform to specific floor-to-floor requirements because of their specialised nature but guidance can be given for some of the building types planned for the site.

- Laboratory and Research Buildings 4.5 meters floor-to-floor max.
- Administrative and Office Buildings 4.0 meters floor-to-floor max.
- General and Academic Buildings 4.0 meters floor-to-floor max.
- Housing 3.0 meters floor-to-floor max.

Several buildings planned for the site are located over a podium level that is situated half way above and below grade. The podium level is typically 3 meters above the adjacent grade and is sometimes pulled away from the building to allow natural daylight to enter habitable spaces.

Some buildings may have a higher (5 meter) floor-to-floor height at the top floor to accommodate special uses such as conference spaces. Setbacks are encouraged at the ground and top levels for rain protection and view balconies as well as to add rhythm and modulation to the building facades. All buildings on the site have a ground floor-to-floor height of 5 meters to accommodate large area public uses, retail and restaurant spaces and to introduce a level of aesthetic consistency and horizontal datum.
In general, the building heights in the Grangegorman Urban Quarter have been set between 4 and 6 storeys to respond appropriately to the education and health uses which they will provide and to relate to the surrounding Dublin city context. At the edges of the district, these building heights step down to be lower, particularly along the North Circular Road and Grangegorman Upper Road.

An important strategy in the Masterplan provides three special places with increased heights to create a strong identity for the Grangegorman Urban Quarter. These three higher elements have been positioned in central locations to give the district a distinctive presence when viewed from around the site and the city. Their locations have been selected to ensure that they would not have a direct impact on the existing residential neighbourhoods.

**The Campanile**

The most prominent element, the “Campanile,” is located along the student housing curve on the north edge of the Fields, at the Upper Terrace, to give expression to this significant public space and establishing a “marker” to set the Grangegorman area in its urban context. Inspired by the numerous slender towers and spires in Dublin, this 15-storey landmark provides an elevated viewpoint for the public, while also helping to orientate users and pedestrians within the Quarter itself. This “campanile” typology can be found in various other urban and campus settings around the world.

**Student Housing**

The student housing buildings are set in a series of curves along St. Brendan’s Way and Serpentine Walk to define the northern edge of the Fields. They step up and down between 4 and 8 storeys to offer a compelling image when viewed from the city, providing a dynamic sense of movement much like the natural landscape. These buildings reinforce the curved geometry to shape a vibrant street realm along the spine of St. Brendan’s Way and Serpentine Walk for pedestrians and users, ensuring that these spaces will be socially activated.

**Broadstone Gate**

The massing of buildings on the Grangegorman Urban Quarter steps up toward the major entry gateway, transport hub and public open space at Broadstone Gate. The buildings in this location strengthen the identity of the public-oriented spaces accommodated in this area, including the Science & Industry Centre, DIT Research Center, and HSE administration. Ranging between 5 and 12 storeys, with the highest elements at 10 and 12 storeys, the buildings create an appropriate, significant urban marker that relates effectively to the greater city in this historically prominent location—especially with regard to the future LUAS line and stations nearby.
character of Ivy Avenue

The character of Ivy Avenue on the north and south sides has been created to optimise solar orientation and shape architectural identity. The north (south-facing) side is more open, incorporating generous landscaping and breaks in the building line, in order to maximise sunlight access into the quads and courtyards.

The south (north-facing) side is provided with a more solid street edge to strongly define the road and buildings along this edge.

South Facing Quads

In general, the Masterplan configures the DIT and HSE Quadrangles so that their varied program will fit with sensitivity and richness into the site. The buildings and open spaces are developed in close dialogue with the topography and the light.

Open spaces, public gathering areas, pedestrian paths, views and buildings are organised in relation to the movement of the land and access to sunlight. Given Dublin's frequently cool and wet climate, orientation to the southern light and warmth is carefully shaped and enhanced for all of the important social gathering spaces—including the major public spaces (Upper Terrace, Library Square, St. Brendan's Way, landscape finger parks) as well as the individual quad courtyards. The connection of buildings, open spaces with the environment and exposure to daylight enhances the specificity of this place and gives expression to the culture and community of the Grangegorman Urban Quarter.
Roofscapes

Roofscapes & Service Courts

The roofs of buildings and other large hard-surface courts are often prominently visible from surrounding taller buildings, particularly in the DIT and HSE areas. These areas should therefore be considered as a building façade with respect to all new building projects, and must be given appropriate design consideration, with particular attention to the treatment of mechanical systems and exposed elements. Green grass sod roofing should also be used whenever feasible.

Rooftop Mechanical Screening

Approximately one-third of a typical lab or research building is devoted to rooftop mechanical equipment and exhaust stacks. Despite required setbacks that decrease the visible mass of the rooftop equipment, the visual impact of the exhaust stacks is still significant. In order to minimise the visibility of undesirable mechanical equipment, the Masterplan advocates that exhaust stacks should be clustered whenever possible and collectively screened within a series of simple forms.

Each building should have an organised and screened appearance for all rooftop equipment from prominent viewing angles, resulting in a collection of simple rooftop forms.
Grangegorman: An Urban Quarter with an Open Future

Architecture

Colours and Materials

Introduction

Colours and materials play a significant role in creating a cohesive image for the Urban Quarter, while lending distinctive identities to various parts of the District. A harmonious palette of colours and materials is developed from the existing Dublin context, the local climate, as well as the design guidelines established for the Grangegorman development. The use of special accent colours and materials is reserved for areas of specific articulation such as important structures, gateways and entries.

- The overall palette of appropriate colours and materials has been selected to respond to the site’s Dublin setting. The materials and colours are intended to look appealing and work well with the specific Irish climate and light. Materials are envisioned to be durable and have a good appearance over time, particularly in regard to the two significant conditions of Dublin’s weather—abundant wet, and limited sunlight, particularly during the winter months.

- Materials are also inspired by precedents of historical buildings in the city. The Georgian brick and stone buildings have kept their engaging appearance despite their age. Having similar materials for the Grangegorman Urban Quarter will link the new District into the urban fabric of the city.

- The Masterplan strives to balance individuality and harmony in terms of colours and materials. While the Masterplan seeks to provide flexibility to the different architects in future phases to design the buildings, it recognizes the importance of achieving an harmony and integrity for the entire Grangegorman Quarter. For example, different faculties within DIT as well as the HSE could have individual identities within an overall unified character.

- All colours and materials will be reviewed and selected according to the highest possible standards regarding overall quality for texture, colour, consistency, durability, etc...) Quality control measures will be implemented to ensure the best possible results, including the preparation of full-size mock-up panels of colours and materials for review.

- It is important for the selection and application of colours and materials on buildings to follow a harmonious and integrated sense of proportion and scale, utilising rectangular unit modules and horizontal grids that complement the primary brick work.

- The transition between different types of colours and materials will be coordinated and treated in a well-articulated, meaningful way in order to achieve a cohesive unity of materials. The arbitrary or random application of multiple colours and materials on buildings will be discouraged.

- The selection and application of all colours and materials will respect the building height datum.

Brick, Stone and other materials

Where brick is used, the buildings on the Grangegorman Urban Quarter will have exterior brick in warm, rich, ochre-like colours that best reflect the light. The selection and application of larger brick or stone panels may be considered. The use of intense red, grey and dark brick colours will be discouraged.

The major public, iconic buildings including those located in the two “hearts” (Upper Terrace and Arts Centre), Broadstone Gate, North Circular Route and other gateways may contain stone elements to provide a more substantial character. The stone material will be a gray-green stone similar to Irish marble. For example, the buildings entries can be distinguished with textured stone panels.

In addition to an overall primary palette of brick and stone, some secondary materials including metal and concrete panels may be considered for the building envelope, on a case-by-case basis.

Windows and Glazing

The windows will help to define the desired vertical and horizontal expression, and distinguish the solid and transparent areas of each building. At night, they will stand out as the visible and prominent features of the buildings.

- Care should be taken in the sizing and composition of the frames, mullions and muntins of the windows in order to provide a varied but harmonious effect.

- The windows are also important in terms of bringing light into the interior spaces and should therefore be generously dimensioned.

- All window mullions and other framing elements should have a light colour (white, off-white or silver) so that they stand out and can be seen against the glazing areas.

- Select high-performance, low-emissivity glass with high light transmittance.

- Provide sufficient depth between the windows and the exterior wall surfaces by incorporating recesses or projections, in order to avoid a superficial, flat look in the elevations.

- The use of the following will be discouraged: dark-tinted glass, mirrored glass, dark mullions, or large/oversized panes of glass.
colours and materials

Secondary Materials for Building Envelope

Other secondary materials may be considered for selected buildings. These will be reviewed and approved on a case-by-case basis, and will be subjected to the same quality control measures as the primary materials, in order to ensure the highest-possible standards.

- Glazed wall.
- Framed panel system.
- Stone cladding.
- Combination of brick and concrete.
- Architectural terra-cotta.
- Metal cladding.
- Point-fixed glazing.
- Pre-cast concrete panels.
Along the major urban path of St. Brendan’s Way, a strong sense of urban connection, vitality and lifestyle will be promoted, with prominent areas of ground-level glazing, arcades and canopies to activate the street edges for pedestrians. The exterior material for buildings along St. Brendan’s Way will have an overall lighter colour in order to maximise exposure to daylight.
masterplan principles

colours and materials

Hearts

The two hearts of the Quarter, Upper Terrace and Arts Centre / Student Hub and the special buildings surrounding them will be given the most significant colours and materials. The Arts Centre will have warmer, brighter and more intense colours to reflect their more public, friendly and informal character. Buildings at the Upper Terrace academic heart will have overall lighter and cooler colours to reflect their more elegant and formal status. Stone, metal and large expanses of glass are suggested as the predominant materials in these areas.
colours and materials

DIT Courts

The courtyard and associated buildings within each Quad will have their own identity, based on the use and faculty accommodated. Individual entries and passageways within the courts can be more intensely coloured, symbolic of the vibrancy of the activity within, yet related to the overall palette of colours and materials for the buildings. The basic material is brick in an ochre colour, but the openings and gateways will have accent colours, using the precedent of colourful doorways on Georgian buildings around the city. The portions of accent colours are limited to only the areas around openings and entryways.
colours and materials

HSE Courts

The exterior materials for the buildings within the HSE zone will be characterised by a softer and warmer palette of colours that are appropriate for health-related facilities. In addition to enhancing an engaging and inviting atmosphere for the HSE, these warmer tones will help in the psychological healing and therapeutic processes of the users and clients of HSE.
colours and materials

Green

The colour and material palette for the open spaces and buildings along the Serpentine Walk and North-South landscape fingers is developed in close response to the landscape design of these major “Green” areas within the Masterplan. The buildings in these areas will carry a textured material to provide a background complementary to the strong, distinctive landscape elements in these locations.
As a major focus of educational, healthcare and community life in North Dublin, the Grangegorman Urban Quarter will be distinguished with primary access points for pedestrian, vehicular and transit traffic at the periphery of the site.

Several primary potential gateways provide entrances and serve the east, northwest and southwest edges of the District. Specific landscape and architectural strategies mark these gateways, enhancing their legibility to pedestrian and vehicular traffic, as well as the surrounding communities.

- Broadstone Gate
  At the east, the Broadstone Gate is the most significant symbolic and historic entrance to the Grangegorman Quarter. This will be the entrance used by most people to the District, with direct links to St. Brendan’s Way—the major pedestrian spine through the District—as well as the future LUAS line.

- North Circular Road
  This will become an important symbolic and visitor entrance to the site from the northwest, especially for patients, employees and staff of the HSE. It is aligned with a strong view corridor toward the Fields to the south.

- Grangegorman Lower Road
  Grangegorman Lower Road itself presents two major gateways. Many people will access the district via this route from both north and south. With priority given to pedestrians, it occupies an important and central position directly adjacent to several landmark structures and well-used zones—the Clock Tower, the Arts Centre, the Cultural Garden and the Student Support Services “hub.”

masterplan principles

colours and materials

Gateways

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masterplan principles

colours and materials

Gateways

Gateways
Sustainable Materials

The building materials for the future Grangegorman Quarter will be selected according to the highest sustainable standards, in order to protect local ecosystems, conserve natural resources and energy, reduce building operation costs, enhance asset value and profits, promote superior indoor air quality, foster increased occupant health and productivity, and ensure long term serviceability for the buildings. Following are the key aspects of a sustainable strategy for materials:

High quality

- Select materials that have low life-cycle costs and require low maintenance, optimising the concept of “reduce-reuse-recycle” to help create buildings that have long and useful lives.

High performance

- Select materials that respond to Dublin’s climate and natural context in a way that conserves resources and energy, and minimises the emission of heat and pollutants.

Healthy

- Enhance indoor environmental air quality, including use of non-toxic, low volatile organic compound (VOC) materials for paints, carpets, adhesives, etc.; elimination of CFC's, HCFC’s, and Halons; and permanent air monitoring systems.
- Implement an indoor air quality management plan during construction.

Environmentally responsible

- Select the use of recycled, recyclable materials and renewable resources whenever possible.
- Promote the use of healthy materials from local sources.
- Use woods for interior applications from certified sources.

Carefully processed

- Incorporate accepted sustainability standards in the manufacturing, transportation, fabrication and installation of the materials.
- Review materials for their use of non-renewable resources during their production, transport to the site and construction.
- Waste during the construction and operation of buildings should be reduced to a minimum and recycled.

Flexible

- Enhance adaptability and durability by adopting a flexible approach to building technology with the goal of ensuring 50- to 100-year buildings. Ensure that building detailing, systems and materials selections represent the very best building practices.
- Select materials that will accommodate low cost re-configuration in interior applications.
Accessibility

The Grangegorman Urban Quarter will be guided by the following principles regarding overall universal accessible design, site and building features:

- Maximise the ability of all potential users—particularly regarding issues of age, mobility, visually or hearing impaired—to enter the site, move around, enter the buildings and use the facilities.
- Design buildings to be logical, simple and obvious to use; to fit into and, where possible, improve surrounding movement networks; to link roads, footpaths and public spaces though and across the site.
- Ensure that building access is clearly and easily identifiable for visitors who may be unfamiliar with the area, and for persons of all abilities.
- Ensure that the movement network supports convenient, safe and appropriate travel, including good and safe principles with regard to the road and pathway design.
- Promote the use of cutting-edge technologies to achieve wayfinding strategies.
- Provide adequate access for emergency services.
- The proposed pedestrian paths throughout the Quarter will provide a good surface for wheelchair users, and roads will be free from kerbs to optimise access.
- Provide external sign-posting/way-finding elements that address the needs of persons with disabilities.
- Design internal way-finding to be effective, safe and efficient whilst minimising disorientation.
- Adopt best practice provisions regarding building and external spaces design (e.g. BS 8300:2001 or other standards/guidance).
- At all stages of the project, fulfill and exceed requirements stated in all relevant current and future regulations regarding accessibility, including up-to-date Accessibility Audits.

Security and Safety

A major goal of the Grangegorman Masterplan is to provide a safe environment at all times for students, clients, users, employees and visitors, by optimising the following measures:

- Ensure that the authorities and officers responsible for safety and security on the Grangegorman Urban Quarter are sensitive to the community.
- Strengthen existing cooperative relationships with the local police and fire protection personnel, public transport personnel, etc.
- Assist local authorities with public safety programs and public emergency response services at and near Grangegorman facilities.
- Implement strategies for optimising passive observation, openness and clear lines of vision, including the adoption of good urban design solutions and the use of CCTV cameras.
- Provide adequate security methods, including exterior lighting, particularly in parking and recreational areas, in order to enhance a safe environment on all Grangegorman sites. These security methods should be designed in a manner which is sensitive to the surrounding communities.
- Support local efforts to increase fire and security protection, especially in communities that may have a high incidence of crime.

Anti-social behaviour

- Implement all appropriate measures regarding police protection, DIT/HSE administrative policy, community involvement and other regulations in order to discourage and reduce all forms of anti-social behaviour as much as possible—including behaviour associated with drug abuse and the excessive consumption of alcoholic beverages.
- To ensure safety and security for all pedestrians, provide sufficient street lighting throughout the District and surrounding streets.
- Provide special anti-graffiti coating on ground and wall surfaces in the pedestrian paths and gathering areas. Should graffiti occur anywhere, remove it as soon as possible to optimise ease of removal and to discourage “copycat” graffiti.
- Select sturdy materials in areas of high pedestrian traffic.
- Provide one or more designated skateboard area(s) or park(s) within the site on an artificial surface, in order to minimise damage and accidents from skateboarding.
- Implement “smart” design solutions in the hardscape and landscape areas as appropriate to prevent and discourage skateboarding, including the following: Use natural stone for surface materials and street furniture to create irregular surfaces, rounding off the edges of street furniture and kerbs, etc...
conservation overview: new uses for protected structures

The Masterplan has been developed with ongoing architectural and conservation input to the overall vision, layout and use strategy in addition to more focused and specific input on the significant protected buildings and structures. Thus, for example, St. Brendan’s Way can be read as a new extension to the important early 18th-century spine of the City which ran from Dublin Castle on the south of the River, through Grattan Bridge (the eastern most river crossing at this time) along Capel Street to Bolton Street/Dorset Street and, leading off this into Henrietta Street—the street of mini-palaces home to the political and financial elite of the period—culminating at Gandon’s King’s Inns. This new extension will connect this historic spine with Broadstone and run east-west through the Grangegorman lands to a possible connection at Prussia Street, integrating many of the important protected buildings along its route.

At the outset of the Masterplan preparation and following site visits and review of previously prepared reports, a number of conservation objectives were developed to provide the following Conservation Strategy for the Masterplan:

• To establish and articulate the protected, social, urban and architectural values of Grangegorman and to ensure these are suitably incorporated within the overall Masterplan. As such, it is important to understand the historic significance of the site from the earliest development of the city and its environs, through to its more known and recent history of institution.

• To integrate the protected structures of significance within the Masterplan in a manner which ensures that they contribute to the generation of spaces and places—both in terms of physical layout and character.

• To identify uses for the protected buildings which are compatible with their spatial layout, which will ensure full and useful occupancy and which will allow this important heritage to make a dynamic contribution to the cultural and functional character of this evolving urban quarter.

• To identify opportunities where history—in built and memory form—can influence the Masterplan in a way which enhances sense of place and, in so doing, enables distinctiveness of place and identity.

• To establish strategies for repair, intervention, adaptation and extension to the protected structures. These will include general and specific strategies and will also include approaches and objectives for upgrading of historic structures for increased thermal efficiency and other initiatives to achieve the Masterplan Brief objectives for greater energy efficiency and sustainable development.

• To ensure that the integration of historic / protected and new built form and landscape achieves an overall coherence and integrity both at the level of the Masterplan and the individual buildings.
1. **Connolly Norman house (St. Dympna’s)**
   This two-story house was built in 1905 as the home of the Director of the hospital. Like all buildings to remain on the site it is listed on the Record of Protected Structures (RPS) of the Dublin City Council. The building will be converted to function as a small administrative space for the mental health program of the HSE.

2. **The Male Ward (Top House)**
   This three-story structure was built in 1870 as the male wards of the Richmond Lunatic Asylum. It will be incorporated as a portion of the DIT Library.

3. **The Laundry Building**
   Single story structure built in 1895. It will be converted into offices for the HSE and a Day Facility for the residents on the HSE site and elderly members of the surrounding community.

4. **The Mortuary**
   Single-story building built in 1900. It will be converted into administrative offices for either the GDA or DIT and may function as a Visitor Orientation Centre.

5. **The Female House**
   Built in 1870 to house the female population of the hospital. It is proposed that it will house portions of the Student Services for DIT and help form a hub of student services and activities.

6. **The Male Infirmary**
   The Male Infirmary was built in 1850. The proposed use is a multi-faith place of worship.

7. **The Roman Catholic Church**
   The existing Roman Catholic Church will remain as a Catholic Church.

8. **The Female Infirmary**
   Built in 1850. It is proposed that it will be converted into a DIT bookstore and cafe.

9. **Church of Ireland Chapel**
   This building was constructed in 1860. It has been unused and was de-consecrated in the 1990’s. This single volume space is planned to be used as a gallery or exhibition space.

10. **The Richmond penitentiary (clock tower building)**
    Built in 1814 and is one of the oldest buildings on the site. The building is scheduled to be used as faculty and teaching space for DIT, probably for the Faculty of the Built Environment.

11. **The Richmond Lunatic Asylum (Lower House)**
    Three-story structure built in 1810. It will be restored and converted into a space that could serve a variety of research or office uses including perhaps a portion of the Science and Industry Centre.
is to be removed it should be re-used on site or, where this is not feasible, an appropriate reuse elsewhere should be identified. Designs and planning applications should demonstrate how impact on the historic fabric will be minimised

Junctions between new and old: New extensions and additions should engage with the historic buildings. Junctions between new and old should relate to primary architectural features of the historic buildings.

New basements adjacent to existing buildings: A number of basements are proposed under the new development. Where these may be close to, or abutting, existing buildings and structures, these require to be set back daylighted in a manner which does not comprise the structural integrity and weathering of the protected structures and any design proposals/planning application should include sufficient details to show how this will be achieved.

Sustainability objectives
It has been stated that the most sustainable building is the already existing building, due primarily to its embodied energy. This value needs to be taken into account in any sustainability audits for new development which includes existing buildings. The cultural heritage value – collective memory, associations, etc. – also contribute to the social sustainability of place and needs to be included in any sustainability assessments.

Appropriate initiatives to improve the energy efficiency of existing buildings should be implemented. The approaches to upgrading will depend on the condition and significance of the internal and external fabric, however there are many ways in which energy efficiency can be achieved without compromising the architectural heritage value. It is important that compatible materials and techniques are used, for example hygroscopic insulators where upgrading breathable external walls. As the historic buildings will form part of a larger development, centralised energy centres, e.g., district heating systems using renewable energy sources, could also serve existing buildings and thus minimise impact within the historic building. There are a number of emerging guidance documents addressing the appropriate adaptation and treatment of historic buildings to reduce carbon emissions and dependence on non-renewable energy sources. Designers and specifiers should seek advice from the DoEHLG Architectural Heritage Advisory Unit on the appropriateness of such guidance and have due regard accordingly.

Monitoring and Maintenance
Maintenance plans should be provided for all protected structures as part of planning applications. This should include provision for monitoring condition both in advance of any refurbishment/redevelopment works and during the ongoing lifetime of the building. Where current building condition is causing deterioration of structure and fabric, appropriate protection measures, temporary or permanent, should be put in place subject to necessary approval by/agreement with the planning authority (for example by way of Section 5 Declaration of Exemption).-

Principles for removal, or partial removal of existing buildings and structures
All structures should be fully recorded in photographic and drawing format prior to demolition/partial demolition. Copies of these records should be lodged with GDA, Dublin City Archives and with the Irish Architectural Archive. Proposals and methodologies for dismantling and reuse of sound elements should be submitted as part of planning applications.

Planning submission requirements for existing buildings
Where significant intervention, alteration and/or addition is proposed, there should be a sufficient level of detail submitted with any planning application to allow a full assessment of the proposals. In addition to the proposal drawings, the information to be submitted should clearly show the existing situation and details and describe – in drawing and text format – the rationale behind the proposal and how any new works relate to and are informed by the existing architecture. This rationale should also include outline material specification and outline scope of works.

Building Repairs
While the adaptation of the buildings to be retained will require intervention and alteration to meet specific use requirements, a considerable portion of the works involved will require repairs to historic structure and fabric. This work should be carried out in line with he following principles for the repair of historic structures.

The works shall have due regard to the Department of Environment, Heritage and Local Government Conservation Guidelines and current conservation principles and techniques.

The extent and scale of works to the buildings will be carried out in a manner sympathetic to the intrinsic quality and architectural significance of the structure.

Retain and repair authentic architectural structure and fabric. Respect for the existing integrity of the building should be a priority, and works should always be carried out with full reference to historical authenticity. All existing fabric which is sound is to be protected. Generally a minimum interventionist approach should be taken with an emphasis on repair, with replacement only of decayed or missing parts, rather than outright replacement.

Repairs and alterations shall be carried out without attempt to disguise or artificially age, but shall also be carried out so that they are sympathetic with the architectural and aesthetic integrity of the building, or building element. All existing features and decorative work to be retained will be protected during the works. Any addition, whether reconstruction or repair, is to be implemented in a manner which will not damage existing fabric or features, and will not obliterate existing authentic work. In as far as possible, repairs should take place in situ.

Materials used for repairs should be compatible with, and, in as far as is possible, match the historic materials. Work to be carried out using traditional or appropriate materials and techniques, including the use of natural materials. The aim is to use natural and traditional materials in preference to synthetic materials which will, in general, be avoided.

Salvage materials shall only be used where of proven provenance and will only be used in a manner that will not confuse the understanding or appreciation of the historic structure. As a general principle it will be the intention to salvage and re-use all sound material arising from modifications or removal, where feasible and appropriate.

Loose debris/rubbish resultant from the works will be removed from the building and disposed of in accordance with waste management disposal requirements of the Local Authority. This operation should be supervised to ensure no important building fabric is removed.

Reversibility or substantial reversibility shall be a guiding principle to repair, alterations and additions to protected structures. As genuine reversibility cannot always be appropriately applied it should not be used to justify inappropriate interventions in these instances.
adaptive re-use of historical wall

- new opening locations
- modified walls

- high walls
- high walls with metal fences
- low walls
- low walls with metal fences
- walls with metal fences and brick/stone piers
- entrances
- blocked-up entrances/arches

masterplan principles
The development of the Grangegorman Quarter is based on the international best practices of environmental sustainability. Early, sustainable masterplanning decisions will be augmented by the requisite governmental requirements and best practises and decisions of the designers of the individual buildings.

At the masterplanning level, buildings have been located and oriented to take advantage of natural daylight, reducing the need for artificial light. Building widths vary but narrow widths have been chosen wherever possible to further ensure the penetration of natural light into the interior spaces. Courtyards generally open to the south to prevent the overshadowing of exterior landscaped space by buildings. The buildings have been located densely on the northern portion of the site, allowing the existing open space to the south to remain a naturally landscaped space. The open playfields have been linked to a more regional chain of open spaces allowing people and wildlife to find a natural system of pathways through the urban density of the city.

One of the major goals of the environmental sustainability strategy is to minimise energy demand and carbon emissions by creating an energy plan that allows the Grangegorman development to become a zero carbon development by 2030. Therefore the energy plan for the Grangegorman development prepares for an eventual 100% renewable energy supply.

The basis of the initial energy plan is subdivided into two components: a site wide energy plant as well as an individual renewable energy plant for each building block. All heating, and a portion of the electricity, will be generated from a centralised combined heat and power (CHP) plant using biofuels and distributed to individual buildings. In addition, each of the individual buildings will provide hot water from hot water solar collectors located on the roofs of each building.

Additional energy producing and energy saving principles, standards and requirements have been introduced through this narrative. But while technology dependent concepts such as power generation from biofuel use and high visibility strategies such as wind turbines and photovoltaics have been considered for the plan, there are also other important energy and water saving principles that are based in sensible and sensitive early planning in the Masterplan.

There are also environmental sustainability principles that relate to the quality of life the building inhabitants and neighbors should enjoy, such as indoor air quality, view corridors, noise reduction, pollution reduction, traffic reduction, and conservation of natural and cultural heritage resources. Some of these issues have been addressed in detail throughout the Grangegorman Masterplan and Masterplan Design Guidelines and the remainder have been detailed within this section. In addition to the energy supply goal, several key environmental sustainability principles have been developed for the project at the masterplanning stage.
**sensible urban density and linking natural pathways**

The 73 acres site has been walled off from the city since the nineteenth century and is one of the largest undisturbed pieces of land in Dublin. It was important to maintain the existing healthy landscape elements, especially the large open fields to the south of the site by planning most of the new construction to the north of the site and creating an urban but sensibly dense design.

The River Liffey, Phoenix Park and the Canal are all important natural resources for the city. Linking these currently unconnected landscape pathways with the new Grangegorman Quarter strengthens the entire infrastructure, providing landscaped pathways for pedestrians and wildlife through the dense urban fabric of Dublin.

**natural daylight, ventilation and wind protection**

The design of the building footprints, heights and layouts have been developed to allow maximum daylight to enter buildings, minimise overshadowing of each other and of landscaped areas and to minimise excessive wind.

**preservation of existing natural and cultural heritage**

There are currently twelve buildings on the site that have been listed on the Dublin Record of Protected Structures. The re-use and re-purposing of all but one of these existing buildings not only conserves the embodied energy used in their initial construction and saves the energy that would be used to replace them, but helps create a connection to the past history of the site. Wildlife habitats and existing mature healthy landscaping have been studied and steps undertaken for conservation.

**transportation strategies**

The Masterplan design encourages pedestrian movement over vehicular use. The concept prevents the general public from traversing the site in automobiles and allowing other vehicles to enter the quarter only via "shared surface" pavement where vehicles are subservient to pedestrians. The design has been oriented to promote strong connections to public transportation such as existing bus routes and the proposed LUAS line at the Broadstone Gate.

**water management**

Water retention strategies such as swales and holding ponds have been designed to reduce runoff into the city system. This runoff has been incorporated into landscape features such as the water rill located in front of the Sports Centre. In addition, permeable surfaces have been incorporated in the outdoor public areas to allow water to return naturally to the aquifer below.

**Renewable, long-lasting and environmentally safe building materials**

The Masterplan encourages the use of recycled and renewable building materials through the various energy efficiency and environmental sustainability standards that it is under the authority of. Using renewable construction materials prevents pollution and waste generation, creates new recycling industries and reduces landfill disposal and expansion.

Using low VOC paints, formaldehyde free adhesives, and other safe building materials creates high indoor air quality and promotes greater health and efficiency for the occupants.

**energy efficiency and sustainability standards**

Each individual building shall achieve a Building Energy Rating (BER) of A3 or better based on 2008 asset rating system, which corresponds to an Energy Performance Coefficient (EPC) of not greater than 0.50 compared to 2008 Building Regulations. This BER shall be calculated using a permitted Irish National calculation methodology for Commercial buildings, being NEAP/ISBEM, or approved Building Simulation software.
To ensure that the appraisal is robust the status of all indicators is achieved through consensus with the professional team. This approach means that the findings of the appraisal are the result of consideration of all factors in deciding the ranking allocated to each indicator. The four sectors of SPeAR are not weighted.

**Appraisal Results**

The following section sets out the key strengths which emerged from the appraisal and some of the future opportunities to continue to improve the sustainability performance of the proposals.

The sustainability appraisal of the development proposals was based on the information available for the current masterplanning stage, August 2008. It should be recognised that the SPeAR assessment is a live document that can be updated at future stages of Masterplan development, and facilitates tracking of improvements in sustainability performance as the scheme progresses.

**Environment**

**Environmental: Key Strengths**

- Reuse of a brownfield city centre site which is designated for redevelopment.
- Development of a new urban quarter that will include a diverse mix of uses.
- Intention that the development minimises energy demand and carbon emissions and can become a zero carbon development by 2050.
- Mobility Management Plan anticipated for implementation.
- Implementation of SUDS (Sustainable Drainage System) e.g. rainwater harvesting, green roofs.
- The implementation of SUDS will enhance and augment existing habitats.
- There is potential to create new feeding routes for wildlife and enhance local microclimate along green fingers of open space.
- Masterplan proposals include comprehensive landscape plan.
- Conservation strategy describes principles and guidelines for repairing, reuse, intervention and adaptation of buildings.
- Flexibility built into design and Masterplan so as to ensure long-term viability of buildings and the site.
- Sustainability technology options outlined in energy strategy.
- Aspiration that buildings will have a reasonable building lifetime.
- Aspirational plan to develop Environmental Management System (EMS) to ISO14001 standard.
- Limited number of car parking spaces to be provided.

**Future Opportunities**

- A Code of Construction Practice should be specified to manage potential air quality impacts during the construction phase.
- Ensure transport associated with the development continues to be addressed to minimise potential impacts on local air quality.
- Commitment should be given to initiatives outlined in the Mobility Management Plan.
- Continue to ensure designs reflect the historical context and townscape of the surrounding area.
- Commitment that detailed design phase retains the varied mix of amenity spaces throughout the site.
- The GDA should explore incorporating green roofs/living roofs at the detailed design stage. Their design should be such as to ensure they have a high amenity and ecological value.
- Investigate opportunities for the cultural heritage of the area to be further incorporated and reflected in the detailed design at the planning application stage.
- Ensure mitigation measures proposed in Strategic Environmental Assessment (SEA) are undertaken regarding the management of the cultural and archaeological heritage.
- Continue to develop detailed design in the context of evolving Award Based Schemes such as BREEAM and LEED.
- Commit to and develop a strategy working towards an environmental management system (such as ISO14001) for the operational phase of the development.
- DIT and HSE to adopt a strategy for sustainable disposal of existing assets including furniture/equipment in existing buildings.
- DIT and HSE to adopt a sustainable strategy for purchasing of new equipment and furniture.
- Opportunities for sustainable internal distribution transport should be further investigated.
- The GDA should continue active liaison with CIE, Dublin Bus, RPA, Bus Eireann on the planned public transport improvements.

**Social**

**Social: Key Strengths**

- A consultation strategy has been established by GDA for the development of the site and prior to the GDA being set up, DIT had carried out consultation since 2002.
- Intention to manifest the history of the current site and DIT’s history.
- Intention to demonstrate their sustainability credentials;
- Flexibility built into design and Masterplan so as to ensure long-term viability of buildings and the site.
- Sustainability technology options outlined in energy strategy.
- Aspiration that buildings will have a reasonable building lifetime.
- Aspirational plan to develop Environmental Management System (EMS) to ISO14001 standard.
- Limited number of car parking spaces to be provided.

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- Continue to ensure designs reflect the historical context and townscape of the surrounding area.
- Commitment that detailed design phase retains the varied mix of amenity spaces throughout the site.
- The GDA should explore incorporating green roofs/living roofs at the detailed design stage. Their design should be such as to ensure they have a high amenity and ecological value.
- Investigate opportunities for the cultural heritage of the area to be further incorporated and reflected in the detailed design at the planning application stage.
- Ensure mitigation measures proposed in Strategic Environmental Assessment (SEA) are undertaken regarding the management of the cultural and archaeological heritage.
- Continue to develop detailed design in the context of evolving Award Based Schemes such as BREEAM and LEED.
- Commit to and develop a strategy working towards an environmental management system (such as ISO14001) for the operational phase of the development.
- DIT and HSE to adopt a strategy for sustainable disposal of existing assets including furniture/equipment in existing buildings.
- DIT and HSE to adopt a sustainable strategy for purchasing of new equipment and furniture.
- Opportunities for sustainable internal distribution transport should be further investigated.
- The GDA should continue active liaison with CIE, Dublin Bus, RPA, Bus Eireann on the planned public transport improvements.

**Future Opportunities**

- A Code of Construction Practice should be specified to manage potential air quality impacts during the construction phase.
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Future Opportunities

- Continue to actively consult with key stakeholders during the detailed planning stages and construction phase.
- Develop Purchasing Policy for the development dealing with the use of locally and sustainably sourced materials. Consider inclusion of targets for ethical and fair trading.
- Ensure that an access strategy is implemented to manage community access to sporting facilities.
- The detailed design phase should commit to designing play areas in line with the National Play Policy, Ready Steady Play.
- DIT and HSE should continue their close liaison to ensure that their individual communities integrate as planned on site.
- Ensure that the objectives of the Mobility Management Plan are implemented.
- Ensure appropriate access for physically impaired people is incorporated into the detailed design phase and exceeds beyond legal compliance.
- The consultation strategy for the construction and operational phase should be reviewing and adapted annually to reflect any changing needs of stakeholders.
- Daylight studies should be undertaken at detailed design phase to ensure that all units and living spaces proposed have an acceptable standard of daylight.
- Continue to consult internally with DIT and HSE regarding the detailed design phase as future occupiers of the site.
- The main contractor will be required to demonstrate strong Health and Safety management credentials.
- Healthy living should be promoted by DIT & HSE in various forms from healthy meal options to raising awareness of health problems.

Natural Resources

<table>
<thead>
<tr>
<th>Natural Resources: Key Strengths</th>
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<tbody>
<tr>
<td>- Series of initiatives proposed for responsible use of materials.</td>
</tr>
<tr>
<td>- Design will employ Sustainable Drainage Systems (SUDS) in the design and operation of the new quarter.</td>
</tr>
<tr>
<td>- Overall aim of the development is minimise energy demand and carbon emissions and can become zero carbon by 2050.</td>
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<tr>
<td>- Energy strategy is aspirational but explores some effective techniques for ensuring energy efficiency of the new development.</td>
</tr>
<tr>
<td>- Centralised CHP Plant together with solar heating which is proposed for heating and hot water.</td>
</tr>
<tr>
<td>- A feasibility study is underway on the potential of geothermal heat sources.</td>
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</tbody>
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Economic: Key Strengths

- Regeneration of an underutilised site with minimal displacement associated with the development.
- Dedicated research centre, incubation centre, science and technology park and commercial laboratories.
- Potential to create additional local jobs during construction and operation phases.
- Diverse range of employment opportunities will be provided on site.

Future Opportunities

- All efforts should be made to ensure the viability of incubation centre and Science Park.
- Commitment should be given to the development of an Environmental Management System.
- The GDA should aim to ensure that a percentage of new employment opportunities are provided for the local community.
- The GDA should aim to implement appropriate measures outlined in the Employment Study currently being undertaken.
- Both DIT and HSE should continue and develop their existing training programmes for staff.
- Examine logistics movements during construction and operational phases to minimise HGV movements.
Because of the private and singular use as a hospital over a long period of time, the Grangegorman site stands out with its extensive and mature landscape and green spaces. The site remains one of the last large-scale landscaped areas within the urban fabric of Dublin.

The Masterplan maintains as much of the existing landscape characteristics as possible by leaving the existing fields to the south relatively untouched and by altering the building footprints where possible to save existing healthy and mature trees and landscaping. As with the existing protected structures that will remain on the site, the existing landscaping makes the site unique and creates a bridge to the past.

The new landscape concepts for the site can be organised into the broad categories noted in the diagrams to the left. (These concepts are explained in greater detail within the Masterplan Details section of this document.) In addition to creating new and unique spaces within the Masterplan, the landscape concepts help connect the historic site into the urban fabric of the city as well as connect the landscape path from the Royal Canal and Mounjoy area in the north with Phoenix park to the west—creating a linked park-like pathway through the urban density of the city.

Existing landscaping on the Grangegorman site.
public art

It is important for the future Grangegorman Urban Quarter to include high-quality public art elements that can help to reinforce a connection with the soul, spirit and culture of the place.

Public art can also help to provide wayfinding and landmarks for users, as well as create an identity for courtyards, gateways and other significant spaces and buildings within the overall District. The range of public art can include the following:

- Individual art pieces and sculptures
- Sculpture garden
- Art walk
- Temporary installations
- Art work involving lighting
- Digital arts and film
- Live art

Guidelines:

- Promote contemporary and experimental art.
- Be international.
- Be culturally diverse.
- Reflect the history of the site, DIT and the surrounding community.
- Promote inclusiveness and participation.
- Reflect a balance of disciplines and art forms.

Implementation Strategy:

- The review, funding, selection and commissioning process of public art work or artist will follow the provisions given in the most current “Per Cent for Art Scheme” program or any other relevant public art program being implemented at that time.
- DIT Students, Graduates and local community artists will be considered and given an opportunity to propose works for the site.
- The Masterplan Design Team will be available for the review and selection process of any artwork and artist connected to the Grangegorman Urban Quarter.
- The existing tunnel under Lower Grangegorman is proposed to be a future “gallery passage” hosting permanent and/or temporary exhibitions on various topics including the history of the Grangegorman site, DIT or HSE.
The quality and intensity of light, as well as the rhythm and pattern created by the placement of fixtures, will contribute to the overall aesthetic character and sense of unity and identity for the Grangegorman Urban Quarter. In daylight, the appearance of the fixtures themselves will have an aesthetic impact as part of the overall public realm. Therefore, lighting levels and fixtures must be carefully designed and selected. The overall lighting strategy will be defined by the following hierarchy of four lighting types:

- **Major Pedestrian Path**
  As the major pedestrian route, St. Brendan’s Way will have strong, glowing lighting as a continuous feature. Elements of featured lighting and flood lighting can be used along its entire length.

- **Plaza**
  The two “hearts” of the project—Upper Terrace and Arts Centre / Student Hub—will be distinguished by the brightest and most intense lighting, as appropriate for these large open public plazas. These major spaces can also be enhanced by featured lighting and flood lighting.

- **Courtyard**
  Each of the various courtyards and other open spaces will require focused lighting. This can be achieved in a more flexible, specific and articulated manner, in order to create a special ambience for each space.

- **Secondary Pedestrian Path**
  Secondary pedestrian routes such as the “Green Fingers” and other connecting paths will require adequate lighting for safety, but no strong pattern of lights is desired.

In addition, the lighting of the new development will strive to deliver the following key objectives:

- To the greatest extent possible, the power for all lighting fixtures will be supplied by sustainable means such as photovoltaic panels.

- Create a District that is lively and well used both day and night.

- Provide a safe, secure and accessible environment for pedestrians and other users.

- Avoid disruptive glare and spill-over lighting to sensitive residential areas.

- In appropriate locations, LED lighting will be used to offer distinctive effects as part of an energy efficient lighting strategy.

- The lighting design will be closely integrated with the design of the landscape and urban spaces to create a clear and legible hierarchy of light levels and effects.

- The covered canopies and rain protection elements will form an important element of the lighting strategy. They will be well-lit to create a strong definition to the edges of the spaces as well as a means of orientation for users.
Grangegorman Identity

The joining of DIT and HSE, two distinct identities with complementary yet diverse functions, in one location should be seen as a unique opportunity for making Grangegorman a memorable place.

The identity for Grangegorman needs to be defined and communicated in a visually coherent way. This includes gateways and entrances; environmental and wayfinding graphics such as street signs, maps, directories, and information kiosks; exterior and interior building signage; as well as print and online/interactive media.

The identity for Grangegorman should be developed by the GDA with the Agency’s original goals and mission statements in mind, with a look to flexibility and a sustainable future.

Our recommended approach for Grangegorman’s visual identity is to celebrate the importance of this historic site while embracing new technologies and media. We propose using more traditional and permanent signage along the major public pathways, while embracing new technologies and electronic media throughout the site and courts to reflect the innovative spirit of the place.

Historical Timeline and Memory

Along St. Brendan’s Way, the major pedestrian pathway, a historical timeline gives visitors and students a sense of the importance of the history of the site and the place. The timeline acts as an interactive journey where old and new are celebrated. Irish language, culture, and public artwork could also be incorporated along the path.

- Identification of important buildings on the Record of Protected Structures
- Location of buildings that were removed or renovated, with original uses
- Signs integrated into pavement, diamond pattern of hardscape, and streetscape
- Signs could be internally lit
- A path of education and discovery along Grangegorman’s major pathway
identity, graphics, and wayfinding

Goals for Graphic Signage

Signage elements will have the appropriate scale and character to distinguish and provide identity to the Grangegorman Urban Quarter. All signs should be oriented to pedestrians and/or to persons in vehicles. The design should optimise rapid orientation for users, add interest to the ground level environment, unify the District as a whole and enhance overall quality and appearance.

• A program of consistent self-directing wayfinding signage will be developed to guide visitors to their desired destinations.
• Informational and directional signage can be integrated with the building designs, or in unique features (e.g. kiosks/maps, pavilions, overlooks, etc…)
• Wayfinding signage will be consistent in design throughout each DIT faculty or HSE department so that signage may be readily identified.
• Signage should be easily read and followed but should not detract from the open space character being developed for the District, or contribute to visual clutter.
• Facilities which host large public events such as concerts, exhibits, sporting events and performances could be provided with changeable message/event signs which would be located adjacent to the public street or path nearest the facility. These signs could also be programmed to announce upcoming events at other campus locations when necessary.

Gateways and Entrance Markers

The first impression of Grangegorman should be that of entering a vibrant new urban quarter within the city. Some strategies for marking the main entrances include:

• Gates and thresholds
• Vertical architectural elements such as towers
• Signs integrated with the existing stone perimeter walls
• Colourful banners
• LED/LCD signs and other electronic media
Creating the Masterplan for the new Grangegorman Urban Quarter provides the opportunity to plan and design for the multitude of inevitable streetscape receptacles, devices and clutter used by people in their everyday lives, and organise and locate these items in a clear, coherent and rational way.

Litter and recycle receptacles, campus maps, post boxes, information kiosks, shuttle or bus stops, public notice display areas, and newspaper boxes are all some of the items pedestrians come in contact with, usually in a haphazard way, everyday. Pre-planning the organization and location of these and other items throughout the Quarter provides the opportunity not only to create a clean and clear streetscape but also provide small landmark structures or nodes at key points within the Quarter creating helpful way-finding devices.

The shelters would provide some of the daily services required by the pedestrian traversing the Quarter. The following is a partial list of services that the shelters would or could provide integrated locations for:

- recycling and litter receptacles
- quarter map, public transportation information, interactive campus information kiosk
- official campus notices, through electronic text or video means
- public post boxes and express post drop-off locations
- campus and local newspaper distribution
- bicycle racks
- emergency call boxes
- automated pay parking kiosk
- bank-teller machines
- stamp and/or public transportation pass purchase
- power receptacles for staff use (landscaping maintenance, etc...)
- telephone, internet or intranet access
- emergency lighting

Creating a type of “one-stop” shop for these types of services at rational and intuitive locations throughout the Quarter would create efficiencies in litter and mail pick-up, newspaper and public notice posting, etc... as well as visually enhance the pedestrian experience and add to the cohesive design of the Quarter as a whole.
Directional Signs

Directional signs should be visible but as unobtrusive and infrequent as possible. The open character of Grangegorman should be maintained with low signs rooted to the ground and integrated with the landscape materials and plantings. These signs could also be integrated into informational kiosks and directories.

- Acceptable materials for directional signs are metal, stone, concrete and glass
- The number of signs should be kept to a minimum, while still providing ease of navigation and safety
- Signs could be internally lit to provide night-time navigation and paths
- Pictograms and icons may be used for ease of identification, such as disabled access, restrooms, etc.
- Key areas or destinations could be marked with taller signs, which would be more visible from a distance

Interior Directional Signs

- Applied to walls, floors, and columns
- Integrated into pavement
- Interior / exterior
- Activate the ground plane
- Timeline concept on floor carried through to interior signs
- Colour as identifying characteristic for departments, floors, buildings, etc.
Building signage should be integrated into architectural elements as much as possible. It is advisable to consider the building and signage as a whole and not have signs that are applied afterwards. Signage should be integrated with materials and could vary from bold and colourful to more subdued and monochromatic depending on the building’s use and function.

- Opportunity for supergraphics
- Lively colours and themes
- Playful, expressive
- Express diversity and functions within
- Technology/media integrated into facade
- Graphics on glass, etched, or cut vinyl, which is easily replaced
- Take advantage of transparency and light of glass

Each court can have its own identity colour which corresponds to the identity of the DIT faculty or HSE colour palette. This can give a unique identity to each of the courts.
masterplan principles

identity, graphics, and wayfinding

Digital Technology

Technology should be used as DIT and HSE are leaders in technology and healthcare. Grangegorman should be a testing laboratory for new advances and techniques, and showcase new technologies. Technology has the advantage of being adaptable, to change and update information quickly—such as provide important news and information across Grangegorman with the flip of a switch.

- Safety
- More sustainable in terms of resources such as having to reprint signs, etc.
- Announce public events
- Entrance to Executive Learning Centre can be enhanced with technology
- Express that Grangegorman is a new vibrant quarter
identity, graphics, and wayfinding

DIT Colour Palette and Typefaces

DIT buildings should follow the guidelines of DIT Brand Identity using the following colours and typefaces. The use of DIT-approved logo, colours, and typefaces will ensure visual coherence among DIT buildings and properties.

HSE Colour Palette and Typefaces

The HSE Corporate Identity Manual outlines guidelines for use of the HSE identity, including logo, colours, and typefaces.

Excerpt from the HSE Corporate Identity Manual:

The Health Services Executive logo design is a contemporary visualisation of the letters HSE.

It is warm, modern and contemporary in look and feel. The colours are green to identify with and reinforce our culture and national identity.

The warmth of the red is symbolic of good health and emphasises that service delivery is the core of our business.

The lighter green used in the ‘E’ graphically symbolises the three tenets of the Health Service Executive - a better health service, a better place to work and better value for money.

The new Health Service Executive logo heralds a new dawn in the integration of Ireland’s health services. It is a symbol that will be quickly and easily recognised.

DIT Logo

The logo for the Dublin Institute of Technology is comprised of the following elements:

- The shield containing the abbreviated Institute name, an abstract block structure which is a representation of the 3 castles of Dublin and a flowing line, which represents the river liffey that flows through the heart of the city.
- A band of text encircling the shield containing the name style in both English and Irish.

It is essential that these elements must always appear together in this exact configuration. The logo must never be adjusted, re-drawn or modified in any way and should always be reproduced from master artwork.

The DIT colour palette can be broken down into the following sections:

**DIT LOGO PALETTE** - Used in logo reproduction

**DIT CORPORATE COLOUR PALETTE** - Used in external corporate publications

**FACULTY COLOUR PALETTE** - Used as primary faculty colours in external publications

**Pantone 556C**

C:42 M:0 Y:33 B:27

**Pantone 561C**

C:85 M:0 Y:54 B:52

**50% TINT OF 561C**

The recommended DIT typefaces are:

_San Serif_ Frutiger, GillSans, TheSans, and Dax.

_Serif_ Times, TheSerif and Trajan

These are available in both Mac and PC formats in a number of weights and sizes.

Please note that the type must not be horizontally or vertically scaled. Also typefaces may be added or subtracted from the list to keep with current trends and styles.

**FACULTY COLOUR PALETTE**

PM012 PMS299 PMS314 PMS321 PMS345 PMS360

**DIT CORPORATE COLOUR PALETTE**

PMS286 PMS2925 PMS312

**DIT LOGO PALETTE**

PMS352 PMS550 PMS641

**FACULTY COLOUR PALETTE**

PM012 PMS299 PMS314 PMS321 PMS345 PMS360

Applied Arts: PMS 012 (Yellow)
Built Environment: PMS 299 (Light Blue)
Business: PMS 216 (Burgundy)
Engineering: PMS 021 (Orange)
Science: PMS 3145 (Turquoise/Green)
Tourism & Food: PMS 302 (Navy Blue)

Good typography is at the heart of effective communication. Consistent use of a typeface is essential to project an image that is all about quality and professionalism. The recommended DIT typefaces are:

_San Serif_ Frutiger, GillSans, TheSans, and Dax.

_Serif_ Times, TheSerif and Trajan

These are available in both Mac and PC formats in a number of weights and sizes.

Please note that the type must not be horizontally or vertically scaled. Also typefaces may be added or subtracted from the list to keep with current trends and styles.
The major pedestrian paths—particularly the east-west connection (St. Brendan’s Way) and the north-south link from North Circular Road to the Fields—are enhanced by a variety of climate-protection elements. These elements are closely integrated into either the fabric/design of the buildings themselves, or the proposed landscape spaces, as follows:

- The sheltering elements are placed at strategic locations along these routes to define an “implied path” for pedestrians, while also providing climate protection as arcades or covered passageways.
- At certain key locations, including the Main Library and the Art Centre / Student Hub, these elements would create semi-acclimatised outdoor spaces that are attached to prominent buildings. These “outdoor rooms” would serve as active, animated social spaces that encourage and invite interaction by pedestrians.
- Prominent arcades around these designated spaces will help to integrate adjacent buildings, visually connecting one building to another. Moreover, the consistent expression of arcades and canopies throughout the development fosters cohesiveness and strengthens the Quarter’s image.
- The arcades and canopies along the edges of the Serpentine Walk, the Arts Centre / Student Hub and Broadstone Gate also enliven the row of retail shops at the ground floor.
- At other locations, climate-protection elements would form arcades and canopies in a contemporary interpretation.
- Tree canopies are also used as sheltering features, to reduce the amount of rainwater in various places along the pedestrian paths.
- In terms of materials, glazed canopies and light structures are proposed to achieve a cohesive architectural language and to allow sunlight to filter through to the pedestrian spaces below.
transportation elements

Pedestrian and bicycling networks

The Masterplan is designed with a dense and attractive pedestrian and cycle network. This is considered to be one of the most important principles, as it will enable the necessary conditions to encourage high levels of pedestrian and cycle journeys to and from the site and the desired quality of the public realm that will ensure its attractiveness and therefore, will contribute towards longer dwell times, hence minimising the impact of peak travel.

Permeability

In order to achieve the maximum integration with the existing urban grid surrounding the site, as well as the best possible access to the public transport networks, the site will be designed to provide the best possible permeability across its boundaries. The pedestrian network plan to the left depicts the proposed internal pedestrian network and its linkages with the wider urban grid. The walk distances are significantly optimised, resulting in a walking catchment diagram which is closer to an “as-the-crow-flies” catchment.

Bicycle parking

Generous provision of cycle parking will be provided in the Masterplan. Secure parking associated with underground car parking to be used by users that require longer periods of parking is provided. This element of cycle parking will be associated with facilities such as showers and lockers, as appropriate. On-street “banks” of cycle parking, possibly covered, located in visible locations near the highest attractors of trips (Library, Faculties, and Sports), and dispersed clusters (4 to 20 spaces) of on-street cycle parking, to maximise access to all buildings and facilities is planned for. These are located in the vicinity of the main building entrances and visible from the main pedestrian thoroughfares.

Road hierarchy

The development will have an internal network of links serving different functions, with different character and typology. Certain sections of the network will have limited access for vehicles but there will not be links within the internal network that will be primarily vehicular.

The Primary Road Link is the existing Grangegorman Road, which bisects the site. Grangegorman Road will be the only available through-route for external traffic and it will be traffic-calmed by means of a shared surface section opposite the clock tower building and the intersection with St. Brendan’s Way.

Secondary Links through the site include Ivy Avenue, the access to the car park and set-down areas from Constitution Hill at Broadstone Gate, as well as servicing and maintenance roads along the periphery of the site and along the Ha-Ha. These Secondary Links are for limited traffic mainly related to servicing, maintenance, disabled access, and possibly taxi and “out-of-hours” access. Limited on-street car parking can be accommodated on Ivy Avenue. The character of the Secondary Links is predominantly pedestrian space shared with occasional vehicular traffic. Generally the shared surfaces would be flush, but with clear delineation of carriageway space. Occasional variations to the horizontal alignment will be included to add to traffic calming effect.
Tertiary Links through the site (in terms of vehicles) include St. Brendan’s Way and adjacent ‘driveable’ surfaces. These links are for limited traffic mainly related to servicing, maintenance, disabled access, and possibly taxi. Vehicular access to these links are to be limited to ‘out-of-hours’. Their character is predominantly pedestrian space shared with very limited vehicular traffic and flush shared surfaces, with minimal delineation of carriageway space.

Emergency access is provided in accordance with the appropriate regulations. The majority of the linear spaces, both streets and landscaped areas, are designed to accommodate occasional emergency movements, enabling the highest level of vehicular penetration.

**Vehicular traffic calming**

The movement network for the site is designed in a manner which prioritises pedestrians over motorised traffic. However, accessibility for cars, service vehicles, etc, will mean that, at a number of points within the site and times of the day, these will be in conflict with pedestrians. The inevitable conflict between pedestrians and vehicular traffic will be mitigated at key locations by traffic calming measures that may range from junction treatment to the overall design of the link. Traffic calming forms part of the masterplanning design, rather than being retro-fitted after construction.

Links throughout the development are designed in a way that will not preclude usage by all types of vehicles. However, a system of traffic cells has been designed to avoid the site being used by general city traffic. Traffic Cells prevent vehicles from travelling through and across an area to “shortcut” another route. The only exception will be Grangegorman Road, which is presently a through route for general traffic. This is the most effective measure to discourage unnecessary vehicular traffic through the site, whilst enabling suitable access to all locations.

Shared surfaces are effective elements of traffic calming, as they enable the re-balance of priority towards pedestrians along roads or across sections of roads. There are different levels of integration between pedestrian and vehicular movement within shared surfaces. These range from areas with no distinction between car and pedestrian spaces, to streets where car are kept separate from pedestrian-only spaces by means of physical barriers (generally bollards). A solution in between both of the above is the visual delimitation of car-only space by means of different materials and/or colours, often using the drainage channels as a subtle physical delineation. The concept of a shared surface is that drivers will recognise that they are circulating through a pedestrian area with clear indication of the limits of their circulation space, and therefore will adopt lower speeds. The whole of St. Brendan’s Way is considered a shared surface, including the section where it crosses Grangegorman Road. The level of integration applied varies along its length, with the development’s two “hearts” being the most suitable to have the least segregation between the modes, perhaps with no clear demarcations at all.

The remaining sections should include some type of visual delineation of the vehicular space, but built-to-purpose physical obstacles such as bollards should be avoided, so as to reinforce the “non-road” character of the space.

**Vehicular parking**

The amount of car parking spaces takes into consideration the impact of car trips on the adjacent road network. Also, specific issues to be taken into account with regards to the quantum of parking are related to the variety of uses and times when the car parking may be required. For example, provision needs to be made for usage of the site outside the normal working days, such
as evenings and weekends, when the availability of public transport is lower. In addition, there is a need to avoid car parking overspill onto neighbouring residential areas, by not keeping car parking numbers within the site to an unsustainable minimum. Approximately 1,000 car parking spaces can be provided within the site. This quantity is purely indicative at this stage and will be heavily influenced by the physical capacity to be accommodated within the present Masterplan proposals.

The vast majority of car parking is accommodated underground, with direct access from the external road network and not via the campus itself. In addition, a number of on-street car parking spaces are provided at locations throughout the site. These will be additional to the residential car parking already provided along Grangegorman Road and Rathdown Road, and is intended to provide a convenience dimension to the car access strategy, and will be able to include part of the disabled car parking requirements.

**Sustainable travel enabled by location and design**

The site occupies one of the largest undeveloped sites within Dublin City Centre. Its location close to the city centre provides the passive conditions for the maximisation of sustainable travel patterns. The benefits are twofold: it provides density of uses, especially residential, within walking and cycling distance from Grangegorman. And it provides proximity to the most of the public transport network, which are concentrated in the city centre. This will enable the maximisation of the bus, LUAS and rail mode shares.

The Masterplan has been designed with a strong focus on pedestrian movements, which guarantees the conditions for walking trips to be encouraged. The design entails a number of restrictions to traffic movements, such as a system of traffic cells, which will contribute to the creation of excellent quality pedestrian and cycling environments throughout the Campus.

A limited quantum of car parking is to be provided within the Campus, as a further measure to guarantee the minimum impact of traffic on the internal public realm, as well as on the adjacent road network. A provision of 1,000 car parking spaces is seen as appropriate for a variety of uses ranging from primary health care to higher education, and including offices, retail and a primary school.

The internal roads where traffic is allowed for convenience purposes are designed to a standard that will discourage speeding and through-movements. Limited traffic and on-street car parking are considered as elements that, if correctly managed, will enhance the quality of some of the spaces throughout the Campus by adding to the activity mix at street level.

Provided with a dense network of pedestrian links, the district can be easily traversed in a 10 to 15 minute walk. Green boulevards dominate the internal circulation and are designed to allow articulated paths for both pedestrians and cyclists, which will provide quality circulation environments in all seasons.

The location of attractors and generators of walking journeys, as well as landmarks within the Campus has been considered so as to provide a coherent, legible and permeable movement pattern that will enable the desired maximum activity and quality of the public realm.

The Masterplan’s emphasis is therefore on the design of quality linkages from the site to the established city grid, in addition to the high quality public realm within the site.
There are various different transport proposals planned in Transport 21 that will improve access to the site as shown in the accompanying diagramme to the left. Within the local vicinity of the site, Metro North and the Luas Line D will directly improve rail services providing high capacity public links to the site. Following is a brief outline of the Transport 21 Strategy infrastructure proposals:

**Metro**

Metro North will connect the town of Swords to Dublin City Centre (St. Stephen's Green) via Dublin Airport as shown in the map on page E-4. This major piece of transport infrastructure is due to be complete in 2013. Metro North will operate underground, surface and elevated tracks with 15 stops available between City Centre and the Airport, including two (Parnell Square and Mater) that are located within reasonable walking distance (approximately 1.4km and 2km, respectively) from the site. Assuming pedestrian connectivity from Constitution Hill and an access on North Circular Road, it is predicted that the site can be reached on foot in 14 minutes from Parnell Square station and 19 minutes from the Mater station.

**Luas**

**Line BX**

This line extension provides connection between the two existing Luas lines, thereby enhancing the connectivity to the City Centre for citywide commuters. A Railway Order submission for line BX is planned in 2009, according to the RPA.

**Line D**

This extension of line BX towards Liffey Junction via Broadstone is still in design stage. This Line will directly serve Grangegorman and is considered to be the single most important public transport infrastructure to serve the site in the future. The improved connectivity of the site brought about by a Luas stations in its immediate vicinity will enable a substantial share of trips to be accommodated by the Luas. This line is expected to have two stations within the immediate catchment of the Grangegorman Campus: one adjacent to the Broadstone building; and another further north, either at the northern side of the present Bus Eireann depot, or in the vicinity of North Circular Road. Both, but especially the former, will provide the development with an excellent level of accessibility by Luas.

**Luas Green Line and Red Line extensions**

The extensions of the Green and Red lines to Bray (the line to Cherrywood is currently under construction) and Saggart will significantly increase that catchments that will avail of a direct connection to the city centre, and with line D, to Grangegorman itself.

**Line F**

Luas line F connects the City Centre and Lucan providing an alternative rail access into the City Centre from the western suburbs. It has to be noted that this line will provide a connection to line BX and D, as well as to Metro West. This project is scheduled for completion in 2013.
masterplan principles

Other Rail Improvements

Rail Interconnector

The Interconnector is due for completion in 2015 is a planned link connecting the existing Northern Line to the lines running out from Heuston Station. It is envisaged that this public transport system would eliminate the existing city centre capacity constraints owing to its higher capacity and more frequent services.

Kildare Line upgrade

This project involves quadrupling of critical section of track between Cherry Orchard and Hazelnatch on the Heuston-Kildare line, along with ancillary works such as signalling and station developments. A key objective is to accommodate a peak hour service pattern of four commuter, four regional and four intercity services. Heuston Station lies approximately 20 minutes walking from Grangegorman.

Navan Rail Line

The project is carried out in two phases. Phase 1 involves reopening 7.5km of railway line running off the Maynooth line, at Clonsilla, to the M3 interchange at Pace, near Dunboyne scheduled for completion in 2010. Phase 2 provides connection to Navan and projected to complete by 2015. With Luas Line D in place and the proposed interchange between these two rail lines at Broombridge, Grangegorman would benefit from the increased catchment provided by the Navan line.

Bus Improvements

Quality Bus Network

The QBN Office carries out a permanent assessment of the needs for improvement to the QBC network and the existing QBCs are being upgraded on a regular basis throughout the city. With regards to sections of the QBN that are relevant to Grangegorman, the QBN Office has revealed that work on QBC along Old Cabra Road is to start before the Summer of 2008 and that further bus priority improvements along Manor Street and Stoneybatter are also planned.

Traffic Management in Greater Dublin Area (GDA)

This provision includes the construction of QBCs, cycle paths, improved pedestrian facilities and traffic management support systems under Transport 21 program. Capital funding for traffic management measures in the GDA is provided through the DTO Traffic Management Grants, in support of its overall transportation strategy. Projected completion is 2015.

Other Bus Improvements

Development of Bus Services in GDA (Dublin Bus): This program is part of Transport 21 and is aimed at expanding the bus network in the Dublin area. Also a target of 60% is set to achieve as an increase in passenger carrying capacity through new and replacement bus acquisition by the year 2015.

New services are introduced under Transport 21 program to enhance Bus Eireann services to customers on city and commuter services. A total of 235 vehicles are to be procured in 2007 and 2008 as part of this program. Bus Eireann intends to improve its present interurban services to Dublin, including substantial frequency and quality enhancements of services along the N2 and N3 corridors.

Walking and bicycling environment

Pedestrian network

The majority of the road network in the vicinity of the site is provided with adequate pedestrian facilities, including signalised pedestrian crossings across the main roads, such as Constitution Hill, North Circular Road and Prussia Street.

However, the present site’s accessibility on foot is limited by its impermeable layout, with only access to the external walking network via Grangegorman Road.

Grangegorman is, at present, cut off from Dublin City Centre by the Broadstone site and a number of adjacent properties such as the Haven House Hostel, off North Brunswick Street. To the west, the site’s wall forms an effective barrier to connections toward the Stoneybatter and Hanlon’s Corner areas.

Site Accessibility on Foot

The diagramme to the left shows how accessible the Grangegorman site will be by showing walking distances to existing and future transport stations and stops as well as other important facilities within the vicinity. Various walking routes are shown from Grangegorman. The Luas stops on the Red line to the south of Grangegorman are all within 15 minutes walking distance from Grangegorman via a number of walking routes. Heuston Station, one of Dublin’s most important stations where many rail services terminates is approximately 20 minutes walk from Grangegorman, while Connolly Station (another important station of Dublin) is within 30 minutes walking distance.

New stations planned on the Metro North Line including the Mater and Parnell Square Stations will be located within 15 minutes walking distance from the site. Also, the Broadstone North and South Stations on the proposed Luas Line D will be located adjacent, on the door step of the Campus.

Cycle facilities

Cycle infrastructure within the vicinity of Grangegorman is as good as any other within Dublin. Cycle lanes are provided on strategic routes such as on North Kings Street and there are also a shared bus/cycle lane on Constitution Hill and portions of North Circular Rd.

Cycle infrastructure is constantly being improved within Dublin. Dublin City Council are implementing the Dublin City Strategic Cycle Network program aimed at providing an extensive and integrated cycle route network for the City.
The Health Service Executive (HSE) has recognised the tremendous opportunity to address the barriers of isolation, institutionalisation and stigma through the redevelopment of the Grangegorman site and facilities. The Masterplan fully capitalises on this opportunity to create a wonderful new treatment environment with secure, therapeutic, fit-for-purpose facilities that are an integral part of a vibrant mixed-use urban community. The design achieves a less institutionalised environment to create a more comfortable, familiar atmosphere for service users, allowing for more interaction between the healthcare facilities and the surrounding community and contribute to the overall quality of life in the Grangegorman Urban Quarter. The Masterplan responds to the challenge of creating a mixed-use healthcare environment on the large scale of Grangegorman by using principles of innovative facility design and creative environmental planning.

Hierarchy of Open Spaces

The HSE component of the Grangegorman Urban Quarter has been designed in consideration of the most current and updated research on healthcare environments and user needs. Whilst it is important to recognise the requirement of providing a safe and therapeutic environment for those who need the security of an institutional environment, many mental healthcare facilities operate cohesively in ordinary neighbourhoods. Many of the facilities operated by the HSE are located within traditional community settings. Other successful mental healthcare environments, integrated with a mix of institutional, residential, commercial and community uses, are being planned and built across Europe and around the world.

A clear hierarchy of open spaces has been established with the following objectives:

- Provide a series of secure, safe “healing gardens” with a range of active, passive and weather-protected recreation spaces, while allowing for a variety of open space sizes and varying degrees of security.
- Promote a safe environment inside and outside, day and night.
- Incorporate a mix of activities and uses that can be shared with the community.
- Promote a well-defined public realm with windows and doors facing the street.
- Avoid having “no-go” areas.
- Provide well-lit streets, walkways and buildings.
- Ensure that front doors face onto public streets to provide “eyes on the street.”
- Ensure logical way-finding.
the health service executive

An Innovative and Cohesive Campus for the HSE

The Health Service Executive (HSE) elements of the Grangegorman Masterplan are designed to achieve a number of key principles:

- Integration of the HSE accommodation with the surrounding local community that it primarily serves and with the new DIT community.
- Provision of privacy and dignity for clients or building users of HSE.
- Convenience and effectiveness of operation for HSE staff.
- Achieving a legible and understandable public domain.
- Providing a range of outdoor spaces from secure to completely open, appropriate to the needs of patients and clients.
- Careful gradation of building heights from domestic scale up to medium-rise.

The topology of the site, the permeability of the boundaries, the brief of the HSE, and the adjacency of local communities all contribute to logically locating the majority of HSE accommodation to the north of the site. In turn this locates HSE accommodation near to the new circulation spines of St. Brendan’s Way and Serpentine Walk and within a short walk of the open parkland areas to the south. The HSE administrative and clinical support services offices have been located near the Broadstone end of the site in an appropriately more office-oriented area and easily accessible from the city centre, the new LUAS link and other public transport.

The design diagram lays out a central north-south circulation spine giving direct access to the most public parts of the accommodation. Mirroring the key concepts of the Masterplan, there is both a landscaped and more urban, part-atrium route. These circulation spaces will be public domain. They connect the North Circular Road to Library Square with its café and library, and are near the more public Primary Care facilities.

Spreading outwards from this spine along a new wooded walkway, the other facilities are grouped around courts with progressively increasing levels of privacy and seclusion. These courts all have their own geometry and character offering clearly legible places.

The most westerly court is devoted to mental health with the Psychiatric Intensive Care unit located at the most secluded end, complete with its secure garden.

The laundry building on the Record of Protected Structures will be converted to serve as offices and the Day Service Facility for the HSE. Its accessibility from Grangegorman Upper Road, and the scale and flexibility of the construction of this building make it suitable for this kind of re-use.

Several HSE Housing developments are located to the east of the Primary Care facilities. Open courtyards and landscaped paths characterise the spaces around these buildings. The proximity of the Primary School to the east provides the opportunity for cross-generational interaction.

1. view of library square and primary care from the library

Library Square provides a public space that activates a central portion of the site bringing people together from the HSE buildings, DIT and the public library.
HSE mental health, primary care and library square

The Health Services Executive is organised around a series of landscaped quadrangles in the same manner as the Masterplan as a whole. The Primary Care facilities are considered to be the most publicly accessed spaces and have been centrally located at the core of the HSE area. Radiating out westward and eastward, the program spaces are organised to provide incrementally greater degrees of privacy and security befitting their uses and the sensitivity of the clients or building users.

Most of the Mental Health program for the HSE is located to the west. The Intensive Care unit is considered to require the most privacy and is located near the existing Grangegorman wall with secure courtyards to the east bordering the main courtyard space for the Mental Health quadrangle. The Rehabilitation and Respite Care program has been situated in north-south oriented buildings, some of which can be organised in townhome-type supported housing for residents with greater independence.

The Primary Care facilities are bordered to the north by an urban plaza facing North Circular Road and to the south is Library Square - a major urban plaza designed as an active and inviting space. The two plazas are linked by a major gateway into the Grangegorman Quarter that starts at North Circular Road and continues south to the Upper Terrace and The Fields.
HSE supported housing and day center facility

Several low-rise housing structures surround the Laundry building bordered by courtyards, gardens and pathways. The open plan of the former Laundry building will become a centre of activity when converted to its new use as offices and a day centre. The day centre is a place for residents of the health campus and of the surrounding community to come and share meals and participate in group activities. The existing openness of the interior spaces and existing overhead skylights will allow natural daylight to enter new open-office type spaces. A drop-off area is located to the north and a small park borders the day centre on the south side. A small urban plaza is located to the south-east where tables and chairs will be situated to provide outdoor seating on sunny days.

The various housing buildings to the west of the Day Centre form a major formal courtyard. To the west of these buildings is one of the green finger parks that traverse the site from North Circular Road southward to The Fields. The juxtaposition of the semi-private courtyard space and the more public green finger park will give residents various levels of opportunity to interact with the community.
primary school

The Primary School is designated to have 16 classrooms with ancillary special education rooms. The site within the Masterplan was chosen for its easy accessibility from Grangegorman and Rathdown Roads and its separation but adjacency to the DIT and HSE buildings. The school's location would benefit from the parks and playspaces designed throughout the new Quarter and pupils would have access to the playfields to the south. A drop off is located near the main school entrance for pupils, staff and community access. There is currently an excess of under-utilised road space at the intersection of these two streets and it is suggested that this unused space could be added to the site footprint for the Primary School. The school's General Purpose Room has a separate entrance from Ivy Avenue that could provide after hours access for school gatherings and functions.
The western-most core area of the Grangegorman Quarter has been termed the Academic and Health "heart" of the quarter. It is comprised of the DIT main library, Central Learning Classrooms, and the Upper Terrace to the south.

The Upper Terrace poses a dramatic belvedere looking south across The Fields. The Library’s information/study/resource centre incorporates the historic Top House in a careful three-part composition of atria, courtyards, and new spaces, poised above the open green. The Upper Terrace provides a natural viewing platform for games and daily student life with the grand backdrop of the Dublin skyline and Mountains. From the Upper Terrace down to The Fields, a tiered stairway/amphitheatre offers a venue for a variety of large-scale events, as well as a social ‘sun-catcher’ in fair weather and offers access to the sports centre below.
tourism and food, science, and engineering

The Masterplan provides each of the DIT academic areas with a defined space with a distinctive identity while organising them to contribute to the overall cohesive image and vision for the Quarter. In addition, the design of the programmatic space adjacencies recognise the necessary cross-disciplinary interactions that take place.

These three academic areas form three separate, similar, but distinctive quadrangles that primarily open to the south providing access to St. Brendan’s Way and the Cultural Garden. The south-facing courtyards allow a greater degree of direct sunlight to fall on the outdoor landscaped spaces and support St. Brendan’s Way as a primary circulation route through the campus. A north-south oriented atrium space connects the Engineering school to parts of the DIT Research Centre and Commercial Laboratories via a series of bridges.
student services, built environment, and the cultural garden

The Student Support Services are grouped as a student "hub" and located in a high profile, easily accessible campus location as part of the cultural-social "heart" of the Grangegorman Quarter. St. Brendan’s Way, the major circulation route through the site, passes between the grouping of protected buildings that, in addition to several new facilities, will comprise the majority of Student Support Services. This hub of student services is complemented by various retail shops, restaurants, cafes and DIT cafeterias along St. Brendan’s Way and is located between the Student Housing to the south and the academic departments to the north—a literal and figurative bridge between the two aspects of student life.

The Built Environment department has its own distinctive courtyard and also occupies the Richmond Penitentiary (Clock Tower building) that will be renovated and expanded. The Clock Tower is seen as a major iconic link from the history of the site to the future of the University and has been given the space required to appreciate the landmark by the design of the Cultural Garden directly opposite it. The Cultural Garden is conceived as a place of reconciliation, celebration and commemoration of the new and protected buildings as well as the past and future uses—a means of marking a significant process of transformation.
The Cultural Garden is an axial space that looks toward the Clock Tower providing an uninterrupted view of this protected structure, and flanks other protected buildings that will be adapted to student social activities.

The Cultural Garden is conceived as a place of reconciliation, celebration and commemoration of the new and protected buildings as well as the past and future uses—a means of marking a significant process of transformation.
1. View of Grangegorman Road looking south

Grangegorman Road currently bisects the site. The character of the portion of road through the site will be altered using traffic calming and shared surface concepts to provide a pedestrian dominant space that knits together the two portions of the site.

2. View of Grangegorman Road looking north

The portion of Grangegorman Road through the site will be treated with a different materiality than the rest of the road relating more to the character of St. Brendan’s Way than a city street. The existing protected stone wall will be substantially retained but may be altered in some places to create more open and inviting spaces.
the faculty of applied arts and the arts centre

The facilities dedicated to the Faculty of Applied Arts (FoAA), including the proposed Arts Centre, comprise the second half of the cultural-social “heart” of the Grangegorman quarter. The Arts Centre is envisioned to be a showplace for the artistic creations of the music, drama, art, design and media departments of the Institute and a destination venue for the community and the city of Dublin. The quadrangle dedicated to the Applied Arts department is dominated by a recital hall, a future performance venue and an art gallery—all partially contained within a glazed atrium wintergarden space.

In addition to opening northward to the pedestrian traffic on St. Brendan’s Way, the location for the arts centre was chosen due to its public access and prominence near the Broadstone Gate with its access to the proposed LUAS light rail line, taxis and bus routes. The Applied Arts quad is also accessed from Grangegorman Road and a drop-off for the creche is provided and underground parking garage is located below grade.

University of Cincinnati Student Life Center, Moore Ruble Yudell Architects and Planners

University of Maryland Center for the Performing Arts, Moore Ruble Yudell Architects and Planners
St. Brendan’s Way and the Serpentine Walk are key design principles considered to be required for the successful implementation of the Masterplan. Both are major organisational and circulation paths through the site but with differing character. The urban quality of St. Brendan’s Way is complemented by the landscaped nature of the Serpentine Walk—a meandering link that traverses the site in two grand arcs, giving a south-facing green edge to student residence halls. The Serpentine Walk is to be a link in the landscape path from the Grand Canal and the Phibsborough / Mountjoy area to the north through the Grangegorman site and out to Phoenix Park to the west. In addition, the Serpentine Walk acts as a collector for several of the north-south oriented “green finger” landscape parks that bring people into the site from the edges of the quarter via a serene park-like setting.

The diagram to the left shows a size comparison between St. Brendan’s Way and Dublin’s popular and much travelled and understood pedestrian way—Grafton Street.
The design for St. Brendan’s Way strives to provide a high quality of surface materials, street furniture, lightning, and a significant planting concept in order to establish a clear understanding of the importance and hierarchy of this very public open space. Paving materials include a warm natural stone in various colours to provide an engaging, almost painterly character. Spacious clusters of street furniture and sculpture along the pedestrian zone provide places for pedestrians to meet, sit down and observe the vibrant life in the District. Carefully selected lighting will give St. Brendan’s Way effective and expressive illumination at night.

Overall, St. Brendan’s Way has a harmonious character in scale, colours and materials. Existing trees have been integrated into the landscaping concept throughout. The Masterplan intends to keep the site vehicle free as much as possible. Due to the traffic and access requirements, there will be shared uses on circulation paths, but these will be clearly prioritised for pedestrians and cyclists. Vehicular use will be limited and controlled. No road markings or signs will be provided, in order to prioritise pedestrians and ensure slow vehicular traffic.
masterplan details

1. View of Library Square and the Top House looking south toward the DIT Library

Library Square will provide a public space that activates a central portion of the site, bringing people together from the HSE buildings, DIT and the Public City Library. A view corridor from North Circular Road, past the protected portion of the DIT Library and out over the Fields will create an important link through the site.

2. View of St. Brendan's Way and the Wellington Monument looking southwest

Breaks through the student housing buildings along the Serpentine Walk provide views out from the site and allow daylight to penetrate and cross St. Brendan's Way.
Providing student accommodations within the boundaries of the Institute will create a lively and energetic place for learning and living. By locating the Student Housing along the spine of the Serpentine Walk, the housing does not become segregated to the periphery of the Institute and in addition creates opportunities for interaction all through the site along St. Brendan’s Way and the Serpentine Walk. The best views of the city and the mountains are from the housing where much of the indoor living and socialising of the students will happen.

The quality of construction and the overall architectural expression of the Student Housing will be important due to its prominent location within the masterplan and the its high-profile view from the surrounding city.
The Grangegorman Science Park is envisioned as a major hub of intellectual capital on campus and a place where knowledge is created and transferred to enterprise, and where the latest developments in education, research and scholarly activity take place. It will be a place of true networking and collaboration between professionals and students in academia and leaders in science research, business and industry.

The Science and Industry Centre shares space at one of the most prominent locations of the site. The Broadstone Gate is a major linkage between the Grangegorman Quarter and the city and the design and construction of the buildings at this gateway will become one of the new identities for the Dublin Institute of Technology. In addition to the practicality of the location due to its proximity to the proposed LUAS light rail line, taxis and bus routes on Constitution Hill and the location of underground parking, the Science and Industry Centre is located to act as a figurative bridge between academic culture and the business of the city.
central learning classrooms

The relocation of all Institute activity to a single campus affords the opportunity to create a central bank of quality learning space in the form of lecture rooms, break-out rooms, seminar rooms and study spaces that would be accessed by all faculties and facilitate the growth or contraction of faculty demands for space over time by complementing the other dedicated faculty spaces around the Institute. It is important that these facilities are centrally located near the main DIT library as well as the Executive Learning Centre and function as a conference centre when not in academic use.

Due to the large space requirements of the Central Learning Facilities, their adjacency requirements to the main library and the density of the site, the Centre is located partially below grade creating a podium level. While the inwardly focused purpose of classroom activity does not require views out, natural daylight is considered a requirement in all learning spaces. Large classrooms and lecture halls are organised along the periphery of the space where natural daylight is brought in from the half-level of space above ground and by pulling away the grade to allow additional light to enter. Seminar rooms are daylit using various skylight elements and the open side of the south-facing podiums allows the opportunity to bring large amounts of natural light into the circulation and common spaces.

Note: These floor plans are conceptual in nature and indicative of only one possible layout and are illustrated here only as an early planning exercise.
main apprenticeship training facilities

The Institute has a major involvement in and commitment to apprenticeship education and training and the relocation of the Institute provides the opportunity to locate much of these facilities closer to each other as well as near other DIT programs and students. A large portion of the facilities have been placed at the centrally located Engineering quad.

Due to large space requirements and heavy equipment, some of the Apprenticeship Training facilities have been located partially below grade similar to the Central Learning facilities, and employ similar means of acquiring daylight into all habitable spaces. Classrooms, seminar rooms and offices are located to the periphery to take advantage of the half-level podium above grade and the pulling away of the below grade space to allow additional light to enter the spaces. A key objective was to co-locate craft training facilities with undergraduate and graduate activities where possible. Areas with large floor areas such as workshops and maintenance bays are daylight by various skylight techniques and by incorporating daylight from the open-sided, south-facing glazed podium wall. In addition, daylight is supplied from a large sunken landscaped courtyard.

note: These floor plans are conceptual in nature and indicative of only one possible layout and are illustrated here only as an early planning exercise. Pulling away the ground to allow light to enter lower levels.

Daylight enters lower level from sunken courtyard and skylights.
sports hall and aquatics centre

As with other DIT programs, the relocation of the sports program to the new site will enhance the student experience allowing students with varying educational focuses to mix with the greater college community, make friends and improve the social infrastructure of the Institute. The Sports Centre will also accommodate educational space for leisure related programs of DIT. In addition, by being open to the public, the Sports Centre will provide a place of interaction with the other users of the Grangegorman Quarter such as the Health Service Executive and Primary School as well as the local community.

The two-level Sports Centre has been located in a high-profile and unique location between the outdoor playfields and the academic and health “heart” of the Quarter. Most pedestrian paths through the Quarter arrive at or pass by the Upper Terrace and the Sports Centre below. Most of the programmatic spaces face directly out to the Fields and are daylit by a south-facing glazed wall revealed by a “ha-ha” (an angled, sloped landscaped change in ground elevation). In addition to regular Sports Centre changing facilities located in the building, there are team changing facilities near the Sports Centre that are directly accessible from the playing fields.

note: These floor plans are conceptual in nature and indicative of only one possible layout and are illustrated here only as an early planning exercise.
The Sports Centre will be daylit by overhead skylights and by using glass walls adjacent to a landscaped “ha-ha” (an angled sloping change in ground elevation).

The Craft Training Facilities will be located partially underground due to the large floor areas required and the weight of heavy machinery. These spaces will be daylit through a number of ways including overhead skylights and sunken landscaped courtyards.
A grand staircase from the Upper Terrace provides south-facing places to sit, study, meet friends and watch the sporting events on the Fields. The Campanile creates an iconic marker for the University as well as allows public viewing spaces above and cafes and eateries accessible from the Fields below.
Connective passageways serve to link between different quads. Passageways also connect the variety of open spaces offered within the Quarter, including individual gardens as well as major open spaces. The consistent use of specific trees and plantings along these passageways, as well as the use of particular paving and lighting standards, add to the collective district image, and visually enhance connectivity throughout the Quarter.

Along St. Brendan’s Way, openings are created to maximise daylight and to frame views south overlooking the Fields and to the mountains beyond.
The existing tunnel under Lower Grangegorman Road has been part of the fabric of the Grangegorman site for many years. During this time, it has accommodated the movement of people, clients and users between the west and east parts of the site.

The Masterplan seeks to incorporate this tunnel as part of the new history of the Grangegorman Urban Quarter, by proposing its transformation into a future “Gallery Passage” hosting permanent and temporary exhibitions. Similar to the Cultural Garden, this well-lit space can provide an important connection to the culture, spirit and history of the place. The gallery would have certain hours of operation and would be attendant supervised.

The future exhibitions in this space can cover a wide range of topics related to the Grangegorman site, DIT, HSE, and the surrounding community, including the following:

- History of the Grangegorman site.
- History of DIT.
- History of HSE in Dublin.
- More information on the mission, goals or various departments of HSE or DIT.
- Artwork by DIT instructors, staff or students.
- Artwork by HSE clients and users.
- Artwork by members of the surrounding community.
energy centre & electrical substation

The project’s power and utility buildings are consolidated in an area along the west boundary of the site, to the north of St. Brendan’s Way. These include the Energy Centre, the Electrical Substation, the Wood Chip Storage, and the Composting Area.

**Strong architectural concept**

These buildings can provide a welcome opportunity to create architecture out of a common, utilitarian building type—one that is not generally associated with high design standards. The Masterplan views these standard service amenities from a fresh perspective and encourages design that would allow them to have a positive impact on their surroundings.

Instead of disguising the utilitarian nature of these buildings, the Masterplan seeks to celebrate this aspect as part of the educational and design aesthetic of the Grangegorman Urban Quarter, by proposing a strong architectural approach—the “Vertical Landscape.”

**Vertical landscape**

The building facades are characterised as a landscape feature, with vines and plantings on the walls. The landscaped spaces are integrated with large windows to allow views inside of the machinery and ductwork, thereby making these buildings become part of the learning process for DIT students and others in the District.

As an extension of the landscape theme, the large roof of the Energy Centre is proposed to be used as an additional area for growing organic vegetables for the Tourism & Food faculty, utilising waste heat from the plant below. The Masterplan envisions the dynamic combination and integration of these landscape and architectural strategies and materials to allow the utility buildings to function as an effective “urban curtain” in their context within the Grangegorman Urban Quarter.
landscape design: quadrangles

The quadrangles or courtyards will be physically and conceptually connected to each other with an expressive, harmonious design using plants, surface materials, street furniture and lighting that create a cohesive identity. In addition, the courts will maintain individual identities not just through the architectural organisation of the spaces but by the design and types of plantings used.

The surface materials of the quadrangles are predominantly permeable to allow rainwater runoff to percolate back into the aquifer below and not be introduced into the city’s drainage system. A drainage system with retention spaces for rainwater runoff during flood conditions has also been introduced into the design. This system allows the water to circulate in a visible drainage network as a “living system.” The water will be collected in swales and flows from the north-west portion of the site in visible swales, through the green finger parks to the Ha-Ha. After heavy rainfall, a water cascade can be seen descending down into the retention canal of the Ha-Ha. Another water feature, a water-garden, has been designed at the lowest elevational point on the site at the southern-most quadrangle.
landscape design: the cultural garden

The Cultural Garden is a green connection between the academic/health heart and the cultural heart of the Grangegorman site. Parts of the garden reflect the history of the site and features a range of spaces for contemplation, gathering and relaxing.

The design of the Cultural Garden provides a clearing to the east with the density of trees increasing toward the west. Lawn pitches which slope down to the middle of the garden is the dominating character. Because of the grades of the lawn, they are faced by little walls and stairs which invite pedestrians to sit down and rest. The Cultural Garden will have the character of a “hortus conclusus” (an enclosed Medieval garden) in the east part, with water features to provide a calming accent. Due to this character the planting concept is more formal. A sequence of hedges creates various “green chambers.” Toward the west, the Cultural Garden opens to St. Brendan’s Way and has a more urban character.
In addition to being main circulation routes through the Quarter, the “green finger” parks have a high ecological value. They provide a connection from a main city route – North Circular Road to Phoenix Park – into the site. The plants consist of native species (especially shrub berries and other feeding plants for song birds), and the existing large, healthy trees are integrated into the finger parks as well. Furthermore, the finger parks improve the microclimatic conditions on the site by increasing humidity, creating air cooling lanes, wind breaking, and improving air quality by reducing fine dust in the air.

The finger parks incorporate several main pedestrian access routes into the Quarter, with small play spaces and play stations arrayed throughout. Various kinds of seating areas to meet and to contemplate will also be arranged.
Because the Grangegorman Hospital occupied the site for such a long period of time, the walled-in site remained one of the last undisturbed open spaces within the city of Dublin. One of the major concepts of the new development for the site was to maintain to the greatest extent possible the existing open space to the south of the site but also serving as parkland recreational space.

Dedicated for the most part to sports related activities but also serving as parkland and recreational space, The Fields occupy an advantageous location for views from the Serpentine Walk, Upper Terrace and Student Housing. The location allows prevailing winds from the south to travel through the site and provide natural ventilation (similar to some of the reasons the site was originally chosen as a hospital).
Play is considered vital to childhood development. In addition to the obvious physical health benefits to children, unstructured, informal opportunities for playing promote childhood creativity and independence, create therapeutic opportunities to relieve physical and emotional stress, and improve social and peer relationships. Over time, changes in the built environment have created less child-friendly surroundings by increased traffic and reduced public open space to play and explore. This is in addition to more hours of children’s days being pre-planned and free time becoming more sedentary with video games and the internet.

The Masterplan has designated several areas for the possible development of children’s playspaces. The majority of the playspaces have been located at the southern end of the site where much of the mature existing landscaping and fields will remain. The playspaces are intended to be easily accessible to children of different age groups, be safe and secure, and be suitable for both able bodied and disabled children.

Several reference documents should be consulted during the design of the playspaces including: the Ireland National Play Policy from the National Children’s Office, the Play Space Guidelines for the Dublin Docklands Development Authority, and the Dublin City Council Play Policy.
landscape design: HSE

The HSE Health Gardens form a series of garden areas accessible to users, clients, caregivers, and staff. Integrating principles of ecological design and medical research on human wellness, these “restorative gardens” are designed to meet the physical, psychological, and social needs of patients and their caregivers. The health benefits of these gardens, however, extend beyond the garden walls to include the wider institution, the surrounding communities, and the living landscape.

The Health Garden areas act as pathfinder elements within an enhanced healing environment incorporating innovative landscape design, sensitive lighting and exterior artwork throughout the HSE healthcare campus. The design of the courtyards, whilst providing facilities to users, clients, staff, and visitors, also acknowledge the privacy and dignity issues associated with adjacent facilities. The courtyards and gardens provide significant social areas for people to meet and talk, with plenty of seating in these spaces as well as the paths and planting beds. They also provide pleasant views from within the gardens as well as from the surrounding developments. Special attention have been paid to making the gardens accessible to people with limited mobility. Seating areas have been designed to provide quiet areas where one can sit and reflect with some privacy.
strategy for the broadstone gate

The Masterplan envisions an urban design strategy for the development of Broadstone Gate that will create a prominent public realm and entrance to both the Grangegorman and Broadstone sites. The plan would provide a strong image and a tremendous economic benefit for both properties. Shown are several possible interim stages of development culminating in a long-range plan that would eventually help to knit together the landscaped path extending from the Canal and the Mountjoy area to the north, through the Broadstone and Grangegorman sites and continuing westward to Phoenix Park.

broadstone gate phase 1
A continuation of the major link along St. Brendan’s Way is established to Constitution Hill, providing pedestrian access to and from the site. The current bus depots for Dublin Bus and Bus Éireann would remain in place on top of the Broadstone plinth. This Stage will also accommodate a new, interim bus terminal.

broadstone gate phase 2
In Phase 2, a LUAS light rail line is constructed and a new station is added at the Broadstone site. The historic station and surrounding site hold the opportunity to be developed and benefit from the increased activity created by the Grangegorman Quarter. The Phase 1 pedestrian access path can be strengthened and expanded, forming a generous urban plaza animated with retail and restaurant/café spaces.

broadstone gate phase 3
Using the Broadstone Gate as one of the major entrances into the Grangegorman site is one of the key principles of the Masterplan. This link is an extension of the historic pathway through the city, from Dublin Castle and along Henrietta Street and through the King’s Inns.
The extension of the LUAS light rail is considered one of the most important public transportation initiatives supporting the Grangegorman site. A grade-separated crossing over Constitution Hill will minimise the impact of traffic and a new train stop in front of the historic Broadstone Station will bring people to a major entrance to the site at the Broadstone Gate.
B_landcape design
grangegorman an urban quarter with an open future

landscape design masterplan
landscape design masterplan - hard and soft landscape
The Landscape Design of the Masterplan sets out the basic design principles and spatial differentiation of public space, its use and functions and thus its equipment, (street furniture, materials, lighting, vegetation). Based on these principles a framework shall be defined, of which the social, economic and environmental sustainability are in the foreground.

The interior and exterior spaces form a coherent network within which scientific research, exchange and teaching, and social life can be explored. Small, almost secluded places offer the possibility of relaxation, contemplation or are suitable specifically for discussion and study. Large and open spaces characterize the urban context and the participation in social life. In addition, a variety of possibilities for sports, games and playgrounds are provided.

The landscape narrative defines design principles regarding equipment and vegetation for access areas, connections and the main residence and traffic and pedestrian areas. This will ensure a high quality and a correspondence between the different buildings and open spaces.

The Landscape Design offers a comprehensive approach to make the different areas into a lively district together. In the context of scale and form and in the hierarchy of materiality and planting the typology and character of the various sections will be experienced.
the fields

The Fields will include three sports pitches as well as generous playspaces. The two main pitches to the west will be lawn pitches on a sand base while the multipurpose-pitch in the east will have an artificial surface. The area will be surrounded with a 1 km - long jogging/bicycle path, together with exercise stations. Areas for contemplation and relaxing will also be provided in the woodland areas, close to the grand stairs to the Upper Terrace, and next to the former Church of Ireland building.
In consideration of biodiversity issues, there will be protected areas in the southern portion of the Grangegorman site and at the former Church of Ireland. The planting concept will work with species which are suitable to the local climate and ground conditions.

A special feature could be a wild flower meadow at the south of the former Church of Ireland. This will create a sharp and fine contrast to the park area. Many butterflies use meadow grasses as food-plants for their caterpillars as well as providing cover for frogs, mammals and insects.

Denser planting to the south of the sport pitches will protect the site from the prevailing south-west winds. The woodland areas and especially the protected areas will provide the opportunity to demonstrate the synergy and positive connection between urban life and ecological elements.
the serpentine walk

The Serpentine Walk is the other main pedestrian route through the southern district of the site. Coming from Broadstone a ramp is envisioned for the Serpentine Walk, slowly going up to the level of the Upper Terrace, while also fulfilling accessibility requirements. The Serpentine Walk is accompanied by the visible drainage system in the Ha-Ha. Different arranged with various street furniture platforms (with possible mobile wind-shelters) provides users with optimal views over The Fields. The pedestrian footpath reaches a venue space next to the urban scaled Upper Terrace. Again, similar to the Cultural Garden, this open space is analogous to a “hortus conclusus,” secluded from the busy surroundings, but visually connected to the Fields and to the Upper Terrace. This venue space is in turn related to the north-south green finger park adjacent to the library.

green finger parks

The “green fingers” have a high ecological value. They provide a connection from one of the main city routes – North Circular Road to the Phoenix Park – into the site. The plants consist of native species (especially shrub berries and other feeding plants for song birds). The existing trees are integrated in the green fingers.

Furthermore the green fingers work to improve the microclimatic condition on the site by providing an air cooling corridor, creating a wind break and reducing the permeation of fine dust.

The “green fingers” incorporate the main pedestrian access routes in the District, with small play spaces and play stations arrayed throughout. Various kinds of seating areas to meet and to contemplate will also be arranged in this area. The “green finger” to the west provides access to two major urban plazas—Library Square and Upper Terrace—and is defined by formal tree plantings. The “green fingers” to the east are provided with permeable surfaces and a more linear garden-like expression. Selected places with artificial water features will be incorporated to invite pedestrians to sit down and relax.
The cultural garden

The cultural garden is a green connection between the academic/health heart and the cultural heart of the Grangegorman site. It is proposed that parts of the garden will reflect the history of the site and its transformation into an urban quarter with an open future. This garden features a range of spaces for contemplation, gathering and relaxing.

The design of the Cultural Garden provides a clearing to the east part of the garden, with the density of trees increasing toward the west part. Lawns which slope down to the middle of the garden is the dominating character. Because of the grades of the lawn, they are faced by little walls and stairs which invite pedestrians to sit down and rest. The Cultural Garden will also have the character of a “hortus conclusus” (an enclosed Medieval garden) in the east part, with water features to provide a calming accent. Due to this character the planting concept is more formal. A sequence of hedges creates various “green chambers”. Toward the west, the Cultural Garden opens to St. Brendan’s Way and becomes more urban.

St. Brendan’s Way

The design for St. Brendan’s Way strives to provide a high quality of surface materials, street furniture, lightning, and a significant planting concept in order to establish a clear understanding of the importance and hierarchy of this very public open space. Paving materials include a warm natural stone in various colours to provide an engaging, almost painterly character. Spacious clusters of street furniture and sculpture along the pedestrian zone provide places for pedestrians to meet, sit down and observe the vibrant life in the District. Carefully selected lighting will give St. Brendan’s Way effective and expressive illumination at night.

Overall, St. Brendan’s Way has a harmonious character in scale, colours and materials. Existing trees have been integrated into the landscaping concept throughout. The Masterplan intends to keep the site vehicle free as much as possible. Due to the traffic and access requirements, there will be shared uses on circulation paths, but these will be clearly prioritised for pedestrians and cyclists. Vehicular use will be limited and controlled.
st. brendan's way paving

grangegorman an urban quarter with an open future

landscape design

landscape design introduction
The design of the HSE Health Gardens will vary to reflect the requirements of the patients and the HSE. The aim is to create a series of garden areas accessible to patients, caregivers and staff. Integrating principles of ecological design and medical research on human wellness, these “restorative gardens” are designed to meet the physical, psychological, and social needs of patients and their caregivers. The health benefits of these gardens, however, extend beyond the garden walls to include the wider institution, the surrounding communities, and the living landscape.

The Health Garden areas act as pathfinder elements within an enhanced healing environment incorporating innovative landscape design, sensitive lighting and exterior artwork throughout the HSE healthcare campus. The design of the courtyards, whilst providing facilities to patients, staff and visitors, also acknowledge the privacy and dignity issues associated with adjacent facilities. External lighting is provided in a sensitive manner that does not become an annoyance to those occupying the surrounding developments.

The courtyards and gardens provide significant social areas for people to meet and talk, with plenty of seating in these spaces as well as the paths and planting beds. They also provide pleasant views from within the gardens as well as from the surrounding developments. Special attention has been paid to making the gardens accessible to people using wheelchairs or with limited mobility—by avoiding unnecessary changes in level as well as in the choice and width of paving materials and the design of the seating and tables. Seating areas have been designed to provide quiet areas where one can sit and reflect with some privacy. High-quality artwork will be commissioned and installed to provide markers and “points of interest” within the sequence of HSE gardens. The artworks are directly experienced from within the gardens, but can also be viewed from the adjacent departments and corridors surrounding the gardens.

HSE restorative gardens
The Intensive Care Unit will have a protected, secure garden which is visually connected to other open spaces so that it does not feel isolated. In the middle of the garden is a spacious lawn for a number of purposes such as playing ball or other games. In the northern part of the garden is a pavilion which is southerly-oriented and provides shelter to the users. Near the patients’ rooms is a patio designed which is more secluded and protected from the outside view. This garden has controlled access points to the whole courtyard and to the footpath which leads through the HSE complex from west to east.

The various parts of the gardens will be linked by secure walking paths with clear way-finding marked by expressive furniture and equipment. Various areas for seating and a south-oriented pavilion will be provided. Although the security of patients is a main concern, there is the possibility to share garden spaces. The aim is to provide a relationship and interaction with the “outside world.”

Inside the garden for dementia services will be a kind of “Journey” with places to sit and meet friends and families. Along this route, different “landmarks” including expressive vegetation, water features, and furniture provide orientation for the patients. Small, secluded garden spaces are designed with a sequence of hedges and gives the gardens a spacious character. A wide range of trees, flowering shrubs and herbacious plants reflect the changes in seasons with a shifting variety of colours, odours and appearances.

For high-dependent users, flower and planting beds are created in the different areas of the garden to support the sensory perception.

An additional aim is to create possibilities for engaging in outdoor activities such as gardening and growing vegetables which could be supplied to the restaurant. Similarly, greenhouses provide opportunity for gardening and plant growing. Additional to the greenhouses, pavilions could be located in the various areas of the HSE courtyards to give shelter for the clients and their visitors.

Furthermore, there will be special services and street furniture designed for people with limited mobility or sensory impairments. The entrances of the HSE courtyards are marked with significant, compact tree groves with different features such as playgrounds and furniture.
courtyards and quadrangles

The quadrangles and courtyards will be connected to each other with an expressive, harmonious design using plants, surface materials, street furniture and lighting. The various courtyards are formal and individually designed due to the use of the various faculties.

A special feature for DIT are the so-called MEDIA PLANETS. They are envisioned to link into St. Brendan’s Way and into the various courtyards. These MEDIA PLANETS provide full internet access and provide users with diverse kinds of information about the site, the university programme, etc. This MEDIA PLANETS are rotatable (to follow the sun) and stand alone or in groups. They are powered with renewable energies such as photovoltaic cells on top of them.

The aim in the Courtyards is to have most of the surfaces permeable to fulfill ecological requirements. This will include a drainage system and retention spaces for rainwater/surface water. (The same system would be provided in the health gardens for the HSE.) This system allows the water to circulate in a visible drainage network as a “living system.” The water will be collected in swales and flows from the north-west in these visible swales through the green fingers to the Ha-Ha. After heavy rainfall, a water cascade can be seen descending down into the retention canal of the Ha-Ha. Another water feature will be seen as a water-garden in the south east of student housing.
enlarged landscape plans, the fields
enlarged landscape plans, the fields, detail
enlarged landscape plans, the fields, detail
enlarged landscape plans, the fields, detail
enlarged landscape plans, section and details
enlarged landscape plans, green finger parks
enlarged landscape plans, upper terrace
upper terrace and serpentine walk materials

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landscape design
enlarged landscape plans, the cultural garden
grangegorman an urban quarter with an open future

enlarged landscape plans, the cultural garden, detail

landscape design
the cultural garden materials
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landscape design

st. brendan’s way materials and street furniture
quadrangles details

landscape design

an urban quarter with an open future grangegorman
grangegorman an urban quarter with an open future

enlarged landscape plans, former church of ireland building

landscape design
enlarged landscape plans, HSE mental health quadrangle
various types of gardens.... colour, ordour, taste, sounds of birds and water...
HSE garden types, colour, odor, sounds
HSE courtyard lighting
playspaces
playspaces

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landscape design
play stations
tree survey by mitchell + associates
tree survey by mitchell + associates
An urban quarter with an open future. Landscape design. Grangegorman.
tree survey by mitchell + associates

grangegorman an urban quarter with an open future

landscape design
Planting Concept

The main objective is to retain as many existing good quality trees as possible and to integrate them in the new urban development.

The new tree concept involves planting about 2,000 new trees. According to the spatial requirements of the different areas, there will be different characteristics in the planting concept.

In the south, at the park boundary, large park trees are characteristic. In addition to the wind protection, the biological diversity is strengthened with this type. Typical features of a forest plants society will be achieved here:

A field layer contains shade loving flowers, e.g.: Anemone sylvestris, Allium ursinum, Hepatica nobilis...

A shrub layer contains, e.g.: Ilex aquifolium (Holly), Corylus avellana (Hazels), Euonymus europaeae, Lonicera periclymenum (Honeysuckles) et cetera

A tree layer contains native plants, e.g.: Fagus sylvatica (Beech), Quercus robur (Oak), Fraxinus excelsior (Ash).

An additional layer for wind protection contains e.g.: Prunus spinosa, Carpinus betulus (Hornbeam), Sorbus aucuparia (Mountain Ash)...
Emotional green

The concept of “Emotional Green” serves as a green backbone for the district. Conspicuous trees (colour, fragrance, flower, fruit) combine the semi-public DIT courtyards with St. Brendan’s Way. This green, public boulevard area can contain the following trees and planting materials:

*Prunus avium (Cherry), Prunus cerasifera (Plum), Fraxinus ornus (Ash), Magnolia soulangiana (Magnolia), Tilia cordata (Lime), Ilex aquifolium (Holly)...*
Natural green

The green fingers improve the microclimate condition in the area. Furthermore, the biological diversity is strengthened in a similar approach to the planting concept in the park. The selection of plants fits to the scale of the green fingers and is connected to the adjacent courtyards. The concept works with typical native plants, e.g.:

Betula pendula (Birch), Betula pubescens (Birch), Cornus mas (Dogwood), Corylus avellana (Hazel), Crataegus monogyna, Euonymus europaea (Euonymus), Prunus avium (Cherry), Malus sylvestris (Apple), Sorbus aucuparia (Mountain Ash), Viburnum opulus...
Cultural green

“Cultural Green” is achieved by a combination of native and non-native plants. The aim is that under future conditions due to climate change, new planting societies will be established. Many non-native plants are important feeding plants for different animal species.

The changing life conditions for plants, especially in urban areas (drought, moisture, frost, winds) can be documented by DIT.

Betula pendula (Birch), Betula pubescens (Birch), Buddleja (Butterfly bush), Crataegus monogyna (Hawthorn), Lonicera (Honeysuckle), Sorbus aucuparia (Mountain Ash), Prunus avium (Cherry), Eleagnus angustifolia, Ilex aquifolium (Holly), Pyrus communis (Pear) ....

Cultural green - native and non-native vegetation in consideration to climate change.
The Cultural Garden will incorporate formal and traditional park design with topiaries and with the integration of existing trees. Plantings will include:

*Carpinus betulus* (Hornbeam), *Carpinus betulus* 'Fran’s Fontaine' (Hornbeam), *Ilex aquifolium* (Holly), *Fagus sylvatica* (Beech), *Morus nigra* (Mullberry), *Quercus rubra* (Oak)...
Courtyards

Courtyards will comprise modern and formal garden design respecting the adjacent building uses. Plantings will include:

- *Acer rubrum* (Maple), *Betula utilis*, *Cercidiphyllum japonicum*, *Malus 'John Downie'*
- *Cornus*, *Gleditsia triacanthos 'Sunburst'*, *Liquidambar styraciflua*,
- *Prunus avium* (Cherry), *Prunus avium 'Plena'*
- *Fraxinus ornus*, *Malus floribunda* (Apple)...
landscape design with traffic concept from arup consulting engineers

POSSIBLE PEDESTRIAN LINK

POSSIBLE VEHICULAR AND PEDESTRIAN LINK
landscape design with traffic concept from arup consulting engineers
D_environmental sustainability
environmental sustainability overview: flexible fabric and visible systems

The development of the Grangegorman Quarter is based on the international best practices of environmental sustainability. Early, sustainable masterplanning decisions will be augmented by the requisite governmental requirements and best practices and decisions of the designers of the individual buildings.

At the masterplanning level, buildings have been located and oriented to take advantage of natural daylight, reducing the need for artificial light. Building widths vary but narrow widths have been chosen wherever possible to further insure the penetration of natural light into the interior spaces. Courtyards generally open to the south to prevent the overshogging of exterior landscaped space by buildings. The buildings have been located densely on the northern portion of the site, allowing the existing open space to the south to remain a naturally landscaped space. The open playfields have been linked to a more regional chain of open spaces allowing people and wildlife to find a natural system of pathways through the urban density of the city.

One of the major goals of the environmental sustainability strategy is to minimise energy demand and carbon emissions by creating an energy plan that allows the Grangegorman development to become a zero carbon development by 2050. Therefore the energy plan for the Grangegorman development prepares for an eventual 100% renewable energy supply.

The basis of the initial energy plan is subdivided into two components: a site wide energy plant as well as an individual renewable energy plant for each building block. All heating, and a portion of the electricity, will be generated from a centralised combined heat and power (CHP) plant using biofuels and distributed to individual buildings. In addition, each of the individual buildings will provide hot water from hot water solar collectors located on the roofs of each building.

Additional energy producing and energy saving principles, standards and requirements have been introduced through this narrative. But while technology dependent concepts such as power generation from biofuel use and high visibility strategies such as wind turbines and photovoltaics have been considered for the plan, there are also other important energy and water saving principles that are based in sensible and sensitive early planning in the Masterplan.

There are also environmental sustainability principles that relate to the quality of life the building inhabitants and neighbors should enjoy, such as indoor air quality, view corridors, noise reduction, pollution reduction, traffic reduction, and conservation of natural and cultural heritage resources. Some of these issues have been addressed in detail throughout the Grangegorman Masterplan and Masterplan Design Guidelines and the remainder have been detailed within this section. In addition to the energy supply goal, several key environmental sustainability principles have been developed for the project at the masterplanning stage:
environmental sustainability

- sensible urban density and linking natural pathways
  The 73 acres site has been walled off from the city since the nineteenth century and is one of the largest undisturbed pieces of land in Dublin. It was important to maintain the existing healthy landscape elements, especially the large open fields to the south of the site by planning most of the new construction to the north of the site and creating an urban but sensibly dense design.

  The River Liffey, Phoenix Park and the Canal are all important natural resources for the city. Linking these currently unconnected landscape pathways with the new Grangegorman Quarter strengthens the entire infrastructure, providing landscaped pathways for pedestrians and wildlife through the dense urban fabric of Dublin.

- natural daylight, ventilation and wind protection
  The design of the building footprints, heights and layouts have been developed to allow maximum daylight to enter buildings, minimise overshadowing of each other and of landscaped areas and to minimise excessive wind.

- preservation of existing natural and cultural heritage
  There are currently twelve buildings on the site that have been listed on the Dublin Record of Protected Structures. The re-use and re-purposing of all but one of these existing buildings not only conserves the embodied energy used in their initial construction and saves the energy that would be used to replace them, but helps create a connection to the past history of the site. Wildlife habitats and existing mature healthy landscaping have been studied and steps undertaken for conservation.

- transportation strategies
  The Masterplan design encourages pedestrian movement over vehicular use. The concept prevents the general public from traversing the site in automobiles and allowing other vehicles to enter the quarter only via “shared surface” pavement where vehicles are subservient to pedestrians. The design has been oriented to promote strong connections to public transportation such as existing bus routes and the proposed LUAS line at the Broadstone Gate.

- water management
  Water retention strategies such as swales and holding ponds have been designed to reduce runoff into the city system. This runoff has been incorporated into landscape features such as the water rill located in front of the Sports Centre. In addition, permeable surfaces have been incorporated in the outdoor public areas to allow water to return naturally to the aquifer below.

- Renewable, long-lasting and environmentally safe building materials
  The Masterplan encourages the use of recycled and renewable building materials through the various energy efficiency and environmental sustainability standards that it is under the authority of. Using renewable construction materials prevents pollution and waste generation, creates new recycling industries and reduces landfill disposal and expansion. Using low VOC paints, formaldehyde free adhesives, and other safe building materials creates high indoor air quality and promotes greater health and efficiency for the occupants.

- energy efficiency and sustainability standards
  Each individual building shall achieve a Building Energy Rating (BER) of A3 or better based on 2008 asset rating system, which corresponds to an Energy Performance Coefficient (EPC) of not greater than 0.50 compared to 2008 Building Regulations. This BER shall be calculated using a permitted Irish National calculation methodology for Commercial buildings, being NEAP/ISBEM, or approved Building Simulation software.
renewable resource energy generation and the combined heating and power plant (CHP)

The Sustainable Energy Strategy is to reduce the energy demand and to optimise the use of renewable energies so that the Grangegorman Urban Quarter may eventually become a Zero Carbon Development. In accordance with the client’s brief, the target aspiration is that at least 30% of energy will be from zero net carbon emissions from energy generated on site on an annual basis. The energy strategy has been developed as a flexible framework which is designed for change over time as and when new affordable technologies become available.

Renewable Energy Supply Strategy

A complete range of on site renewable energy strategies for the Grangegorman Quarter have been considered including: Sun, Wind, Geothermal and Biofuels. The preliminary profile for the energy demand of the new development is as follows:

<table>
<thead>
<tr>
<th>Heating (inc. Hot Water)</th>
<th>Electricity</th>
<th>Cooling</th>
</tr>
</thead>
<tbody>
<tr>
<td>65.9%</td>
<td>30.7%</td>
<td>3.4%</td>
</tr>
</tbody>
</table>

Heating and Hot Water

The primary strategy is to provide all the heating from a centralised CHP and biomass boiler plant. The plant consists of a series of boilers burning bio fuels to produce heated water. The type of bio fuel will depend upon the ease of source and price. However, the Masterplan has been designed to accommodate wood chips, as these require more storage space than other fuels, thus allowing for all other possible fuel storage eventualities.

The medium temperature water from the boilers is distributed across the site along an arrangement of district heating pipes. During the winter and mid seasons the building solar hot water supply is supplemented with hot water from the district heating system. During the summer, if required, the hot water supply may be used to provide cooling for individual buildings via heat absorption chillers located on the roof of individual buildings as required. The bio fuel heating system will provide in excess of 55% of the energy demand for the development.

It will be feasible to locate solar hot water collectors on the roof of individual buildings to provide hot water requirements during peak summer period. The hot water will be supplemented from other sources during the cooler periods of the year.

A feasibility study into the potential use of geothermal heating is currently being undertaken. Technical feasibility depends upon:

- Access for the ground pipe system
- Availability of geothermal heating source
- Access to drill for vertical pipes
- Ground conditions will affect ease of construction and system performance

Electricity Power Supply

The early stages of development will be predominantly supplied with electricity from the on site electrical substation supplying power from the local electrical grid. At present only 7.5% of the electricity generated in Ireland is generated from renewable sources with the remaining 92.5% from fossil fuels.

However, the Energy Supply Board (ESB) announced on 25 March 2008 that their Energy Strategic Framework 2020 is to invest over 22 Billion Euro to halving carbon emissions by 2020 and achieving a carbon net zero by 2035. 50% of the 22 Billion Euro investment package is geared towards investment in renewable future. By 2020, the ESB will increase renewables from 7.5% to at least 30%. This will include 1,400 megawatts of wind power generation in addition to wave, tidal and biomass.

Short Term Strategy for On Site Electrical Power Generation

Careful consideration will be given to emergency lighting, street lighting and sports flood lighting being powered by proprietary wind/photovoltaic stand-alone lighting systems.

A considerable portion (23%) of annual energy would be provided by the CHP power generated on site.

Long Term On Site Zero Carbon Electricity Supply by 2035

By 2035 either the off site electricity supplied to the site will be from a zero carbon source and/or more on site electricity will be generated from on site wind, solar and bio fuels. The Masterplan has been future proofed for either eventuality. Therefore the development has the potential to become a zero carbon development.

Optional Large Scale On Site Renewable Energy Electrical Power Generation

As well as traditional placement on rooftop locations, there is the possibility of including large scale PV arrays throughout the Grangegorman Quarter, such as potential walkways around campus, on building elevations etc.

Technical and Planning Issues that need to be considered:

- Systems should ideally face between south-east and south-west and pitched at 30 to 45 degrees from horizontal to maximise the amount of light on the PV's
- Unshaded at all times of day if possible
- Consider loading capacity of roof/structure
- Ensure the building’s metering system allows export of energy if needed
- Birds may need to be discouraged from perching near the systems
**Combined Heat and Power Plant**

Combined heat and power (CHP) is the simultaneous on-site generation of electricity and heat. Types of CHP available range from the sterling engines Micro CHP’s of about 5 kWe to large scale reciprocating engines or large gas turbines with a production of greater than 2 MWe.

The significant benefit of CHP installations is that they can convert up to 90% of the energy available in the fuel into electrical power and useful heat which compares very favorably with conventional power generation with a delivered energy efficiency of only 30–45%. Other benefits of CHP installations include reduced running costs, reduced environmental global emissions and improved security of electrical supply.

However, the capital investment on CHP plant can be substantial, so it is important to run the plant to achieve maximum returns. Also, electricity generation produces heat which in summer periods requires cooling energy as it cannot be utilized in heating buildings. So it is important that any CHP plant operates to a development that provides a significant base load for the CHP to meet. Conventional boilers and grid supply or on-site renewables can then provide the peak demand.

Analysis of annual heating and power hourly load schedules has been undertaken. This identified that the optimum CHP unit size for the development to be 2MWe total, operating September through to June.

Space has been allocated at the CHP to replace one or more of the district heat boilers with bio diesel CHP generator, increasing the electrical power produced from renewable means and the on-site electrical production.

**Allowance for Building Spot Cooling**

Building spot cooling is to be determined on a building-by-building basis. However, in the future if spot building cooling is required across the whole quarter due to building use or and climate change then district cooling may be considered from the centralised plant.
sensible urban density and linking natural pathways

The Programming Brief for the Grangegorman Quarter requires near 400,000 square meters of development within the 73 acre / 29.5 hectare site. This indicates a general Floor Area Ratio of about 1.4, indicating that if the program area were distributed evenly across the site it would cover the entire site 1.4 times.

To introduce roads, pathways and courtyards and maintain healthy portions of the existing landscaping and open space, the plot ratio increases a certain percentage and building designs increase in height. Portions of higher building density offset portions of open space. The key to designing is the sensible and sensitive location of building density based on specific site criteria (such as site topography, latitude and solar orientation, existing site features to retain, wind characteristics and macro / micro climate information) and community factors (such as noise, traffic, overshadowing, views, etc...).

The major existing site conditions that were determined important to retain were many of the mature healthy trees on the site and the open fields to the south. Building footprints were then located north of the existing open fields and the footprint locations were adjusted to accommodate some of the trees and landscaping to remain. Some of the Grangegorman program such as the Sports Centre, large classroom blocks and some of the Craft Training Facilities were located partially underground to further conserve existing open space. A well designed urban layout design can have the following benefits:

- Attractive and usable external spaces
- A sufficient amount of solar heat gain or solar shading
- A sufficient amount of daylighting and minimum overshadowing
- Passive cooling or shelter from strong winds
- Dispersion of pollutants and reduction in carbon dioxide emissions
- Reduction in energy consumption

Heating and lighting energy can be reduced by the climate-sensitive masterplanning for passive solar gain and daylighting and UK studies of passive solar housing suggest that improved site layout can save 5% or more in domestic energy consumption. In non-domestic buildings, the effective use of daylight can lead to savings of 40% or more in lighting energy use.

While the building density is to the north of the site, it was important not to over density or plan buildings with heights that would be uncharacteristic or overshadow the community around the edges of the site. The building heights have been reduced as the planning of buildings reaches the edges of the site to prevent encroachment on, block the views of, or overshadow residents of the surrounding community.

The Grangegorman development was also an opportunity to link together several disparate natural landscape paths in the areas near the site. With the retention of The Fields and the introduction of the Serpentine Walk, the new development links together a pedestrian landscape and wildlife corridor from the Canal and Mountjoy area in the north, through the site and out to Dublin’s Phoenix park.
natural daylight, ventilation and wind protection

A naturally daylit building provides contact with the outside world either directly through a view out, or indirectly as the changing daylight reflects the time of day or weather conditions. Daylight can reduce, and in some situations eliminate, the need for artificial lighting during the day. In non-domestic buildings, the effective use of daylight can lead to savings of 40% or more in lighting energy use. The quantity and quality of daylight depends on (in addition to the external environment and obstructing buildings):

- Building depth
- Windows
- Internal reflectance
- Type of glass
- Internal use and space layout

In general, the volumes shown in the Masterplan have been designed with a shallow or narrow plan between 14 and 16 meters in width to allow natural light to penetrate into the interior spaces. At the building design level, other techniques such as light shelves and light tubes can be employed to further increase the penetration of natural daylight.

Solar Access

Sunlight is highly valued as an amenity. In housing, the main requirement for sunlight is in living rooms, especially in the afternoon. It’s less valued in bedrooms and kitchens, where it’s preferred in the morning. The BRE guidance document ‘Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice’ states that:

“In general, a dwelling or non-domestic building which has a particular requirement for sunlight, will appear reasonably sunlit provided that: At least one main window wall faces within 90° of due south and; On this window wall, all points on a line 2 meter above ground level (floor level) are within 4 meters (measured sideways) of a point which receives at least a quarter of annual probable sunlight hours, including at least 5% of annual probable sunlight hours during winter months, between 21st September and 21st March.”

In a dwelling the room in which the main window wall is situated must be the main living space in that dwelling. For the student accommodation however this would be the shared living space proposed within each apartment. This has been incorporated into the Masterplan with notional internal floor layouts specifying that the shared living space is within 90° of due south.

Building Form

The majority of buildings within the DIT development fall into the shallow plan category, the result of which is that there is the potential for natural ventilation to be incorporated into the design depending upon individual building orientation and proximity, and greater daylight penetration reducing the need for artificial lighting throughout the development.
Exterior Daylight Availability

The Masterplan strategy is to minimise to a large extent the east-west orientated building volumes in favor of north-south orientated building volumes to reduce the amount of north facing building facade. In addition, the Masterplan design stacks higher building volumes in the north-south orientated directions as opposed to the east-west orientated directions to minimise the amount of overshadowing of adjacent buildings and landscape space. Where feasible, the courtyards open to the south to allow maximum daylight to penetrate onto the exterior spaces.

Several solar access studies were undertaken during the Masterplan process. One study was based on a modified Daylighting Factor. The Daylight Factor is traditionally a ratio between the amount of light received at a point inside a building from an overcast sky, to the amount of light that would be received at the same point from an unobstructed overcast sky. In the case of the Exterior Daylight Study undertaken, the definition of Daylight Factor has been modified to be the ratio between the amount of light received at a point outside a building from an obstructed overcast sky, to the amount of light that would be received at the same point from an unobstructed overcast sky.

Daylight factor ranges and descriptions:

- 0% - 20% Very poor daylight access
- 21% - 40% Poor daylight access
- 41% - 60% Minimum daylight access
- 61% - 80% Good daylight access
- 81% - 100% Excellent daylight access

The majority of external spaces should receive daylight factors greater than 50%. This indicates minimum through to excellent access to daylight. Un-shaded external spaces receiving less than 40% daylight factors should be minimised. These areas can form intermediate zones between well daylight exterior spaces and covered or interior spaces and should be found close to buildings where the shading by the building is predominant.

The predicted distribution of external daylight availability is displayed on the colored Masterplan analysis diagram on the preceding page. The diagram illustrates daylight availability in terms of daylight factors using five colour bands as indicated on the key to the right of the figure. Orange areas achieve more than 80% daylight factors, while dark blue areas achieve less than 20% daylight factors. The greyed areas indicate buildings, atria or other covered areas.

The diagram shows that the majority of external spaces achieve more than 60% daylight factors (areas shown yellow and orange). This includes the sports fields, the open urban spaces and the open spaces around the buildings. Some areas on the site achieve between 20 and 60% daylight factors (areas shown light blue and green). This includes streetscapes between opposite medium-rise buildings, smaller courtyards within blocks and areas immediately adjacent to building facades. Very few areas receive less than 20% daylight factors (areas shown dark blue). These areas are all in small corners or near to the entrances of buildings. These are appropriate locations for lower levels of daylight as they assist in visual adaptation between bright exteriors and less bright interiors or covered spaces.

Natural Ventilation Strategies

The benefits for allowing areas of the building to be naturally ventilated, or to benefit from outside conditioning, when the conditions allow, are a reduction in energy consumption and an increase in environmental connectivity.

It is clear however that correct satisfactory comfort conditions must be maintained throughout the year, and that comfort conditions must not be compromised solely by the desire for natural ventilation. In this respect air conditioning and heating will be needed in certain spaces, however periods of natural ventilation or free cooling may be maximised through bio-climatic design.

There are three varying methods of natural ventilation:

- Single sided ventilation
- Cross ventilation
- Stack driven ventilation

Single sided ventilation relies on openings at one end of the room and natural pressure to ventilate the internal space. High and low level openings can be adopted to maximise efficiency; with cooler air entering at the bottom, hot air out at the top. To further increase the efficiency of this process, it is opportune to increase the distance between the openings.

Cross ventilation is a more powerful mechanism that relies on the natural pressure differences established across the building by the interaction of the built form with the prevailing wind system. As wind forces are so much larger than those of stack effect, wind powered cross-ventilation is most effective for ventilation in summer.

Cross-ventilation is feasible in unobstructed open-plan offices (for example, those with low partitions) that have window openings at both ends. It will also work, though less effectively, in cellular offices, provided doors onto corridors are opened in hot weather - a condition that cannot be guaranteed if the occupants prefer privacy. But cellular offices with heavy partitions have the advantage that their higher thermal mass will dissipate heat.

Stack ventilation utilizes a combination of wind and thermal effects to maximise ventilation effectiveness. Generally, increasing the height difference between the stack exhaust and the inlet areas maximizes ventilation rates. Under still conditions, buoyancy forces will cause a constant movement of air through the space. When windy, the exhaust located at high level will typically remain depressurized with respect to the inlet location and good levels of ventilation are experienced.

For multi-storey buildings, raising the outlets of the atrium above the top of the building will prevent hot destratified air from convecting heat into the upper levels.

Night Time Cooling

During the night, outdoor temperatures are lower than indoor ones. Consequently, it is possible to ventilate the building by allowing the outdoor air to enter the spaces and remove the stored heat that has been trapped in the buildings thermal mass during the day. This means that occupants enter into a cooler environment in the morning resulting in a substantial energy saving from the reduced operation of the buildings mechanical ventilation system.
Environmental sustainability

Daylight and Shadow Study, overall view

Overall daylight and shadow study showing the effects of the building massing and heights for certain periods of the year at the latitude for Dublin, Ireland.
**Daylight and Shadow Study, DIT view**

Detail view of a daylight and shadow study showing the effects of the building massing and heights for certain periods of the year at the latitude for Dublin, Ireland.
Daylight and Shadow Study, HSE view

Detail view of a daylight and shadow study showing the effects of the building massing and heights for certain periods of the year at the latitude for Dublin, Ireland.
### Wind Analysis

The windiness in and around the Grangegorman development was quantified using a CFD wind assessment by ARUP Consulting Engineers. This assessment was carried out to help understand the ground level wind conditions affecting pedestrian comfort throughout the scheme. The general conclusions of the CFD analysis are:

- The arrangement of the buildings on the north side of the site are sheltered by the taller buildings on the south side of the site. The southerly buildings are exposed to the prevailing winds across the sports fields. As a consequence, conditions in the areas to the north of the site are anticipated to be calm, generally in the “Standing” range. These conditions are typical of an appropriate pedestrian environment.
- The area around the southerly buildings, particularly around the campanile, would be excessively windy without landscaping. These areas would be significantly improved by the proposed landscaping and the addition of further mitigation measures (on the individual buildings) such as windscreens, canopies, etc...
- The routes within the Grangegorman development facing the prevailing winds are subjected to “Strolling” conditions with local “Business Walking”. These conditions would be generally improved in installing dense landscaping as proposed to achieve suitable conditions for an appropriate pedestrian environment.
- Conditions around the train station were shown to be generally acceptable for the intended use of the area. The proposed development would have very limited off-site impact.
- With no trees, conditions in the sports fields are in the “Standing” or “Strolling” range and are acceptable for the intended use of the area. With the proposed landscaping, conditions are expected to improve.
- Entrances or areas of sensitive use should be generally kept away from the corners of the exposed buildings. The gaps through the buildings and roof overhang are shown to be windy and may require massing adjustment or additional mitigation measures. (The proposed landscaping is not enough to solve the windiness in these areas).
- External seating areas or outdoor cafe terraces should be placed in area of “Sitting” conditions for the possibility of a regular use of these areas in summer.

### Environmental Sustainability

- The wind speeds are predominantly from the south-west in winter months. Winds shift westerly in the summer months, and Southeast winds are strong in the spring months.

---

**Table: Wind comfort criteria**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
<th>Wind speed (m/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting</td>
<td>Reading, newsstand, eating, drinking</td>
<td>&lt; 0.5 m/s (60 days exceeded during season, eg winter)</td>
</tr>
<tr>
<td>Standing</td>
<td>Bus stops, pedestrian shopping &amp; building entrances</td>
<td>0.5 - 3.0 m/s (6 days)</td>
</tr>
<tr>
<td>Walking</td>
<td>Walking &amp; sightseeing</td>
<td>3.0 - 5.0 m/s (15 days)</td>
</tr>
<tr>
<td>Business Walking</td>
<td>Areas around tall buildings where people are not expected to linger</td>
<td>&gt; 5.0 m/s (30 days)</td>
</tr>
</tbody>
</table>

---

**Figure: Lawson Comfort Criteria**

With Landscaping – Worst Season – Overview of the results

As expected conditions are shown to be significantly improved by the integration of landscaping.

However, trees were modeled with leaves which could artificially improve winter conditions.

In some areas, the level of windiness may be one category higher (This is illustrated in red in the Figure to the left) with possible exceedance of the distress criterion around some of the buildings corners.

Additional trees or mitigation measures may be needed in these areas depending on the details.
preservation of existing natural and cultural heritage

Habitat Conservation

The Grangegorman site is an important sanctuary for urban wildlife, especially birds. Given the site's proximity to the City Centre, the local value of the remaining semi-natural habitats is greater than would otherwise be the case. While the wildlife link through the site is already explained in previous sections, it should be noted that other landscape features such as the Green Finger Parks will provide additional habitat and feeding routes. The retention of much of the stone walls will also help retain the existing habitats on the site.

Landscape Conservation

The site is not covered by any nature conservation designations but there are some habitats of local ecological significance including areas of dry grassland, trees and shrubs. The Dublin City Biodiversity Action Plan 2008 should be referred to during the redevelopment of the site. As demonstrated in the Architectural and Landscape design narratives, much of the existing healthy and mature trees are being retained as is the large existing open space area to the south of the site. The implementation of SUDS (Sustainable Urban Drainage Systems) will enhance and augment existing habitats. There is the opportunity to eradicate invasive alien plant species such as Japanese knotweed and giant hogweed.

Cultural Heritage Resources

There are 30 existing structures on the site. Twelve of the buildings, the entrance gates and the boundary walls are protected in the Dublin City Development Plan 2005-2011. The Conservation Strategy outlines principles and guidelines that should be adhered to for repairing, reusing, intervention and adaptation of buildings. This will impact on the settings of buildings but will reuse historic properties. This gives new opportunity for buildings to have long term use. The re-use and re-purposing of these existing buildings not only conserves the embodied energy used in their initial construction and saves the energy that would be used to replace them, but helps create a connection to the past history of the site.

Archaeological Resources

The archaeological heritage of the site will be investigated. There are currently no stray finds from topographical files of the National Museum of Ireland recorded from the locality and no recorded archaeological monuments are located within the site. There is potential for revealing subsurface remains of archaeological material. There is the possibility of burials within the proposed development. The playing fields on the west side remain undisturbed and possess potential for archaeological features.
transportation strategies

pedestrian and bicycle network

The Masterplan has been designed with a strong focus on pedestrian movements which guarantees the conditions for walking trips to be encouraged. In addition, the design entails a number of restrictions to auto traffic such as a system of traffic cells which will contribute to the creation of excellent quality pedestrian and cycling environments throughout the site. Cycle storage will be provided in a number of locations. This will take the form of 1) cycle parking for student residences which will be secure and at ratio of 1 space per 3 beds 2) Secure underground cycle parking for users that require longer periods of parking. (This element will be associated with facilities such as showers and lockers where appropriate). 3) on-street banks 4) Dispersed clusters of on-street cycle parking. A Pedestrian network plan has been included in the Site Access section of the Masterplan. Outdoor cycle parking locations can be seen in the Landscape Design narrative section of the Masterplan.

automobile parking

A limited quantum of car parking is to be provided within the Quarter. A provision of car parking in the region of 1,150 spaces is seen as modest in the context of an overall population of over 25,000 and a variety of uses ranging from primary health care to higher education, and including offices, retail and a primary school.

public transportation

A main goal of the Masterplan is to enable the seamless connection to the existing and future transportation networks, taking full advantage of Grangegorman’s sustainable city centre location. Connections to the south and the east are considered to be vital because they will provide access to the city centre, but also to Luas and bus networks, as well as to Metro North and the commuter rail services at Heuston and Connolly stations. The Masterplan’s emphasis is on the design of quality linkages from the site to the established city grid and to the high quality public realm within the site.
Surface Water Run-Off Management

The main goal of any new development’s water strategy is to ensure that there is a minimum increase in surface run-off. However, due to climate change, rainfall levels and therefore surface run-off levels are likely to increase. The result of which is that any development’s water management strategy must ensure minimum surface run-off on current levels but based upon the potential of future increases in rainfall levels. To achieve this, the surface water management strategy consists of two varying techniques, courtyard depression water management (incorporating rainwater rooftop recycling) and ha-ha/sports field water management.

Courtyard Water Management

During a rainfall event, surface water run-off will run into a slight depression in the centre of the courtyards spaces, that acts as a small attenuation pond, allowing the water to discharge at a slower rate. Any additional run-off will flow south towards the ha-ha. Rainwater will be collected from building roofs where possible and used for non-potable water applications (WC’s, etc) within each individual building unit.

Ha-ha/Sports Field Water Management

During a rainfall event, any surface run-off from paved areas and attenuated discharges from block landscaped areas and swales will travel towards the Ha-ha through a possible reed bed cleaning system (or perhaps through petrol interceptors). This system is intended for use during light to moderate rainfall events only. This body of water in the Ha-ha is maintained through a storage tank which feeds the Ha-ha during dry periods.

During a flood event, the flow diversion chamber restricts the water supply to the Ha-ha and instead directs the majority of surface run-off towards the piped system. The piped system will divert water to the irrigation storage tank. Once this is full, water will then be diverted either to the attenuation tank located under the sports field and to the proposed DCC surface water sewer depending upon the size of the rainfall event.
environmental sustainability

renewable and long lasting building materials

The Masterplan encourages the use of recycled and renewable building materials through the various energy efficiency and environmental sustainability standards that it is under the authority of. Using renewable construction materials prevents pollution and waste generation, creates new recycling industries and reduces landfill disposal and expansion. Using low VOC paints, formaldehyde free adhesives, and other safe building materials creates high indoor air quality and promotes greater efficiency for the occupants.

Prohibited Building Materials

The following list identifies a list of materials that are prohibited as stated in the "Hazardous Building Materials, Second Edition, 2002" by Steve Curwell, Bob Fox, Morris Greenberg and Chris March.

- No non sustainably sourced timber (except for reclaimed timber) to be used for building structure.
- No insulating material to have an ozone depletion potential greater than 0 and of a global warming potential of greater than 5.
- Asbestos – exposure to it increases risks of asbestosis, lung cancer, and mesothelioma in a dose dependent manner. No threshold has been identified for carcinogenic risks.
- Lead – historically, the criteria of lead toxicity were such effects as convulsions, paralysis, anaemia, severe colic and an associated malaise. Latterly, concern has been for whether covert effects might occur at levels of intake below those causing frank disease.
- Urea formaldehyde foam (UFF) – it is capable of liberating detectable amounts of formaldehyde vapour that cause irritation of eyes, nose, throat and chest accompanied by weeping, sneezing, coughing and breathlessness. Additionally it has been classified as a possible human carcinogen.

Building materials known to have a health risk during construction and occupancy of the building (materials which we feel are of significant importance are highlighted in bold):

- Stone
- Slate
- Concrete
- Vermiculite
- Calcium Silicate
- Gypsum
- Ionising lightning conductors
- Non-asbestos mineral fibres
- Cellulose fibres
- Polysyocyanurate foam
- Polychlorinated biphenyls (PCBs)
- Polyvinyl fibres
- Para-Aramid fibres
- Heavy metals
  - Chromium
  - Zinc
  - Cadmium
  - Halogenated Flame Retardants (HFRs)
- Perfluorocarbons (PFC)
- Wood preservatives
- Wood surface treatment

Embodied Carbon

<table>
<thead>
<tr>
<th>Material</th>
<th>Embodied Energy in MJ/kg</th>
<th>Material</th>
<th>Embodied Energy in MJ/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Concrete</td>
<td>0.64-2</td>
<td>Mortar</td>
<td>2.25</td>
</tr>
<tr>
<td>Concrete block</td>
<td>0.86-1</td>
<td>PVC</td>
<td>59-65</td>
</tr>
<tr>
<td>Concrete Poured</td>
<td>1.3</td>
<td>PVC Recycled</td>
<td>29</td>
</tr>
<tr>
<td>Concrete pre-cast</td>
<td>3.5-2</td>
<td>Polyethylene</td>
<td>85-98</td>
</tr>
<tr>
<td>Steel</td>
<td>28-40</td>
<td>Polyethylene recycled</td>
<td>56</td>
</tr>
<tr>
<td>Steel Recycled</td>
<td>8-18</td>
<td>Polyurethane</td>
<td>65</td>
</tr>
<tr>
<td>Stainless Steel</td>
<td>40</td>
<td>Polystyrene</td>
<td>96</td>
</tr>
<tr>
<td>Copper</td>
<td>60-150</td>
<td>Aluminium Doors/ Windows</td>
<td>218</td>
</tr>
<tr>
<td>Copper Recycled</td>
<td>10-25</td>
<td>UPVC Doors/ Windows</td>
<td>53.82</td>
</tr>
<tr>
<td>Brass</td>
<td>70-160</td>
<td>Plaster Board</td>
<td>5.73</td>
</tr>
<tr>
<td>Brass Recycled</td>
<td>10-30</td>
<td>Plaster</td>
<td>2.45</td>
</tr>
<tr>
<td>Zinc</td>
<td>65</td>
<td>Linoleum</td>
<td>70.95</td>
</tr>
<tr>
<td>Aluminium</td>
<td>145-250</td>
<td>Ceramic tile</td>
<td>2.9</td>
</tr>
<tr>
<td>Aluminium Recycled</td>
<td>10-27</td>
<td>Membranes</td>
<td>68.42</td>
</tr>
<tr>
<td>Hardwood</td>
<td>0.5-9.54</td>
<td>Roofing Tile</td>
<td>2.9</td>
</tr>
<tr>
<td>Softwood</td>
<td>5</td>
<td>Mineral wool ins.</td>
<td>18.4</td>
</tr>
<tr>
<td>Glass</td>
<td>16.2</td>
<td>Polyurethane ins.</td>
<td>82.33</td>
</tr>
<tr>
<td>Bricks</td>
<td>2.9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Other materials known to have national and global issues associated with environmental impact are:

- Peat
- Weathered limestone
- Uncertified timber
- Global warming potential materials

Material/Product Selection Procedure

For building development on-site it is recommended that a procedure for the selection of environmentally appropriate materials should be followed. A typical selection process is outlined in the table below.

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>Create prohibited material list for the project.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 2</td>
<td>Specify material/product characteristics</td>
</tr>
<tr>
<td></td>
<td>Physical properties (such as U-values, strength, stiffness, hardness, etc)</td>
</tr>
<tr>
<td></td>
<td>Lifespan</td>
</tr>
<tr>
<td></td>
<td>Toxicity (such as percentage of VOCs, HCFCs, CFCs, virgin PVC, formaldehyde, etc)</td>
</tr>
<tr>
<td>Stage 3</td>
<td>Identify appropriate material/product selections.</td>
</tr>
<tr>
<td></td>
<td>Include requirements within tender documents for contractor to follow and report against material selection procedure stages 4-8 and comply with prohibited material list.</td>
</tr>
<tr>
<td></td>
<td>Evaluate materials available on-site for reuse and locally sourced reclaimed materials.</td>
</tr>
<tr>
<td>Stage 4</td>
<td>Evaluate more environmental alternatives using relevant guideline specifications.</td>
</tr>
<tr>
<td></td>
<td>Log all selection choices and reasons with products/materials have been discarded.</td>
</tr>
<tr>
<td></td>
<td>(Relevant Ireland documentation yet to be analysed)</td>
</tr>
<tr>
<td>Stage 5</td>
<td>a) Assess ability to improve environmental impact by increasing recycled content</td>
</tr>
<tr>
<td></td>
<td>b) Evaluate material/product selection against environmental impact</td>
</tr>
<tr>
<td></td>
<td>c) Locate nearest certified manufacturer to site and consider how it would be transported to site</td>
</tr>
<tr>
<td></td>
<td>d) Identify whether the supplier has either a Environmental Management System (EMS), ISO 14001 or if supplying timber can ensure a full chain of custody.</td>
</tr>
<tr>
<td>Stage 6</td>
<td>Report product selections against embodied energy, % recycled content.</td>
</tr>
<tr>
<td>Stage 7</td>
<td>Weight selections in order of least environmental impact based on findings of STAGES 4 and 5.</td>
</tr>
<tr>
<td>Stage 8</td>
<td>Material/product selected in agreement with stakeholders.</td>
</tr>
</tbody>
</table>

CO₂ Emissions due to Transportation

<table>
<thead>
<tr>
<th>Transport Mode</th>
<th>CO₂ Emissions (kg CO₂ / tonne)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>1160 to 2150</td>
</tr>
<tr>
<td>Inland Waterways (Canals)</td>
<td>40 to 66</td>
</tr>
<tr>
<td>Rail</td>
<td>39 to 48</td>
</tr>
<tr>
<td>Road</td>
<td>207 to 280</td>
</tr>
</tbody>
</table>
existing situation

Roads

The site is located between Phibsboro and the Phoenix Park with the North Circular Road to the north, Prussia Street to the west and Grangegorman Road Upper passing through the site to the east as shown in the map. The site is also bound by the Broadstone site to the north east and east and Kirwan St to the south. The site is located just outside the City Centre. The road network comprises a hierarchy of roads including national, primary, regional, local and other roads and includes the following (refer to map to left). Following is the list of roads in the vicinity of the site.

- N2 Phibsborough Road: This is a national primary road running from Dublin to the border with Northern Ireland. The N2 commences at a junction with the N1 along the Dorset Street Upper. The route runs via St. Mary’s place, Phibsborough road, Berkeley road and Blessington Street.
- N3 Cabra Road: This is a national primary road running between Dublin, Cavan. The route connects in North Circular road (R101).
- North Circular Road (R101): This is a regional road and runs along Summerhill Parade, Dorset Street lower, Phibsborough Road, Cabra Street, Prussia Street/Old Cabra Road and Infirmary Road.
- Grangegorman Road: This is a local road connecting North Circular road to the north and Brunswick Street to the south. Upper Grangegorman road splits into upper Grangegorman and Rathdown down road as it approaches North Circular Road.
- Brunswick Street: This is a one-way local road and runs between Stoneybatter and Upper Church Street.
- Kirwan Street: This is a one-way local road connecting Manor Street and Upper Grangegorman Road.

Road capacities

A baseline traffic capacity appraisal of the road network surrounding the Grangegorman site has been carried out.

The main road links surrounding the Grangegorman site have been assessed using a method based upon national maximum one-way hourly capacities. This method is recommended in the National Road Authority’s Design Manual for Roads and Bridges (DMRB), which is a highly recognized roads and transport design guideline used in Ireland (and the UK).

Traffic carrying capacity is derived by calculating the theoretical number of cars that are able to pass by a certain point along a road without any constraints. The capacity of the road is then reduced by taking into consideration a number of factors such as the speed limit, the parking regime, the existence of side roads and driveways, the frequency of pedestrian crossings and the type of bus stops along a specific section of road. These factors affect the traffic throughput on the road and the road capacity is therefore derived by making adjustments to represent the affect that the above factors may have on road capacity.

The Old Cabra Road-Prussia Street-Stoneybatter and Phibsborough Road- Constitution Hill-Church Street corridors are the ones with generally the most traffic capacity. The section of North Circular Road to the East of Phibsborough Road can be considered over capacity in the AM peak, and the same happens with Phibsborough Road North and South of North Circular Road, during the PM peak.

Capacity constraints at upstream junctions may reduce the normal traffic throughput which will mean less traffic along the downstream link. On the other hand, capacity constraints downstream will give rise to congestion along an upstream link that is not determined by the link capacity itself.

Junction Capacities

The operation of a road network is primarily determined by its junction capacities rather than road or link capacities. The above mentioned capacity appraisal focused on the performance of a number of relevant junctions in the vicinity of Grangegorman, including Hanlon’s Corner, St. Peter’s Church and Doyle’s Corner junctions, as well as Constitution Hill/Western Way junction. Junction capacities have been assessed using computer modeling software available for the assessment of different types of junctions. Signal Controlled junctions have been assessed using TRANSYT while priority junctions were assessed using PICADY.

Hanlon’s Corner

This is a four arm junction between North Circular Road, Prussia Street and Old Cabra Road, which is commonly known as Hanlon’s Corner. This signal controlled junction is operated by a four stage signal plan.

During the evening the westbound approach to the junction operates close to capacity. This link accommodates all the movements in a single lane. No right of way is assigned to this right turn movement. Travelling through the junction on gaps only, this right turn movement seriously affects the performance of this link. All the other approaches operate within capacity during both the AM and PM.

St. Peter’s Church and Doyle’s Corner junctions

All the approaches to both the junctions currently operate within capacity during both the AM and PM peak hour periods. The traffic volumes through these junctions are considered to be low. This is as a result of vehicles being held up at junctions upstream and downstream of these junctions. If the capacity of the upstream and downstream junctions are improved, it is expected that the above junctions will experience congestion and queuing.

Constitution Hill / Western Way / Phibsborough Road junction

This is a high capacity three-arm junction operated by a three stage signal plan. All the approaches operate within capacity during both the AM and PM peak hour periods. The straight and left turn movements on the Phibsborough Road approach to the junction shows signs of congestion during the AM peak hour.

Other junctions

No capacity constraints were identified on the junctions along North Circular Road (NCR) with Grangegorman Road Upper, Rathdown Road and Charleville Road. Any capacity issue at these locations is likely to be caused by congestion along the main link (NCR), rather than the flows on the minor arms, which are generally low.

Junctions along Church Street and Blackhall Place, south of Grangegorman were found to perform well. It is expected that vehicle throughput at these junctions are also constrained by other upstream ad downstream junctions with limited capacity (Hanlon’s Corner and Doyle’s Corner in the AM peak; and the quays and crossings of the Liffey in the PM peak).
Public Transport

Existing Public Transport

The Grangegorman site is currently well connected by bus services as shown in the diagramme to the left. A large part of Dublin falls within the catchment of the Dublin Bus routes that links to the site. Grangegorman is also within 30 minute walking distance of the City Centre where the majority of bus routes terminates, making the site accessible from anywhere in Dublin and beyond. One of the most important and busiest bus routes is the Cabra N3 Quality Bus Corridor (QBC) which facilitates service nos. 10, 37, 38, 39, 70, 83, 120, 121 and many variations of these. These buses link Grangegorman to locations such as Carpenterstown, Blanchardstown, Cloncilla, Ashtown, Ongar, Tyrellstown, Castleknock, Mulhaddart and Dunboyne. Grangegorman is also linked to locations such as Santry, Glasnevin, Ballymun, and Pop-pintree to the north by Dublin Bus Services no’s 4, 83 and 19A. To the south locations within south east Dublin such as Ballsbridge, Sandymount, Merrion and Ratoath, Belfield, Stillorgan and Donnybrook are linked to Grangegorman by routes 4, 39B and 70X and to the south west locations such as Crumlin and Harold’s Cross are linked by routes no. 121, 122, 83 and 19A.

Bus services within the local vicinity of Grangegorman are shown in the diagramme below. To the west of Grangegorman, Prussia Street, Stoneybatter and Cabra Road is a main bus corridor. Many bus service uses this route and bus vehicle frequencies along this corridor is high.

To the east of the site, Phibsborough Road/Constitution Hill is also served by a significant number of services destined to the Quays and the City Centre. To the north of Phibsborough, these services cater mainly for the N2 corridor (Glasnevin/Ballymun/Finglas).

Despite having only one service, the section of North Circular Road that is immediately adjacent to the site provides one of the highest bus frequencies that can potentially serve the proposed development. The service number 10 connects UCD with Phoenix Park via O’Connell Street with frequencies of up to 10 buses per hour per direction during the peak periods.

LUAS

The existing Luas Red line running from Tallaght to Connolly Station has two stops (Smithfield and Four Courts) with walking distance from the Grangegorman site. The total journey time for the red line from Tallaght to Connolly Station is estimated at 46 minutes.

The Luas Red and Green lines are not connected; however it is a 15 minute walk from the Abbey Street stop on the Red line to the St. Stephen’s Green stop on the Green line. The Green line runs from St. Stephen’s Green to Sandyford.
There are various different transport proposals planned in Transport 21 that will improve access to the site as shown in the accompanying diagramme to the left. Within the local vicinity of the site, Metro North and the Luas Line D will directly improve rail services providing high capacity public links to the site. Following is a brief outline of the Transport 21 Strategy infrastructure proposals:

**Metro**

Metro North will connect the town of Swords to Dublin City Centre (St. Stephen’s Green) via Dublin Airport as shown in the map on page E-4. This major piece of transport infrastructure is due to be complete in 2013. Metro North will operate underground, surface and elevated tracks with 15 stops available between City Centre and the Airport, including two (Parnell Square and Mater) that are located within reasonable walking distance (approximately 1.4km and 2km, respectively) from the site. Assuming pedestrian connectivity from Constitution Hill and an access on North Circular Road, it is predicted that the site can be reached on foot in 14 minutes from Parnell Square station and 19 minutes from the Mater station.

**Luas**

- **Line BX**
  This line extension provides connection between the two existing Luas lines, thereby enhancing the connectivity to the City Centre for citywide commuters. A Railway Order submission for line BX is planned in 2009, according to the RPA.

- **Line D**
  This extension of line BX towards Liffey Junction via Broadstone is still in design stage. This Line will directly serve Grangegorman and is considered to be the single most important public transport infrastructure to serve the site in the future. The improved connectivity of the site brought about by a Luas stations in its immediate vicinity will enable a substantial share of trips to be accommodated by the Luas. This line is expected to have two stations within the immediate catchment of the Grangegorman Campus: one adjacent to the Broadstone building; and another further north, either at the northern side of the present Bus Eireann depot, or in the vicinity of North Circular Road. Both, but especially the former, will provide the development with an excellent level of accessibility by Luas.

- **Luas Green Line and Red Line extensions**
  The extensions of the Green and Red lines to Bray (the line to Cherrywood is currently under construction) and Saggart will significantly increase that catchments that will avail of a direct connection to the city centre, and with line D, to Grangegorman itself.

- **Line F**
  Luas line F connects the City Centre and Lucan providing an alternative rail access into the City Centre from the western suburbs. It has to be noted that this line will provide a connection to line BX and D, as well as to Metro West. This project is scheduled for completion in 2013.
Other Rail Improvements

Rail Interconnector
The Interconnector is due for completion in 2015 is a planned link connecting the existing Northern Line to the lines running out from Heuston Station. It is envisaged that this public transport system would eliminate the existing city centre capacity constraints owing to its higher capacity and more frequent services.

Kildare Line upgrade
This project involves quadrupling of critical section of track between Cherry Orchard and Hazelhatch on the Heuston-Kildare line, along with ancillary works such as signalling and station developments. A key objective is to accommodate a peak hour service pattern of four commuter, four regional and four intercity services. Heuston Station lies approximately 20 minutes walking from Grangegorman.

Navan Rail Line
The project is carried out in two phases. Phase 1 involves reopening 7.5km of railway line running off the Maynooth line, at Clonsilla, to the M3 interchange at Pace, near Dunboyne scheduled for completion in 2010. Phase 2 provides connection to Navan and projected to complete by 2015. With Luas Line D in place and the proposed interchange between these two rail lines at Broombridge, Grangegorman would benefit from the increased catchment provided by the Navan line.

Bus Improvements

Quality Bus Network
The QBN Office carries out a permanent assessment of the needs for improvement to the QBC network and the existing QBCs are being upgraded on a regular basis throughout the city. With regards to sections of the QBN that are relevant to Grangegorman, the QBN Office has revealed that work on QBC along Old Cabra Road is to start before the Summer of 2008 and that further bus priority improvements along Manor Street and Stoneybatter are also planned.

Traffic Management in Greater Dublin Area (GDA)
This provision includes the construction of QBCs, cycle paths, improved pedestrian facilities and traffic management support systems under Transport 21 program. Capital funding for traffic management measures in the GDA is provided through the DTO Traffic Management Grants, in support of its overall transportation strategy. Projected completion is 2015.

Other Bus Improvements
Development of Bus Services in GDA (Dublin Bus): This program is part of Transport 21 and is aimed at expanding the bus network in the Dublin area. Also a target of 60% is set to achieve as an increase in passenger carrying capacity through new and replacement bus acquisition by the year 2015.

New services are introduced under Transport 21 program to enhance Bus Eireann services to customers on city and commuter services. A total of 235 vehicles are to be procured in 2007 and 2008 as part of this program. Bus Eireann intends to improve its present interurban services to Dublin, including substantial frequency and quality enhancements of services along the N2 and N3 corridors.
**Walking and Biking Environment**

**Pedestrian Network**

The majority of the road network in the vicinity of the site is provided with adequate pedestrian facilities, including signalised pedestrian crossings across the main roads, such as Constitution Hill, North Circular Road and Prussia Street. However, the present site’s accessibility on foot is limited by its impermeable layout, with only access to the external walking network via Grangegorman Road.

Grangegorman is, at present, cut off from Dublin City Centre by the Broadstone site and a number of adjacent properties such as the Haven House Hostel, off North Brunswick Street. To the west, the site’s wall forms an effective barrier to connections toward the Stoneybatter and Hanlon’s Corner areas.

**Site Accessibility on Foot**

The diagramme to the left shows how accessible the Grangegorman site will be by showing walking distances to existing and future transport stations and stops as well as other important facilities within the vicinity. Various walking routes are shown from Grangegorman. The Luas stops on the Red line to the south of Grangegorman are all within 15 minutes walking distance from Grangegorman via a number of walking routes. Heuston Station, one of Dublin’s most important stations where many rail services terminate is approximately 20 minutes walk from Grangegorman, while Connolly Station (another important station of Dublin) is within 30 minutes walking distance.

New stations planned on the Metro North Line including the Mater and Parnell Square Stations will be located within 15 minutes walking distance from the site. Also, the Broadstone North and South Stations on the proposed Luas Line D will be located adjacent, on the door step of the Campus.

**Cycle Facilities**

Cycle infrastructure within the vicinity of Grangegorman is as good as any other within Dublin. Cycle lanes are provided on strategic routes such as on North Kings Street and there are also a shared bus/cycle lane on Constitution Hill and portions of North Circular Rd.

Cycle infrastructure is constantly being improved within Dublin. Dublin City Council are implementing the Dublin City Strategic Cycle Network programme aimed at providing an extensive and integrated cycle route network for the City.
Provided with a dense network of pedestrian links, the district can be easily traversed in a 15-minute walk. Green boulevards dominate the internal circulation and are designed to allow articulated paths for both pedestrians and cyclists, which will provide quality circulation environments in all seasons.

The location of attractors and generators of walking journeys, as well as landmarks within the Campus has been considered so as to provide a coherent, legible and permeable movement pattern that will enable the desired maximum activity and quality of the public realm.

Most importantly, the Masterplan will include in-Campus accommodation for approximately 1,500 students, which will greatly maximize the share of walking journeys generated by the development’s population. Cycle journeys are also encouraged by design, as the required cycle parking facilities will be available in tandem with a good quality cycling environment within the Campus. The different cycle parking needs are catered for in the Masterplan, ranging from cycle parking for student residential accommodation to pockets of convenience on-street cycle parking.

The DIT, HSE and the commercial elements of the Masterplan will avail of secure staff cycle parking and shower/changing facilities, mainly accommodated within the underground car parking areas.

Rather than providing a number of new transport links to serve the new population on site, the main aim of the Masterplan is to enable the seamless connection to the existing and future transportation networks, taking full advantage of Grangegorman’s sustainable city centre location.

Connections to the south and the east are considered to be vital because they will provide access to the city centre, but also to Luas and bus networks, as well as to Metro North and the commuter rail services at Heuston and Connolly stations.

The Masterplan’s emphasis is on the design of quality linkages from the site to the established city grid and to the high quality public realm within the site.

The Masterplan has been designed with a strong focus on pedestrian movements, which guarantees the conditions for walking trips to be encouraged. The design entails a number of restrictions to traffic movements, such as a system of traffic cells, which will contribute to the creation of excellent quality pedestrian and cycling environments throughout the Campus.

A limited quantum of car parking is to be provided within the Campus, as a further measure to guarantee the minimum impact of traffic on the internal public realm, as well as on the adjacent road network. A provision of car parking in the region of 1,150 spaces is seen as insignificant in the context of an overall population of over 25,000 and a variety of uses ranging from primary health care to higher education, and including offices, retail and a primary school.

The internal roads where traffic is allowed for convenience purposes are designed to a standard that will discourage speeding and through-movements. Limited traffic and on-street car parking are considered as elements that, if correctly managed, will enhance the quality of some of the spaces throughout the Campus by adding to the activity mix at street level.

The most relevant improvement to the public transport networks that is to be provided as part of the Masterplan is a bus terminating facility that, at an area that can suitably cater for the overall Grangegorman/Broadstone area is decided upon at a later stage in the masterplanning process.

It provides density of uses, especially residential within walking and cycling distance from Grangegorman. This will enable these modes to assume greater importance with regards to trips in and out of the development.

It provides proximity to the most of the public transport network, which are concentrated in the city centre. This will enable the maximisation of the bus, Luas and rail mode shares.

The access off Constitution Hill is envisaged to cater for: a) access to Dublin Bus depot; b) access to bus terminus (for Dublin Bus and possibly Bus Eireann); c) vehicular access to the eastern part of the Grangegorman Campus; and d) access to Bus Eireann depot. This is envisaged to work in conjunction with a wide pedestrian boulevard that will provide a connection across Broadstone from Constitution Hill.

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The provision of a bus terminus as part of the Masterplan will greatly enhance the capacity and flexibility of the existing bus network, which already serves the periphery of the site with considerable levels of service.

Luas Line D is an extension of the existing Luas Green Line that will include two stations in the Broadstone area adjacent to Grangegorman and when completed will provide the development with a direct high capacity connection with the city centre.

The details of the multi-modal link via Broadstone, including the connections to the interim and ultimate bus termini are outside the remit of the Master-planning team. However, a concept for the achievement of seamless and high quality connections between the stations and the core of the Campus has been put forward by the Masterplan.

The conjunction of existing and future bus provision with the new Luas line, will create the conditions for the eastern access (via Broadstone) to become the main Gateway to the district.

**Cycle Parking**

Generous provision of cycle parking will be provided in the Masterplan. Cycle parking will be provided throughout the Campus, having regard to the likely requirements of the different groups of users. It is therefore proposed to provide:

- Cycle parking for student residences, which needs to be secure and possibly at a ratio of 1 space per every 3 bed spaces provided.
- An element of secure parking associated with underground car parking, to be used by cyclists requiring longer periods of parking. This element of cycle parking will be associated with facilities such as showers and lockers, as appropriate.
- On-street “banks” of cycle parking, possibly covered, located in visible locations near the highest attractors of trips (Library, Faculties, and Sports).
- An element of dispersed clusters (4 to 20 spaces) of on-street cycle parking, to maximise access to all buildings and facilities. These should be located in the vicinity of the main building entrances and visible from the main pedestrian thoroughfares.

**Non-motorised transport modes**

**Pedestrian and Cycling Networks**

The Masterplan is being designed with a strong focus on the provision of a dense and attractive pedestrian and cycle network. This is considered to be one of the most important elements of the proposals, as it will enable: a) the necessary conditions to encourage high levels of pedestrian and cycle journeys to and from the Campus; and b) the desired quality of the public realm that will ensure its attractiveness and therefore, will contribute towards longer dwell times, hence minimising the impact of peak travel.

**Links to broader city networks**

One of the main objectives of the Masterplan is to create a new neighbourhood for Dublin. One of the most important elements that will enable this will be the seamless integration of the proposed internal walking and cycling networks with the existing urban grid.

**Permeability**

In order to achieve the maximum integration with the existing urban grid surrounding the site, as well as the best possible access to the public transport networks, the site will be designed to provide the best possible permeability across its boundaries.

The pedestrian network plan depicts the proposed internal pedestrian network and its linkages with the wider urban grid. If this level of permeability is achieved by the Masterplan, the walk distances would be significantly optimised, resulting in a walking catchment diagram which is closer to an “as-the-crow-flies” catchment.

**Legibility and Attractiveness**

It is envisaged that the internal circulation networks are designed with a focus on providing legible routes throughout the Campus. Adequate signage is proposed to guide the different types of users using the various modes of transport. Suitable directional signage to and from the main destinations, including transport nodes outside the Campus will enhance the attractiveness of pedestrian and cycling journeys to and from the Campus.

Public art is an important aspect of legible and attractive public realm. It can provide important landmark features that help guiding pedestrian and cycling, but also vehicular circulation. The creation of visually attractive nodes throughout a pedestrian network is seen as a significant factor on the willingness of people to undertake journeys on foot.
Secondary Links
These will include the east-west link to the north of St. Brendan’s Way, the access to the car park and set-down areas from Constitution Hill, as well as servicing and maintenance roads along the periphery of the site and along the Ha-Ha.

Function
Caters for limited traffic mainly related to servicing, maintenance, disabled access, and possibly taxi and ‘out-of-hours’ access. On-street car parking can be accommodated near the Grangegorman Road entries to the development.

Character
Predominantly pedestrian space shared with occasional vehicular traffic. Generally flush shared surfaces, but with clear delineation of carriageway space. Occasional variations to horizontal alignment to add to traffic calming effect.

typology
Shared surfaces: Flush surface with clear delineation of carriageway space; 5.5m vehicular corridor; no need for footways as adjacent space is primarily pedestrian; horizontal deflections (e.g. chicane, pinch-points).

Access from Constitution Hill: surface with clear delineation of carriageway space; 5.5m vehicular corridor; no need for footway on northern side as adjacent space is primarily pedestrian; 3m wide pedestrian only ‘buffer’ on southern side.

Maintenance roads: 5.5m wide with occasional widening (width variable) for loading/unloading or to allow for turning movements in and out of service areas. There is a possibility of accommodating ‘out-of-hours’ parallel car parking to serve playing pitches.

Tertiary Links
This category mainly applies to Saint Brendan’s Way and adjacent ‘driveable’ surfaces.

Function
Caters for limited traffic mainly related to servicing, maintenance, disabled access, and possibly taxi. Vehicular access to these links should aim to be limited to ‘out-of-hours’.

Character
Predominantly pedestrian space shared with very limited vehicular traffic. Flush shared surfaces, with no clear delineation of carriageway space.

Typology
Flush pedestrian space with no clear delineation of carriageway space; 5.5m unobstructed vehicular corridor defined by usage of planting, urban furniture, and if necessary, bollards.

Traffic Calming
Objectives
It is envisaged that the movement network is designed in a manner which prioritises pedestrians over motorised traffic. However, accessibility for cars, service vehicles, etc., will mean that, at a number of points within the site and times of the day, these will be in conflict with pedestrians.

The inevitable conflict between pedestrians and vehicular traffic will be mitigated at key locations by traffic calming measures that may range from junction treatment to the overall design of the link. It is desirable that traffic calming forms part of the masterplanning design, rather than being retro-fitted after construction.

Available measures
Traffic cells
It is envisaged that all links throughout the development are designed in a way that will not preclude usage by all types of vehicles. However, a system of traffic cells is proposed to avoid the site being used by general city traffic. The only exception will be Grangegorman Road, which is at present a through route for general traffic. Traffic cells will be accessed from Constitution Hill, Grangegorman Road, North Circular Road and Prussia Street.

This is the most effective measure to discourage unnecessary vehicular traffic through the site, whilst enabling suitable access to all locations. The Masterplan aims to achieve a system whereby the traffic cells are of equal size and levels of usage are adequate to the immediate external road network.

Shared surfaces
Shared surfaces are effective elements of traffic calming, as they enable the re-balance of priority towards pedestrians along roads or across sections of roads. There are different levels of integration between pedestrian and vehicular movement within shared surfaces. These range from areas with no distinction between car and pedestrian spaces, to streets where cars are kept separate from pedestrian-only spaces by means of physical barriers (generally bollards). A solution in between both of the above is the visual delimitation of car-only space by means of different materials and/or colours, often using the drainage channels as a subtle physical delineation.

The concept of a shared surface is that drivers will recognise that they are circulating through a pedestrian area with clear indication of the limits of their circulation space, and therefore will adopt lower speeds. It is important that these spaces are well used by pedestrians, so that their priority is reinforced.

Within the Grangegorman development, it is envisaged that the whole of St. Brendan’s Way could be a shared surface, including the section where it crosses Grangegorman Road. The level of integration applied will vary along its length, with the Library plaza, the area between the Student Centre and the section opposite the Performing Arts Centre being the most suitable to have the least segregation between the modes, perhaps with no clear demarcations at all. The remaining sections should include some type of visual delineation of the vehicular space, but built-to-purpose physical obstacles such as bollards should be avoided, so as to reinforce the ‘non-road’ character of the space.

Ivy Avenue and the section of Grangegorman Road opposite the Clock Tower building and across St. Brendan’s Way should be shared surfaces with clear demarcation of the vehicular space. It is envisaged that the numbers of motorised vehicles (including service/deliveries vehicles) will be higher than along St. Brendan’s Way, despite the fact that pedestrians are still likely to dominate, especially during busy periods. However, it is not proposed that some type of kerbing will be in place and that the material used for the carriageway should be suitable for pedestrian circulation, if not the same as the paving of the pedestrian-only fringes.

Due to its location at the interface between HSE, DIT and community uses, the area to the north of the DCC Community Library has the potential to become a very attractive plaza. It is suggested that higher levels of space integration are applied. This can be achieved by the usage of the same type of surfacing material throughout the plaza (limited to the north by the cafeteria building and to the south by the Community Library), with only subtle delineation of vehicular circulation space, perhaps by drainage channels.
only, normally associated with clear priority assignment. A pinch-point can have priority assigned, namely in the cases where it reduces the circulation space to allow only one vehicle to pass, but often doesn’t.

These types of measures are suitable for points where pedestrian movements across the road are expected. The effect on pedestrian safety is threefold: a) it reduces traffic speed; b) it reduces the length of the pedestrian crossing; and c) it provides additional pedestrian reservoir on one or both sides of the carriageway, often “placing” pedestrians in the line of sight of vehicles.

As a general rule, the vehicular circulation spaces should not be wider than 6m, with 5.5m being a suitable width so as to allow two heavy vehicles to cross each other without having to stop. Taking these general widths as a benchmark, the vertical deflections should either maintain the width, in the case of chicanes, or reduce it towards a minimum of 3.7m, in the case of pinch-points or build-outs. 3.7 metres is the minimum width that allows for suitable circulation of emergency vehicles. Ivy Avenue, Grangegorman Road Upper and Lower and Rathdown Road are especially important areas for the adoption of these measures.

On-street car parking
Car parking can be used as an element of traffic calming, when correctly placed. Pockets of car parking (parallel, perpendicular or chevron), can work well with the horizontal deflections proposed above. The provision of on-street car-parking needs to be sympathetic to the pedestrian desire lines, in order to avoid acting as an obstacle to pedestrian movements. The Masterplan proposes in the long term the larger quantum of car parking to be accommodated in underground facilities. In the medium term, surface car parking will be provided on quadrangles not yet developed.

Buildings location and landscape design
The location of buildings, urban furniture and landscaping in relation to the circulation space can also be an effective element of traffic calming. A variety of forms, materials, uses, and relative distances from the carriageway should be sought so as to provide a discontinuous visual environment along the street. Visual lines that follow and enhance the vehicular circulation direction should be avoided, and conversely the pedestrian desire lines, especially those crossing or running adjacent to the vehicular space should be emphasised.

Car Parking
Proposed quantum of car parking

The quantum of car parking will take into consideration the impact of car trips on the adjacent road network, but specific issues to be taken into account with regards to the quantum of parking are related to the variety of uses and times when the car parking may be required. For example, provision needs to be made for usage of the Campus outside the normal working days, such as evenings and weekends, when the availability of public transport is lower.

In addition, the Masterplan will have regard for the need to avoid car parking overspill onto neighbouring residential areas. Keeping car parking numbers within the site to an unsustainable minimum could have such an effect.

It is therefore suggested that approximately 1,150 car parking spaces are provided within the site. This quantum is purely indicative at this stage and will be heavily influenced by the physical capacity to be accommodated within the present Masterplan proposals.

Surface treatment
The choice of surfacing materials can have a traffic calming influence but can often be unattractive or even inadequate for pedestrian and cycle usage. The solutions proposed will have regard for these constraints.

Vertical and horizontal deflections
Commonly, traffic calming is achieved by the implementation of vertical deflections on the carriageways such as speed ramps or speed tables. In situations where these may have a negative impact on the circulation of buses, speed cushions are implemented.

Apart from speed tables, which can have a positive effect in providing for improved pedestrian facilities across a road or junction, vertical deflections are generally afterthoughts and/or implemented to mitigate an existing vehicular speed issue to discourage rat-running.

The Masterplan for Grangegorman considers that the majority of the internal road network should be flush (and in most cases integrated) with the pedestrian space, forming something like a site-wide raised table. Therefore, the vertical deflections would occur as a feature at the following points of access:

- off North Circular Road;
- off Prussia Street;
- on Grangegorman Road north of the Clock Tower;
- on Grangegorman Road south of St. Brendan’s Way; and
- off Constitution Hill.

Within the development, it is considered more suitable to apply horizontal deflections. These consist of changes in the carriageway alignment such as pinch-points, build-outs, chicanes that have the effect of changing the real or visual width of the vehicular circulation space, and therefore can have a significant traffic calming effect.

The difference between a build-out and a pinch-point is that the former is a narrowing of the vehicular circulation space on one side of the carriageway
The Masterplan proposes that the vast majority of car parking is accommodated underground, with direct access from the external road network and not via the campus itself. The potential locations proposed for underground car parking are the following:

- On the eastern side of the development, south of St. Brendan’s Way, with access from Constitution Hill and from Grangegorman Road. This would accommodate the largest concentration of car parking – approximately 450 spaces;
- On the northern side of the development, accessed off North Circular Road, with capacity for approximately 350 spaces;
- On the eastern side of the site, north of St. Brendan’s Way, with access off Grangegorman Road Upper, with capacity for approximately 200 spaces; and
- On the southern side of the site, under the Science and Technology Park, accessed from Morning Star Avenue, with capacity for approximately 150 spaces.

In addition, it is proposed that a number of on-street car parking spaces are provided at locations throughout the site. These will be additional to the residential car parking already provided along Grangegorman Road and Rathdown Road, and is intended to provide a convenience dimension to the car access strategy, and will be able to include part of the disabled car parking requirements.

The management of on-street car parking, especially that within the site boundary will be a matter to be dealt with by the traffic management plan for the Campus. Due to the likely limitations to the quantum, it is important to ensure that the usage of the car parking is optimised, taking advantage of different uses that may complement each other (e.g. day-time university uses and evening-time sports or events).

The on-street car parking provided may be restricted in usage or subject to a fare strategy that encourages short term usage. It is seen as beneficial to allow for parking by general users at least during times when the Campus may be less busy, such as evenings and weekends.

**Vehicular Access Strategy**

**Access locations and layouts**

The Masterplan proposes that vehicular access is limited to the existing through-route along Grangegorman Road and additional accesses from any (but not necessarily from all) of the following external roads:

- Constitution Hill (via Broadstone site)
- North Circular Road
- Rathdown Road
- Grangegorman Road Upper
- Grangegorman Road Lower
- Morning Star Avenue
- Prussia Street (to be explored)
constraint seems to be the presence of trees along North Circular Road, which may hinder the visibility splays depicted in the drawing. There is residents’ parking on the northern side of North Circular Road that would need to be relocated.

Access off Prussia Street
This access has been designed to accommodate limited amount of traffic. It is envisaged that a share of the servicing traffic would utilise this gate into Grangegorman, as well as general traffic accessing a traffic cell. The preliminary proposals entail a 6.0 meter wide carriageway, with adjacent footpaths on either side with a minimum of 2.0 meters in width. It would be desirable to achieve greater pedestrian width on at least one of the sides of the carriageway, in order to maximise the function of the access as a main pedestrian gate into the Campus.

Accesses off Rathdown Road and Grangegorman Road
These roads will provide frontage to a considerable part of the development, and therefore will be provided with a number of accesses to the internal Masterplan road network. The access to the Laundry Building will be accommodated from Rathdown Road, as will the primary school drop-off. The new internal route Ivy Avenue, will connect with Grangegorman upper. A minor access road south of Marine Villas will provide access to underground facilities if required. On Grangegorman Road lower there will be limited traffic accesses to the eastern and western sides of the site, as well as an alternative access to the main car park south of St. Brendan’s Way.

Access off Morning Star Avenue
Morning Star Avenue is at present a cul-de-sac off Brunswick Street that terminates at the site boundary. The proposal is to allow alternative vehicular access to the southern sector of the Masterplan. It is likely that this access allows for service access, as well as access to a limited amount of car parking. In addition, Morning Star Avenue would provide an additional alternative for pedestrian and cycle journeys to and from the south.

Car access
As mentioned before, the vehicular circulation patterns within the site will be determined by a series of traffic cells. The traffic cells will be designed in a manner that will prevent general city traffic using Campus roads as through routes. The only exception being Grangegorman Road, which is presently a through route for general traffic and is proposed to continue its role, but with design changes which, will discourage movements and/or speed. Traffic cells will be accessed from Constitution Hill, Grangegorman Road, North Circular Road and Prussia Street.

Service access
As described before, all links within the development are designed to suitably accommodate the movements of all the necessary vehicles, including those of articulated trucks.

Although a system of permanent traffic cells is desirable to avoid through-movements, it may be justified that occasional movements between the traffic cells occur, especially if the overall length of service journeys is to be optimised. It is also possible that the design for the turning movements of heavy vehicles at the head of each traffic cell results in an impact to the landscaping and quality of the public realm that could be avoided with the allowance of through connections.

The variety of options for vehicular access does not necessarily entail proposed new vehicular routes through the site. The concept is that, with the exception of Grangegorman Road, all the other points of access will lead to ‘traffic cells’, as can be seen in the vehicular access diagram.

Access off Constitution Hill
The master planning team is in discussions with CIE on a set of proposals for an eastern vehicular and pedestrian access to Grangegorman that would require a section of the present Broadstone depots. The proposal entails a phased implementation of what is intended to ultimately be the main entrance to the Grangegorman development. It is envisaged that vehicles would avail of a road integrated with a wider pedestrian boulevard. In the interim options presented in the Masterplan document, the access is shared with buses, but in the ultimate vision for this entrance, buses could be provided with a separate access to an underground or undercroft bus terminus beneath the redeveloped Broadstone.

Access off North Circular Road
The feasibility of this access has been assessed and a design of an option that includes a right-turning lane on North Circular Road is shown. The main
site access

Trip Patterns

DIT
Universities tend to have trip patterns that do not impact significantly on the normal peak periods. The AM peak generation has generally a flatter profile than normal commuting patterns, as it is extended from 8.00 (staff trips mainly) to 10.00 or even 11.00. In the evening, the peak departure of students tends to occur before the normal network peak.

The provision of facilities such as sports and entertainment on Campus, will contribute to the extension of the period when trips to and from the Campus are likely to occur, and consequently will minimise the impact of these on the road and public transport networks.

HSE
More so than academic uses, trips generated by health uses do not often impact on the transportation networks, as they generally occur outside the network peaks. In this circumstance, the uses proposed for Grangegorman have a significant component of residential care and shift patterns.

Other uses

Commercial
The majority of trips generated by the commercial element of the development will have a direct impact on the normal morning and evening peak periods.

Primary school
The primary school will generate a number of peak trips, especially during the morning peak. Journeys to and from school tend to have a significant impact on the local traffic, and therefore should be mitigated by means of encouragement to use sustainable modes of transport.

Crèche
The crèche is meant to cater for children of DIT students and staff, and therefore is not likely to generate additional trips.

Community Library
This facility is likely to generate a limited amount of trips mainly after the morning peak period and from local origins, and therefore is not expected to have a noticeable impact.

Sports and entertainment
These uses will provide activity before and after normal peak times, hence contributing to a flatter overall profile of trips in and out of the Campus. These are seen as important factors in the mitigation of peak trip impact.

Taxi access

As with general traffic, it is proposed that taxis avail of access to all points within the development, albeit constrained by the layout of the traffic cells.

Emergency access

Emergency access is provided in accordance with the appropriate regulations. The majority of the linear spaces, both streets and landscaped areas, are designed to accommodate occasional emergency movements, enabling the highest level of vehicular penetration.

The requirements relating to fire appliance access is governed by the building height and volume and is based on a percentage of the perimeter of a building being accessible by a fire tender for small to medium sized buildings. Within the scheme at the master planning stage an assessment has been carried out to determine the minimum requirements as recommended by the relevant guidance (Regulation B5 of Technical Guidance Document B of Building Regulations 2006).

A significant amount of frontage is available via the normal traffic circulation routes throughout the overall site resulting in the majority of buildings being adequately served without the need for additional routes. Buildings which, due to their location, layout, division or level, cannot be reached by fire fighting vehicles have been provided with internal fire-fighting mains which allow fire-fighters to fight fires inside the building. This is particularly relevant for buildings surrounding a courtyard and those along the “green fingers”.

Routes identified to be accessible by a fire tender will be designed to:

- be negotiable by fire fighting vehicles
- be free from permanent obstructions at all times (with the exception of removable bollards, etc)
- have a minimum width of 3.7 m
- have a minimum carrying capacity of 16.25 tonnes; and
- have a minimum clearance height of 4 m

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- have a minimum carrying capacity of 16.25 tonnes; and
- have a minimum clearance height of 4 m
F_site services
There are no Dublin City Council separate surface water sewers in the vicinity of the Grangegorman site.

However the Bradoge River runs southwards to the River Liffey through Grangegorman. According to the “Rivers of Dublin” by Clare Sweeney, the Bradoge River originates in Cabra, where it took a course eastwards through Cabra West and East, south easterly through Grangegorman to the ford at Broadstone where at this point the watercourse appears to split in two. The main course turns eastwards at the railway terminus and crossed under Constitution Hill/Broadstone Road into Kings Inn and down into Bolton Street where it now travels in a 2400 x 900mm brick sewer past Chapel Street into Kings Street, Halston Street, Cuckoo Lane and Chancery Street before discharging into the River Liffey.

The smaller course at the rear of Broadstone branched off due south through St Brendans before separating into two at the west end of the old Richmond Hospital on Brunswick Street North and rejoined again to run southwards on Red Cow Lane and across Kings Street North. It then flows south down Arran Street North entering the River Liffey on Arran Quay downstream of Queens Street Bridge. The Bradoge river system has been incorporated into the Dublin City Council sewerage system. The total length of the main lines of the network is 5½ kilometres.

Dublin City Council Drainage Division (DCCDD) have confirmed that the Bradoge River system has been incorporated with the public combined sewerage system and as such would not be suitable for opening up as a water feature within the development. DCCDD have indicated that the long term view of the Council was to provide for the separation of surface water and foul flows from the Bradogue Culvert upstream of Grangegorman and the North Circular Road, however a timescale is not available for this. DCCDD have suggested that following this separation the culvert could provide a permanent water source for the Ha-Ha.

Proposed Surface Water Sewerage

Drainage from the proposed development of Grangegorman shall be on a completely separate system with separate foul and surface water drainage before connection to separate foul and surface water sewers in the existing or new public access roads throughout the development.

Surface water disposal shall be in accordance with the Greater Dublin Strategic Drainage Study published in March 2005. Sustainable Urban Drainage Systems (SUDS) techniques shall be incorporated into the development.

The surface water drainage system will combine various techniques through a storm water management or treatment train approach to ensure that both runoff quantity and quality are addressed.

The following SUDS measures shall be incorporated into the development where appropriate, in line with the Greater Dublin Strategic Drainage Study:

- Infiltration systems including infiltration trenches, infiltration basins, permeable paving, soakaways and green roofs (roof gardens).
- Filtration systems including swales, bioretention systems and filter strips.
Surface water will be stored/reused/infiltrated where possible and the outflow restricted to Greenfield rates for storm events up to and including the 100 year return period storm. Surface water runoff shall be attenuated as close to source as possible (green roofs/rainwater harvesting/landscaped areas) with overflows connected to site attenuation facilities (detention ponds/underground tanks etc) provided as appropriate.

Surface water drainage from the proposed development either side of Grangegorman Road shall be collected separately in a private drainage system before a restricted discharge by gravity to a new public surface water sewerage system in Grangegorman Road Lower.

Discussions with Dublin City Council Drainage Division (DCCDD) have confirmed their requirement for a new surface water sewer to facilitate the proposed development. This will require the construction of a new 600mm surface water sewer from Smithfield Plaza to service the new development. The existing 600mm surface water sewer at Smithfield discharges directly to the River Liffey. The route of this new sewer to Grangegorman Road Upper will be in agreement with DCC Drainage Division.

The Proposed Primary School Site will be provided with a separate surface water drainage system and separate connection to the new 600mm diameter DCC surface water sewer on Grangegorman Road Upper, in agreement with DCCDD.

The early phase HSE Developments will be provided with a separate surface water drainage system and connections in agreement with DCCDD, to either:

- The new 600mm diameter DCC surface water sewer on Grangegorman Road Upper.
- The existing 450mm diameter or 1010x610mm combined sewer on North Circular Road. This may require a pumped connection at a controlled rate to a discharge manhole. Consent to discharge surface water to combined sewers will require further discussions and agreement with DCCDD, and may be granted on a temporary basis only, subject to construction of the remainder of the site-wide drainage infrastructure.

**Surface Water Treatment Train**

The treatment train is a hierarchy for the design of surface water drainage systems with the extent of treatment at each level determined by the site area, complexity and receiving system.

The surface water treatment train for the Grangegorman site is identified opposite. This should be read in conjunction with the water management section of Part D - Environmental Sustainability.

The extent of the site control measures required will be determined by the degree to which management and source control techniques are employed.

Reduction in surface water runoff volumes and peak flows, and improvements in water quality will be achieved through a number of measures in the treatment train.

- Retention systems including retention ponds.
- Detention systems including underground tanks, underground attenuation, detention basins and filter drains.

Careful consideration should be given to the placement of above ground surface water attenuation features (ponds, swales etc) where children are expected to play.

It is proposed that surface water drains will be provided on the main primary access routes throughout the development. It is not envisaged that drainage on the campus will be taken in charge, however DCCDD have advised that main surface water drainage within the development should be constructed to DCCDD adoptable standards. The requirements for DCCDD adoptable drainage are set out below:

(i) Proposed surface water sewers to be a minimum of 225mm diameter.

(ii) Sewers shall comply with Dublin City Council Drainage Division “Code of Practice”.

(iii) Sewers and manholes shall be constructed to the details and specifications of the Drainage Division.
Site Management Techniques

Rainwater Harvesting
Rainwater harvesting systems direct rainfall from roof areas to storage tanks located at high level or in-ground, for reuse as flush water for WC's or washing purposes. The roof outlet is usually provided with an in-line filter and UV treatment may also be employed.

The system requires separate pipework clearly marked as non-potable. An overflow from the storage tank should be connected to a surface water drainage system and a mains water back-up installed for use during dry weather conditions.

Green Roofs
Green roofs comprise of vegetated material placed on a waterproof membrane and drainage layer at roof level. The green roof can reduce rainfall runoff significantly, so rainwater harvesting may not be compatible with this system.

Proprietary Systems

Oil Interceptors
Oil interceptors are installed on gully and pipe systems which are subject to significant hydrocarbon loading (car parks) or risk of oil spillages (petrol station forecourts, service yards). A bypass may be installed for large storm events. An alarm should be fitted to warn when the maximum oil storage volume is exceeded.

Downstream Defenders
Downstream defenders are vortex – type filters, suitable for removal of sediments where other SUDS measures cannot be employed. Regular maintenance and silt removal is essential to ensure proper operation of the unit.

Source Control Techniques

Permeable Pavements
Permeable pavements allow direct infiltration of rainwater as it falls on the road surface. The permeable surfacing can be constructed of gravel, porous asphalt, reinforced grass or block pavers. The selection of an appropriate surfacing depends on expected traffic loading. Permeable pavements can provide treatment through filtration process in the underlying stone layers and geotextile, if provided.

Swales
Swales are open vegetated channels that can convey and filter runoff. They are often used as edge-of-road drainage accepting sheet flow and their use negates the requirement for gullies and inspection chambers. Depths of water and velocity of flow should be minimised to prevent erosion of the swale and to maximise its infiltration/filtration potential. This can be achieved by limiting gradients and side slopes. Check dams can also be introduced if necessary.

Filter Drains
Filter drains are constructed of a stone filled trench with a perforated pipe placed at the base. A geotextile may be placed around the backfill material to prevent ingress of fines and provide filtration of the runoff. Gullies are not required but it is good practice to provide inspection chambers for maintenance purposes.

Bioretention Areas
Bioretention areas are planted swales with a variety of vegetation which improve the treatment potential and flow attenuation of the swale. A perforated pipe may be introduced to prevent waterlogging of the bioretention area.

Detention Basins/Ponds
Detention basins and ponds are provided as a final level of treatment and attenuation prior to discharge from a site. Water levels within these structures will vary according to runoff volumes. A flow control device is usually fitted to the outlet to limit discharge to an agreed rate. Silt control can be included by means of smaller primary settlement ponds or filters upstream.

Underground Storage Systems
Underground storage systems can be placed beneath roads, paved and landscaped areas to provide attenuation storage volume. Surface water treatment is limited, however if the system is sealed the stored runoff can be reused (irrigation water, for example).

Site Control Techniques

Detention Basins
Detention basins are provided to contain runoff prior to discharge from an impervious area. Water levels within these structures can be controlled by a flow control device to limit discharge to an agreed rate. Silt control can be included by means of smaller primary settlement ponds or filters upstream.

Swales
Swales are open vegetated channels that can convey and filter runoff. They are often used as edge-of-road drainage accepting sheet flow and their use negates the requirement for gullies and inspection chambers. Depths of water and velocity of flow should be minimised to prevent erosion of the swale and to maximise its infiltration/filtration potential. This can be achieved by limiting gradients and side slopes. Check dams can also be introduced if necessary.

Surface Water Discharge Rate from Site
Surface water discharge from the site will be limited to 2 l/s/Ha. However, where landscaping/SUDS features and other measures can be demonstrated to provide interception, treatment, and attenuation storage upstream, this allowable discharge rate may be increased subject to agreement with DCCDD.

Another factor will be the proportion of flow in the 600mm diameter DCC surface water sewer which is allocated by DCCDD to the Grangegorman site.
Drainage from St. Brendan's, Grangegorman is divided into two areas. St. Brendan's West discharges to the Dublin City Council combined sewers on Grangegorman Road Upper and St. Brendan's East discharges both eastwards to the 600mm diameter Dublin City Council foul sewer (Bradoge River Culvert) traversing the site to the eastern boundary with the Broadstone Depot and westwards to a 1010 x 600mm brick sewer on Grangegorman Road Lower.

The 1150 x 770mm sewer divides at Marne Villas into a 600mm diameter sewer (Bradoge River Culvert) draining through St. Brendan's East and a 375mm diameter sewer draining southwards down Grangegorman Road Lower.

Drainage from St. Brendan's East is drained on a combined system with 6 outfall points to the City Council sewers. Four of these outfalls discharge to a 1150 x 770mm brick sewer and the fifth to the 375mm diameter sewer on Grangegorman Road Lower.

Drainage on the site is mainly constructed of glazed earthenware with brickwork manholes.

**Proposed Foul Sewerage**

Drainage from the proposed development shall be completely separate, with separate foul and surface water drains before connection to separate foul and surface water sewers in the existing or new public access roads throughout the development.

Existing and proposed foul drainage is shown opposite.

The following Dublin City Council combined sewers are located in the vicinity of the Grangegorman site.

- A 450mm sewer runs eastwards along the North Circular Road into a 1010 x 610mm sewer at the junction of Annamoe Parade. This sewer turns southwards down Grangegorman Road Upper.

- A 1010 x 810mm sewer on Grangegorman Road Upper is part of the Bradoge Culvert system. This sewer splits in two at Marne Villas with a 600mm pipe discharging through the eastern section of St Brendans Hospital before connecting to the 1500mm sewer on Brunswick Street North.

- A 1030 x 610mm sewer on Prussia Street which drains southwards to the 1350mm sewer on Manor Street and eastwards to the 300mm sewer on Grangegorman Road Lower.

- A 300mm sewer on Kirwin Street which drains both westwards to the 1350mm sewer on Manor Street and eastwards to the 300mm sewer on Grangegorman Road Lower.

- A 375mm sewer splits from the 1010 x 810mm sewer at Grangegorman Road Upper and discharges southwards down Grangegorman Road Lower before connecting into a 1010 x 600mm sewer at the Stanhope Street junction.

Due to the design of the development it is unlikely that any of the existing combined drains on the site will be retained. However in the event that sections of existing drains could be utilised depending on their structural integrity and capacity being verified, these drains shall be utilised as foul drains only. It is expected that the existing 375mm diameter combined outfall sewer on Grangegorman Road Lower will be utilised as the proposed foul sewerage outfall from the development to the 1500mm foul sewer on Brunswick Street North.

However any existing drains being utilised will require the following:

(i) Condition survey including CCTV survey and report to WRC Standards.

(ii) Capacity check.

(iii) Agreement with Dublin City Council Drainage Division regarding items (i) and (ii) above.

The existing 600mm diameter DCC combined sewer (Bradoge Culvert), running North to South through the East side of the Development will likely require diversion within the site to avoid basements structures/buildings. Possible indicative routes for the diversion are shown on the plan opposite. In order to complete a detailed assessment of diversionary routes, a survey of the existing 600mm diameter combined sewer should be conducted to include:
The HSE Development may be provided with a separate foul drainage system and connections in agreement with DCCDD, to either:

- The existing 1150x770mm combined sewer on Grangegorman Road Upper.
- The existing 450mm diameter or 1010x610mm combined sewer on North Circular Road. This may require a pumped connection to a discharge manhole.

A disconnecting manhole shall be provided at each site boundary with a channel interceptor (broads trap) and fresh air inlet, constructed in the manhole, to prevent noxious smells and gases entering into the development from the public sewers.

All disconnecting manholes shall be constructed to Dublin City Council Drainage Divisions requirements. All private foul drains shall be constructed to Part H of the Building Regulations 1997.

**water supply**

**Existing Water Supply**

The following Dublin City Council Watermains are in the vicinity of the Grangegorman site.

- A 450mm and 175mm main on the North Circular Road.
- A 125mm main on Grangegorman Road Upper which changes to a 150mm main on Grangegorman Road Lower. The 125mm main connects into both the 175mm and 450mm mains on the North Circular Road.
- A 100mm and 225mm main on Prussia Street continuing down into Manor Street.
- A 150mm main on Kirwin Street connecting to the 150mm main on Grangegorman Road and the 225mm on Manor Street with a connection to a larger 300mm also on Manor Street.
- A 250mm and 800mm main on Brunswick Street North.
- A 225mm main on Phibsborough Street running into Constitution Hill.
- A 800mm main on Constitution Hill which is a continuation of the main from the existing Grangegorman development to the combined sewers on Grangegorman Road Upper.

Both St. Brendan’s East and West are served off the existing Dublin City Council 150mm watermain on Grangegorman Road Upper. There are 2 existing metered connections to St. Brendan’s West and 2 metered connections to St. Brendan’s East, with the Nurses Residences connection the only one in use on the east side.

Pressure and flow tests were carried out on the existing 150mm main on Grangegorman Road Upper in June 1998 with a pressure of 37 PSI and a flow of 160 gallons/minute being achieved. A test was also carried out in St. Brendan’s West and the results achieved were 31 PSI and a flow of 130 gallons/minute.

**Proposed Water Supply**

The proposed School Site may be provided with a separate foul drainage system and separate connection to the existing 1150x770mm combined sewer.

(iii) Sewers and manholes shall be constructed to the details and specification of the Drainage Division.

DCCDD have confirmed that a Drainage Study for the Grangegorman area has been undertaken with consultants HR Wallingford Ltd to upgrade the DCC existing drainage model, however results are not expected until 2010.

DCCDD have confirmed that due to the removal of surface water run-off from the existing Grangegorman development to the combined sewers in Grangegorman Road, there will be spare capacity for the increased foul discharge coming from the development to this sewer. However, flow monitoring will be required by DCCDD to confirm capacity of the existing foul sewerage infrastructure to deal with any new development.

Foul drainage from the proposed development either side of Grangegorman Road shall be collected separately in a private drainage system before discharge by gravity to the public sewerage system in Grangegorman Road Lower.

The Proposed School Site may be provided with a separate foul drainage system and separate connection to the existing 1150x770mm combined sewer on Grangegorman Road Upper.

**Plan locations, cover levels and invert levels of manholes, connectivity of sewers, pipe materials and sizes.**

**CCTV survey to assess condition of existing sewer and identify any branched connections. The CCTV survey would also identify the possible linkage with the Broadstone Depot sewers.**

Any diversions of the 600mm diameter combined sewer will require agreement from DCCDD.

It is proposed that foul drains will be provided in the main primary access routes throughout the development. It is not envisaged that drainage on the campus will be taken in charge, however DCCDD have advised that main foul drainage should be constructed to DCCDD adoptable standards.

The requirements for DCCDD adoptable drainage are set out below:

(i) Proposed foul sewers shall be a minimum of 225mm diameter.

(ii) Sewers shall comply with Dublin City Council Drainage Divisions “Code of Practice”.

(iii) Sewers and manholes shall be constructed to the details and specification of the Drainage Division.
There are no ring main systems in St. Brendan’s East with fire hydrants fed from the existing 150mm main on Grangegorman Road Upper. There are 2 ring main systems in operation in St. Brendan’s West and vary from 100mm to 150mm diameter mains.

**Proposed Water Supply**

Existing and proposed water supply is shown in the figure on page F-5. Dublin City Council Water Division (DCCWD) have confirmed that the 450 mm high pressure main on the North Circular Road is near to capacity. There is an 800mm high pressure main on Brunswick Street North which runs up to Constitution Hill. DCCWD have suggested that linking the 450 mm and 850mm mains would be beneficial for the development in providing an additional supply for any future development. It would be preferable to route this new link along public routes rather than through the campus, however the exact route will be in agreement with DCCWD.

However DCCWD have confirmed that capacity checks on their network on linking the two mains would be required to ensure sufficiency of any future supply to meet the increased demand of the new development.

New watermains will also be required to replace the existing mains on Grangegorman Road. Dublin City Council Water Division will be looking for any sustainable proposals for reducing water consumption for the development.

New 150mm diameter connections will be made to the existing public mains to supply the new development.

The size of the new watermains along the main primary access routes within the development will be 150mm diameter. New building blocks will be served by 100mm diameter ring mains with sluice valves and fire hydrants located to the requirements of Part B of the Building Regulations 1997. Watermains shall be constructed with MOPVC (blue) pipework and the watermains shall comply with the “Specification for the Laying of New Watermains in Private Property” issued by Dublin City Council Water Division.

Pressure and flow tests shall be carried out, in consultation with the Water Division, to confirm the (a) suitability of the existing mains system to meet Dublin City Council’s Fire Officer’s requirements for the area and (b) to assess whether boosting will be required to serve the high level storage tanks.

**Proposed Electrical Network**

A power load estimate of 10MW has been advised to ESB. They have advised that the existing medium voltage (10kV) network in the vicinity of the site will not be capable of meeting the demand of the development and it will be necessary for a new high voltage (110kV) substation to be constructed. Details have been issued to ESB planning department for preliminary design. The process involved in the planning and construction of a new high voltage substation is approximately 3 years and the works will therefore need to start at an early stage.

Once the new 110kV substation has been constructed, the development would be supplied by means of a network of 10kV underground cables from the 110kV substation to several strategically located 10kV/400V substations, which would house the transformers required to provide low voltage (400V) power to the various buildings.

The proposed new development may be supplied as a single point supply or under ESB’s Business Parks Policy. As a single point supply, there would be a single customer and the electricity would be distributed internally on a needs basis. The ESB would build and equip the new 110kV substation on a site provided by the developer. The developer would install all necessary cable ducts, the 10kV network from the 110kV substation and the 10kV/400V substation buildings and equipment required for the development. Under the Business Parks Policy, ESB would build and equip the new 110kV substation on a site provided by the developer, install the new 10kV network from this substation and provide electrical connections to customers in the development under its standard policy. The developer would install all necessary cable ducts and 10kV/400V substation buildings required for the development and provide easement rights to ESB for all cable routes within the development.

**Size and Layout of Substations**

The new 110kV substation will be a Mixed Technology Substation (MTS) and requires a 53m x 39m site to be transferred to ESB for its construction. It will include outdoor switchgear and a control building and will be surrounded by a 3m high boundary wall. Full vehicular access will need to be provided to the site to facilitate the construction and subsequent operation of the substation. The suitability of the proposed site will need to be agreed with ESB.

If the substation is required to be installed internally, a capital contribution would be required by the ESB to construct a non-standard substation.

The 10kV substations will be accommodated at grade and/or incorporated into other buildings. They will have unrestricted vehicular access and be constructed in accordance with ESB standard details.

The quantity depends on the final layout but approximately 17 no. are expected to be required. Each 10kV substation will also require a 400V switchroom immediately adjacent to it to accommodate the main low voltage switchgear / metering equipment associated with the substation. The substations will each require a 16m x 4m area.

**Combined Heat and Power Plant**

Combined Heat and Power (CHP) plants for the development have been found to be viable. The viability of a CHP depends on utilising the waste heat from the generator all year round to increase the plant efficiency. This would be used in cool months to heat water for the district heating system. During warm months it would be used to supply heat to facilities that require it year round (swimming pool, hospitals etc.) and could supply cooling via local absorption chillers in buildings with significant cooling loads.

The CHP units would reduce the peak load requirement from the ESB and could also act as emergency back-up generators. They would be installed in the Energy Centre and would replace a number of the boilers. Based on the preliminary heating load and cooling load estimates, it is expected that a low level of CHP will prove viable.
telecommunications

Existing Telecommunications Infrastructure

Existing telecommunications infrastructure within the site is by combination of overhead and underground cables, fed from the existing Eircom network on Grangegorman Road. This network is not suitable for re-use in the proposed development and it will be necessary for this to be decommissioned and removed.

Proposed Telecommunications Infrastructure

The development will incorporate a Central Communications Hub with connections to the national and international telecommunications networks.

natural gas

Existing Natural Gas Supply Network

There are existing 4 bar and 700 mbar gas mains running along North Circular Road to the north of the site, with tee-off 700 mbar mains routing down along both Grangegorman Road and Prussia Street. There are currently several separate gas connections to serve the existing buildings within the site.

Proposed Natural Gas Supply Network

The envisaged gas consumption throughout the development is envisaged to be relatively low, for uses such as catering and laboratories etc. There is an option of using gas as the fuel for the CHP but it is preferable to use a form of biomass.

Bord Gais have advised that the existing mains are of sufficient capacity to supply the development and that it would not be necessary to bring new infrastructure from further afield.

Although the overall capacity of the existing gas network will be adequate for the development it is anticipated that the positioning and alignment of the gas supplies within the existing site will need to be reviewed and it is likely that sections of the existing network will have to be removed.

Gas distribution within the development will be installed within designated service routes. Metering units for each user would be located at ground level adjacent to building entry points. Bord Gais will install underground mains up to and including the metering point. The developer will be responsible for the installation of gas services downstream of the meter positions using registered gas installers.

In terms of cost and contributions for new gas connections to the development, the developer may be required to pay a contribution of between 30% and 100% of the actual cost involved in providing the new connections. The percentage payable would be dependant on the results of an investment appraisal to be carried by Bord Gais once the requirements for the development have been fully identified.

Size and Layout of Equipment

The Central Communications Hub will be installed adjacent to the Energy Centre. It will be subdivided into 3x3m cages to accommodate rack mounted equipment for each network operator.

The quantity and size of telecommunications rooms in buildings depends on the size and use of the building.

It is expected that dual connections will be provided via separate routes to include a high level of redundancy in the design.

The hub will be provider neutral i.e. it will incorporate space for network terminating equipment for all potential network providers to buildings in the development.

Each building will have its own Equipment / Telecommunications Room which will act as the main distribution point for the cabling in that building. The hub will connect to these rooms using resilient fibre rings installed in the network of underground cable trays and ducts along the primary services routes.
heating

The heating requirements for the development will be provided centrally by a district heating system. Central biomass powered boilers will be installed in the Energy Centre. These will provide hot water which will be distributed to all buildings in the development through a system of underground water pipes.

The pipes will be lagged to minimise heat losses. It is expected that wood pellets will prove the most viable biomass fuel for the boilers. These will be stored in a dedicated storage area in the energy centre beside the boilers with road access for delivery. The district heating system will also be fed by the CHP plant when in operation.

Domestic hot water heating will be supplemented locally at each building by solar water heating panels. These will provide approximately 50% of the domestic hot water load.

cooling

The cooling requirements for the development will be provided for locally on a building by building basis with chiller plant serving each building as required. The majority of the buildings in the development will be served by natural ventilation and passive cooling methods that do not involve chilled water.

Buildings that have a chilled water load will be served by a local absorption chiller. The absorption chiller plant will utilise the hot water service to the building to generate chilled water.

services routes

Services will be installed underground in 5m wide services trenches incorporating underground ducts and pipes to bring services to individual buildings. There will be appropriate separation distances between the different services and chambers will be installed at regular intervals and at changes of direction to allow services to be accessed and additional cables to be installed in future.

An underground concrete utilidor (utilities corridor) may be utilised from the energy centre along the main spines of the development. This would be located adjacent to underground carparks and building foundations allowing it to be constructed as an extension to these structures if the phasing was appropriate. The utilidor would have a smaller footprint (3.5m wide) for the level of services installed along the route and allow greater flexibility and ease of maintenance for installation of future services.
Ground conditions
The purpose of this section is to outline the site’s history, to identify typical ground conditions in the area and to highlight potential geotechnical issues with regard to the redevelopment of the site.

The site measures approximately 73 acres and lies between 16.8 and 27.2 m OD Malin.

The main sources of information for the Desk Study were:

- Historical maps of Dublin
- A History of St Brendan’s Hospital, Dublin by Dr Brian O’Shea and Dr Jane Falvey
- Grangegorman Campus, Historical Sequence of Development
- Ordinance Survey maps
- Soils of Dublin, Farrell & Wall (1997)
- Rivers of Dublin, Sweeney (1991)
- Previous site investigations
- Geological Survey of Ireland (GSI) 6” Drift Maps
- GSI ground water information

The history of development at the Grangegorman site dates back to 1775 when the House of Industry was established. Prior to this time the land had mainly been used for agricultural purposes. After the establishment of the House of Industry, the Government at the time decided to construct the Richmond Asylum and Richmond Penitentiary (1810). Remains of these buildings exist today.

In 1832 the Penitentiary Gardens were incorporated as part of the Richmond Asylum site and it is mentioned that they were dedicated as a burial ground for a cholera epidemic in the same year. These gardens lay to the west of the current Grangegorman site.

The Grangegorman Campus, ‘Historical Sequence of Development’ notes the existence of a tunnel between the Church of Ireland and the Asylum ground to the east of the site. This tunnel was used to transfer patients between the two areas and is still in existence.

Geology

The ground conditions at Grangegorman are typical of the Dublin area. The overburden geology is strongly influenced by the glacial period and consequently there is a thick mantle of glacial tills overlying the bedrock. These tills which were essentially formed at the bottom of the ice sheet typically consist of intermittent layers of stiff brown black silty sandy gravely clay (boulder clay) and dense sandy sometimes silty gravels.

Bedrock

The GSI 1:100,000 bedrock geology map of Ireland shows Dublin city centre to overlie the Carboniferous Calp formation that consists of both limestone and shale. However the thickness of the limestone bed, grain size, colour and proportion of shale was found to vary widely across the area.

A draft copy of bedrock levels in Dublin from the GSI indicated bedrock to be dipping from -15mOD to -30mOD from the west section of the site to the east.
The presence of man-made obstructions should be anticipated, in terms of old foundations, potential basements, buried services, tanks, etc which will require detailed investigations to identify.

Foundations for relatively light structures may be carried by the upper firm-stiff brown boulder clay or alternatively carried down to the stiff-hard boulder clay stratum. Piles should be anticipated for heavy structures.

**Environmental Considerations**

As part of prior ground investigations exploratory trial pits were excavated across the site. Made ground was encountered at all exploratory locations during the course of the investigation. Chemical analyses were carried out on soil samples from two of the exploratory locations. Further ground investigations will be necessary to determine the extent and nature of the made ground prior to its excavation and removal.

This material is likely to be unsuitable for engineering purposes and will have to be disposed of in a suitable landfill. In addition, a geophysical survey has identified some anomalies that may represent backfilled pits and as such should be subject to further investigation.

**Hydrogeology**

As previously discussed the ground conditions consist primarily of brown and black boulder clay. These materials have very low permeability and hence would be an aquitard. However given the possibility that there is a weathered zone at the interface with the overburden the underlying bedrock is a potential aquifer. It is also common to encounter silt, sand or gravel pockets or lenses within the boulder clay deposits, which would be water bearing.

**Groundwater**

Sources

The aquifer classification map for Ireland shows Dublin to lie on a poor to minor aquifer which is locally productive. The GSI National draft bedrock aquifer map describes the bedrock aquifer in Dublin as a locally important aquifer which is generally moderately productive in local areas. The GSI Vulnerability map carried out as part of an interim study of Dublin city centre found the vulnerability to range from high to low.

Quality

A previous site investigation of groundwater has yielded pH values of 7.7 to 8.4 and electrical conductivity ranging from 446 to 1067 µS/cm indicating that groundwater at the site is fresh. Further investigation of the groundwater is necessary to determine if the water is suitable for human consumption or other uses. The only potential source of groundwater for use on-site would be from fracture zones within the limestone bedrock.

**Table 3.1: Appropriate Ground Conditions on Site**

<table>
<thead>
<tr>
<th>Strata</th>
<th>Approx thickness (m)</th>
<th>Approx depth to top of stratum (m)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Made Ground</td>
<td>0.6 – 2.35</td>
<td>0</td>
<td>Further investigation required</td>
</tr>
<tr>
<td>Firm-stiff brown boulder clay</td>
<td>2</td>
<td>0.6 – 2.35</td>
<td>Variable quality for foundations and use as fill</td>
</tr>
<tr>
<td>Stiff-hard black boulder clay</td>
<td>&gt; 20</td>
<td>2.5 – &gt; 3.8</td>
<td>Generally good for foundations and use as fill</td>
</tr>
<tr>
<td>“Calp” Limestone Bedrock</td>
<td>-</td>
<td>&gt; 20</td>
<td>Strong to very strong, dark grey to black LIME-STONE</td>
</tr>
</tbody>
</table>

**Overburden**

The boulder clays are very stiff and would be suitable for normal pad foundations. Any deep excavations shall be relatively economical due to the strength of the clays. Farrell & Wall (1970) state that the boulder clays are generally found near the surface and are underlain by glacial and post glacial gravels. Areas of alluvium along the site boundary associated with the Bradoge River, if present, may require dewatering as they are likely more permeable and water bearing. The brown and black boulder clays are generally impermeable and consequently extensive pumping of groundwater from excavations is not likely to be required; however rainfall runoff would have to be pumped.

Generally the information gathered from maps and reports into the area correlated well with the information obtained from a previous site investigation and interpreted ground conditions can be found in Table 3.1. The section illustrates the strata described above in a geologic cross-section that runs diagonally across the proposed site.