## 6.4. The existing landscape

### *Site context and location*

6.4.1. The Site is centrally located on Poolbeg Peninsula on the east side of Dublin City. The peninsula, which lies within the Dublin Docklands, is an area of reclaimed land extending eastwards into Dublin Bay from Ringsend. The peninsula, which terminates at the South Bull Wall with its associated lighthouse, defines the southern side of the Liffey estuary where the river feeds directly into Dublin Bay.

**Figure 6.1 Aerial view over Dublin and Dublin Harbour**
***(Site of proposed Dublin WtE Facility shaded red)***



6.4.2. Given the 'C-shaped' arc of Dublin Bay, the peninsula has a central almost pivotal visual location dominated by the twin Poolbeg stacks, which rise to over 210m above ordnance datum (AOD). The visual prominence of the Site is reinforced by the surrounding topography, which being generally flat around the immediate coastal and city locations, gives way to rising coastal headlands at Killiney to the south/southeast and Howth to the northeast. The Dublin Mountains provide a prominent elevated background to the south/southwest of the city.

6.4.3. The surrounding landscape of Dublin Bay consists of extensive residential areas extending from Dun Laoghaire in the south around to Howth in the north. The sweep takes in locations such as Blackrock, Booterstown, Merrion, Sandymount, Irishtown and Ringsend south of the River Liffey and Fairview, Clontarf, Dollymount, Raheny, Kilbarrack and Sutton. The open waters of Dublin Bay, with Bull Island to the northeast, lies to the northeast, east and southeast of the peninsula.

6.4.4. The closest residential areas to the Site are at Ringsend, Irishtown and Sandymount located between 1 and 2km east and south of the Site. Clontarf is situated 2km directly north of the Site while North Bull Island, an important ecological and recreational amenity area, is situated approximately 3 km+ to the northeast of the Site.

6.4.5. Dublin Bay is generally shallow in depth with extensive areas of mud and sand flats at low tide – particularly at Sandymount. Dublin Port divides the estuaries of the Liffey and Tolka rivers. Certain areas of the bay are designated sites of conservation – for further details refer to Chapter 15 of this EIS. Dublin Bay is an important area for both land-based and water-based recreational activities. Such activities include coastal walks, beach activity, sailing, windsurfing, fishing and swimming. The eastern end of Poolbeg Peninsula is a popular destination for walking and bird watching and a small beach located on the south shore east of the Ringsend Wastewater Treatment Works.

6.4.6. As previously noted, Irishtown Nature Park is located to the southeast of the Site. Originally part of an infill/landfill area, the park has been designed as an ecological park with a focus on habitat creation and nature conservation and is a well-used amenity area. Native trees, shrubs, wildflowers and grasses were planted and the park now comprises a mix of young trees and shrubs and open areas of grassland. Tree species include birch (*Betula pubescens*), alder (*Alnus glutinosa*), willow (*Salix* spp.) and oak (*Quercus* spp.). Native scrub of blackthorn (*Prunus spinosa*), elder (*Sambucus nigra*) and hawthorn (*Crataegus monogyna*) is spreading within many areas. For further information refer to Chapter 14 "Terrestrial Ecology".

6.4.7. A pedestrian access to the south of the Site links Irishtown Nature Park, with Sean Moore Park in Ringsend to Pigeon House Road. Shelly Banks, a small sandy beach between ESB - Poolbeg Generating Station and the South Bull Wall, is also widely used for active water sports, particularly boardsailing. A small adjoining car park provides a popular viewing point.

6.4.8. Further notable features are the South and North Bull seawalls that extend out into Dublin Bay and the extensive area of estuary at Sandymount and Clontarf, which dry out at low tide. The North Bull Wall, Bull Island, Clontarf Promenade, South Bull Wall and Sandymount Strand are intensively used as leisure and recreational amenities.

6.4.9. Extending into Dublin Bay leads to extremes of climatic exposure with the result that there is limited tree or shrub vegetation in the area. Only the hardiest species have established in the area. Some more extensive planting is establishing on Irishtown Nature Park and in addition there are occasional belts of screen planting around the ESB - Poolbeg Generating Station. Species include leylandii, (*x Cupressocyparis leylandii*) pines (*Pinus* spp.), escallonia (*Escallonia* spp.) olearia (*Olearia* spp.) and tamarisk (*Tamarisk* spp.). Some small-scale dispersed plantings of sycamore (*Acer pseudoplatanus*), cypress (*Cypressus* spp.), poplar (*Populus alba*) and pioneering species such as butterfly bush (*Buddleia* spp.) are also present.



### *The Site*

6.4.10. The principal part of the Site comprising 5.5 hectares is somewhat centrally located in an almost north south alignment on Poolbeg Peninsula. Pigeon House Road lies to the immediate north; Shellybanks Road to the immediate west; Ringsend Wastewater Treatment Plant to the east, while to the south undeveloped land extends to the southern shore of the peninsula. Irishtown Nature Park is located to the southeast. The immediate context of the Site is clearly illustrated on the aerial photographs provided in Plates 6.1, 6.2 and 6.3:

**Plate 6.1**


**Plate 6.2**

**Plate 6.3**


6.4.11. The Poolbeg Peninsula, which stretches from the South Bank roundabout, is industrial in character. It comprises of docklands area at the mouth of the River Liffey and its activities are typical of a port setting. The principal industrial activities on the peninsula consist of power generation, sewage treatment, metal recycling, a concrete batching plant, oil storage, gas regulation and freight storage. While the peninsula is mainly industrial in character it does contain some open and undeveloped areas with Irishtown Nature Park on the southern shore being of particular interest. Additional lands (*i.e.* North Port) within Dublin Port lie north of both the Poolbeg peninsula and the Liffey estuary. The Dublin Port Ferry Terminal lies at the eastern end of these northern port lands, see Plate 6.1.



6.4.12. The Site has a similarly industrial setting between the combined Synergen – Dublin Bay Power Plant to the west and the Ringsend Wastewater Treatment Plant to the east. The northern portion of the Site is occupied by a scrap metal recycling yard. A molasses plant operates on the central portion immediately south of the recycling yard. The southern end of the Site is fenced off and is currently under hard standing.

6.4.13. Where not in use the Site includes areas of rank grassland and some bare ground and spoil heaps, particularly to the south. A line of sycamore trees has been planted along the western Site boundary with Shellybanks Road. The trees, which are the most significant vegetation relating to the Site, are early-mature and in the region of 7-8 m in height. A line of dense planting of Escallonia (*Escallonia* spp.) with brambles and pioneering species such as butterfly bush has also been established along the western side of Shellybanks Road. The planting includes some trees including cypress, white poplar and sycamore.

6.4.14. Existing ground levels in and around the Site are generally between 3.0 and 6.0m AOD. However, within Irishtown Nature Park – the only area of any notable elevation, ground levels rise to 20m AOD. in height. A berm some 7-10m AOD extends west from the park along the coastline as far as Sean Moore Park at Ringsend.

## *Landscape Character*

6.4.15. The Poolbeg peninsula is an entirely man-made landscape. The lands are the result of centuries of infilling and flood protection while every land use from the predominant Poolbeg stacks to Irishtown Nature Park is the result of mans activity and intervention.

6.4.16. The landscape character of the area is essentially determined and dominated by the expansive presence of surrounding water; the enclosing coastal landscape of Dublin city and the intensive industrial infrastructure of the Poolbeg peninsula. . However, despite having a port-related and industrial land use with an immediate industrial landscape character - punctuated by the two tall Poolbeg stacks - the peninsula is also strongly influenced by its central and pivotal visual location within Dublin Bay.

6.4.17. At proximity the landscape and particularly as it relates to the Site, is overwhelmingly "industrial". The surrounds may also offer opportunity for amenity and recreation outlet *e.g.* walks on along the south shore and on the South Bull Wall; on the beach at Shellybanks; or in Irishtown Nature Park but the over riding industrial nature of the peninsula prevails.

*View from the southwestern corner of the Site with the twin Poolbeg stacks in the background*

6.4.18. However, the lands are of significant landscape and visual interest because of their setting on a coastal peninsula and the views offered over surrounding water, landscape and city. Similarly, Poolbeg peninsula with its various structural features jutting out to sea has a pivotal influence on the seascape of Dublin Bay. Within this setting the Site itself has a central location within the mosaic of its industrial landscape and as such is largely indistinct and consistent with its surrounding industrial character. Therefore, while the Poolbeg peninsula has a significant landscape and seascape influence within Dublin Bay and surrounds, the Site in itself is considered to be low landscape sensitivity.



### *Visual character and quality*

6.4.19. Despite the industrial visual aspect of the land use and its physical isolation, the wider Poolbeg peninsula has a strong visual presence within Dublin Bay and its immediate coastal landscape. The peninsula is openly visible from within the arc of the bay and the twin Poolbeg stacks are amongst the most dominant features of the east part of Dublin City. The peninsula, and particularly the twin stacks, is also visible from many areas located back from the coastal landscape. The peninsula is prominent in views from many elevated locations within the wider city – not only from Killiney Hill or Howth but also from elevated vantage points such as Mount Merrion, Deerpark, Mount Annville and from the northern slopes of the Dublin Mountains. The stacks themselves are visible from a wide section of the city landscape, including from a citywide selection of elevated commercial, office and residential developments; from elevated sections of the M50 Motorway and from many streets where the alignment facilitates longer views towards Poolbeg *e.g* Bath Avenue. As a landmark landscape and seascape location, the peninsula, despite its visually unattractive principal land use is of primary visual significance to Dublin City.

6.4.20. The visual character of the Site is consistent with its industrial and port-related surrounds and as it comprises little of particular note within this setting, the Site is visually indistinct on the Poolbeg peninsula. That said, the Site - or rather silos and structures thereon – are openly visible from much of the coastal area of Dublin Bay, particularly from Sandymount northwest to Irishtown; from Dollymount southwest to Clontarf; and from areas within the north port of Dublin. Within such views the Site lies centrally on the peninsula and comprises generally lower structures than areas to either its west or east. Even from proximate locations such as Pigeon House Road or Irishtown Nature Park, the Site is viewed as part of the visual mosaic of industrial clutter, which characterises the industrial areas of the peninsula. In this setting the Site has in by way of positive visual

quality. The molasses plant, which occupies the central portion of the Site is ordered and its blue silos amongst the most prominent Site elements, the remainder of the Site is visually degraded. Large mounds of scrap metal rise over metal hoarding to front Pigeon House Road while abandoned areas of deteriorating hard-standing defined by rusting palisade fencing front lands leading to the southern shore. Shellybanks Road along the western boundary of the Site and from which access is provided to the molasses plant is strewn with broken glass and sealed with concrete barriers. Therefore, it can be concluded that the Site has an industrial but visually degraded character, which is of poor visual quality.

## *Landscape planning*

6.4.21. The landscape planning context of the Site is considered under a number of planning and development references including:

- Dublin City Development Plan, 2005-2011
- Dublin Docklands Area Masterplan, 2003
- Draft Poolbeg Framework Plan Dublin South Bank, 2003
- Dun Laoghaire Rathdown County *Development Plan 2004-2010*
- Fingal County Development Plan *2005-2011*

## *Dublin City Development Plan 2005 – 2011*



6.4.22. The Dublin City Development Plan 2005-2011 sets out the framework for the city. Planning and zoning objectives pertaining to the Site are considered in Chapter 3 Need of the project. The following refers solely to landscape and visual aspects. In addition the lands at Poolberg are designated as a Framework Development Area under the plan. For further information see Chapter 4 of this EIS.

6.4.23. The Development Plan 2005-2011 designates a number of areas within the city as Framework Development Areas, and outlines a number of general development principles specific to each of these areas. As previously noted the Development Plan 2005 - 2011 designates the South Bank/Poolbeg area as such a Framework Development Area (FDA 13). A number of the principles particular to the South Bank / Poolbeg Framework Development Area are of relevance to the development at the subject site. These principals include *interalia*:

1 To ensure that new development facilitates the implementation of a global landscape plan for the Poolbeg Peninsula developed in the context of the unique landscape qualities of the peninsula, river and bay area.

2 To ensure that significant dimensions of the landscape framework are implemented as part of any future development in utilities.

3 To support a ‘differentiated character’ approach within an overall landscape framework that will allow for the consolidation of specific objectives.

4 An urban scale and form of development with mixed use and defined areas of ‘predominant character’.

5 To allow for utilities operation and expansion within an overall environmental improvement strategy and landscape plan.

….

11 To ensure that the unique landscape qualities of the Poolbeg Peninsula, rivers and bay area are recognised in any development proposals for the Poolbeg area and that the existing open character and nature of the views from Irishtown Nature Park are retained as far as practicable.

6.4.24. Within Chapter 11 **Recreational Amenity and Open Space**, the development plan at sub-section 11.1.5 **The Coastline** notes that:

*Dublin city's coastline extends from Blackbanks (Kilbarrack) to Merrion and includes Dollymount and Sandymount strands. With new developments in waste treatment and quality and recreational potential of these strands are now much improved. The coastline itself is a valuable amenity with recreational potential, which has been partially exploited by the creation of walkways at Clontarf and Sandymount. There is further potential to develop a walking and cycling route along the perimeter of the bay, which would ultimately link its northern and southern extremities..*

6.4.25. The plan goes on to outline the following policy (**Policy R014**) in relation to the coastline:

It is the policy of Dublin City Council to maintain its beaches at Dollymount, Sandymount, Merrion and Poolbeg/Shellybanks to a high standard and develop their recreational potential as a seaside amenity, in order to bring them a Blue Flag standard within the development plan timeframe.



6.4.26. The development plan at sub-section 11.3.0 **Specific Objectives** outlines **Objective RO1** stating that it *is an objective of Dublin City Council to continue to develop the following parks, open spaces and amenities* and lists amongst others the following parks:

- Sean Moore Park (including the provision of an appropriately sited children's playground subject to available funding)
- Irishtown Nature Park (unless and until protected by a Special Amenity Area Order)

6.4.27. Further Specific Objectives which pertain to the coastline and its amenity potential include:

- **Objective RO8** – relating to *the feasibility of developing, in conjunction with adjoining local authorities a pedestrian way and cycle route along or near the coastline from Sutton to Sandycove*;
- **Objective RO9** – relating to *provision for the enhancement of the entire area of Dublin bay;* and
- **Objective RO16** which states that it *is an objective of Dublin City Council that a review of the coastal zonings, and specifically the extent and location of Z11 zonings* (To protect and improve canal, coastal and river amenities)*, shall be undertaken over the lifetime of this Plan*.

### *Dublin Docklands Area Master Plan 2003*

6.4.28. As noted above the lands at Poolbeg on which it is proposed to locate the WtE Facility, are zoned Z7 in the Dublin Docklands Area Master Plan.

6.4.29. The Plan recognizes that the Poolbeg Peninsula contains under-utilised land, which ispoorly laid out, is largely within state ownership, is isolated from any residential areas, and requires a coordinating plan to realise its physical and economic development.

6.4.30. The Plan also recognises the interface between both the residential areas of Ringsend and high amenity areas along Sandymount Strand and the utilities/general industry on the Poolbeg Peninsula. It points out that in relation to the proposed WtE development the key planning considerations in the assessment of a proposal are likely to relate to access, the management of truck movements and the impact upon amenities.

### *Draft Poolbeg Framework Plan Dublin South Bank, 2005*

6.4.31. The Poolbeg Framework Plan is a forward looking plan the purpose of which is to provide a comprehensive framework and concept plan for future development at Poolbeg Peninsula. The plan, which is currently in Draft form, seeks to:

- safeguard the growth of the utilities while allowing for limited but valuable development of the city centre
- promote the peninsula as an active leisure, recreational and cultural amenity for Dublin.



6.4.32. The Draft Framework Plan notes that the South Bank area is the principle location for the majority of Dublin city's public utilities. The Plan identifies both existing and proposed utilities, including the proposed WtE Facility.

6.4.33. The Site for proposed WtE lies within Principle Development Area 5 as defined in the Poolbeg Project document which is part of the overall Development Framework Plan. Under the Plan, Area 5 is identified as forming part of *a 'hard' core of utilities* part of which is designated for a "30yr+ Ringsend CCGT plant / Thermal Plant".

6.4.34. The Framework Plan defines three zones of character. The proposed WtE Site is situated in Zone 2 the objective of which is "*to allow for operation and expansion of utilities with sufficient new development to establish a waterfront related development character".*

6.4.35. Development Zone 2 is further outlined as, '*A core area retained for public utility functions that would allow for further limited expansion of the same (potential thermal waste treatment plant).*

6.4.36. *Primary potential for intervention includes environmental improvement measures through the landscape strategy to increase accessibility of coastal routes, Irish Town Nature Park and through-access to South Bull Wall.*

6.4.37. *Longer term potential to accommodate development extension zones to northern and southern edges'* (Dublin South Bank Strategic Development Framework).

### *Other Development Plans*

6.4.38. Both the Fingal County Development Plan and the Dun Laoighaire Rathdown Development Plan are of interest in that they pertain to areas at Sutton/Howth and Dun Laoghaire/Killiney respectively, which relate to Dublin Bay and from which there are views of the Poolbeg peninsula.

6.4.39. In particular, the Fingal Development Plan identifies that much of Howth Head is subject to a Special Area Amenity Order (SAAO) and objectives to preserve views pertain to many of the local roads and walks. In addition, there is an objective to preserve views from the Howth (Coast) Road leading east from Kilbarrack towards Sutton.

6.4.40. Similarly the Dun Laoghaire Rathdown Development Plan indicates objectives to preserve views from much of the coast road between Booterstown to Blackrock; from Idrone Terrace in Blackrock; from Seapoint Avenue; and from the Old Dunleary/Crofton Road in Dun Laoghaire.

6.4.41. The view coastwards from all of these locations encompass the full arc of Dublin Bay, particularly from Howth, and sections of road, which run along the coast. The existing industrial developments at Poolbeg, but particularly the Poolbeg stacks, are clearly visible within such views as is the full range of the bay, and its adjoining city edge.

6.4.42. The view coastwards from all of these locations encompass the full arc of Dublin Bay, particularly from Howth, and sections of road, which run along the coast. The existing industrial developments at Poolbeg, but particularly the Poolbeg stacks, are clearly visible within such views as is the full range of the bay, and its adjoining city edge.

### *Do-nothing impact*

6.4.43. The Site has an existing industrial land use and zoning. As such, should the proposed development not proceed it is considered most likely that the Site will continue in its present use or be redeveloped, either in-part or as a whole, for some similar industrial / port-related use.



### *Summary*

6.4.44. Poolbeg peninsula is a significant feature within the landscape and seascape of Dublin City. Despite is physical isolation the peninsula has an almost central and somewhat pivotal setting within the arc of Dublin Bay. This central and pivotal characteristic is reinforced by the predominant visual presence of the 210m high twin stacks of Poolbeg ESB Generating Station. As a result and despite its overwhelmingly industrial character, Poolbeg peninsula is of significant landscape/seascape character as well as visual character within Dublin City.

6.4.45. By contrast the Site, which is centrally located on the peninsula, is visually indistinct and its character is consistent with the core industrial nature of its surrounds. Indeed from proximate locations the Site has a visually degraded industrial appearance and as such is of low landscape sensitivity. The Site has no specific landscape or visual-related designation. However the peninsula is an important amenity and recreational resource, particularly in terms of its association with Dublin Bay, e.g. coastal walks, views to and from the area, Shellybanks Beach and also because of Irishtown Nature Park located directly southeast of the Site.

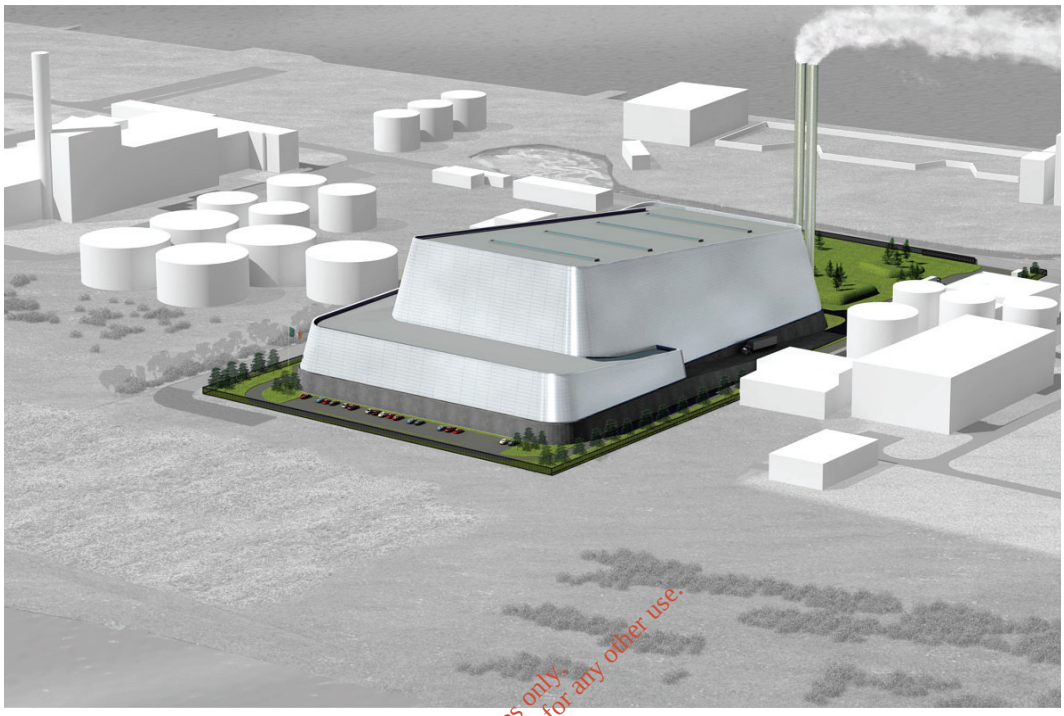
## 6.5. Characteristics of the Proposed Development

### *Introduction*

6.5.1. The proposed WtE Facility has a number of characteristics of landscape and visual note. The construction stage will entail significant demolition works, major earthwork activities, the construction of a major building structure together with two smaller buildings and structures and the provision of various infrastructural elements, fencing, landscaping *etc*. Thereafter the proposed development involves the operation, maintenance and management of a significant waste to energy facility. This involves the introduction of a

significant physical and visual structure and its on-going activity and operation including; transport aspect, emission of plumes, lighting *etc*.

**Figure 6.2 Aerial view from South East *(as represented on physical model)***



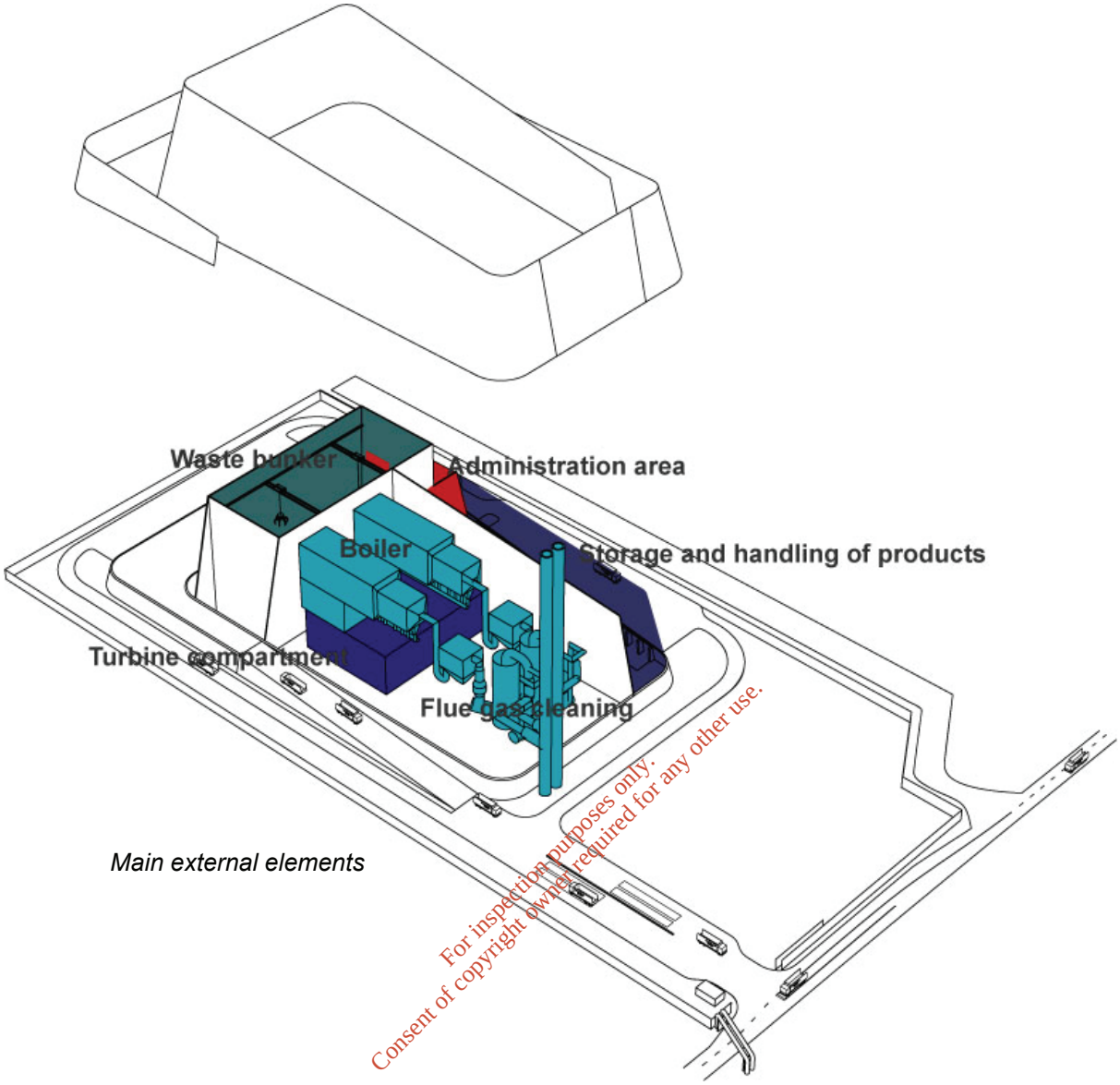


6.5.2. A detailed description of the proposed development, its plant and processes is provided in Chapter 5 “Description of the Proposed Facility”.. The principal components of landscape interest are as follows.

### *The Main Building*

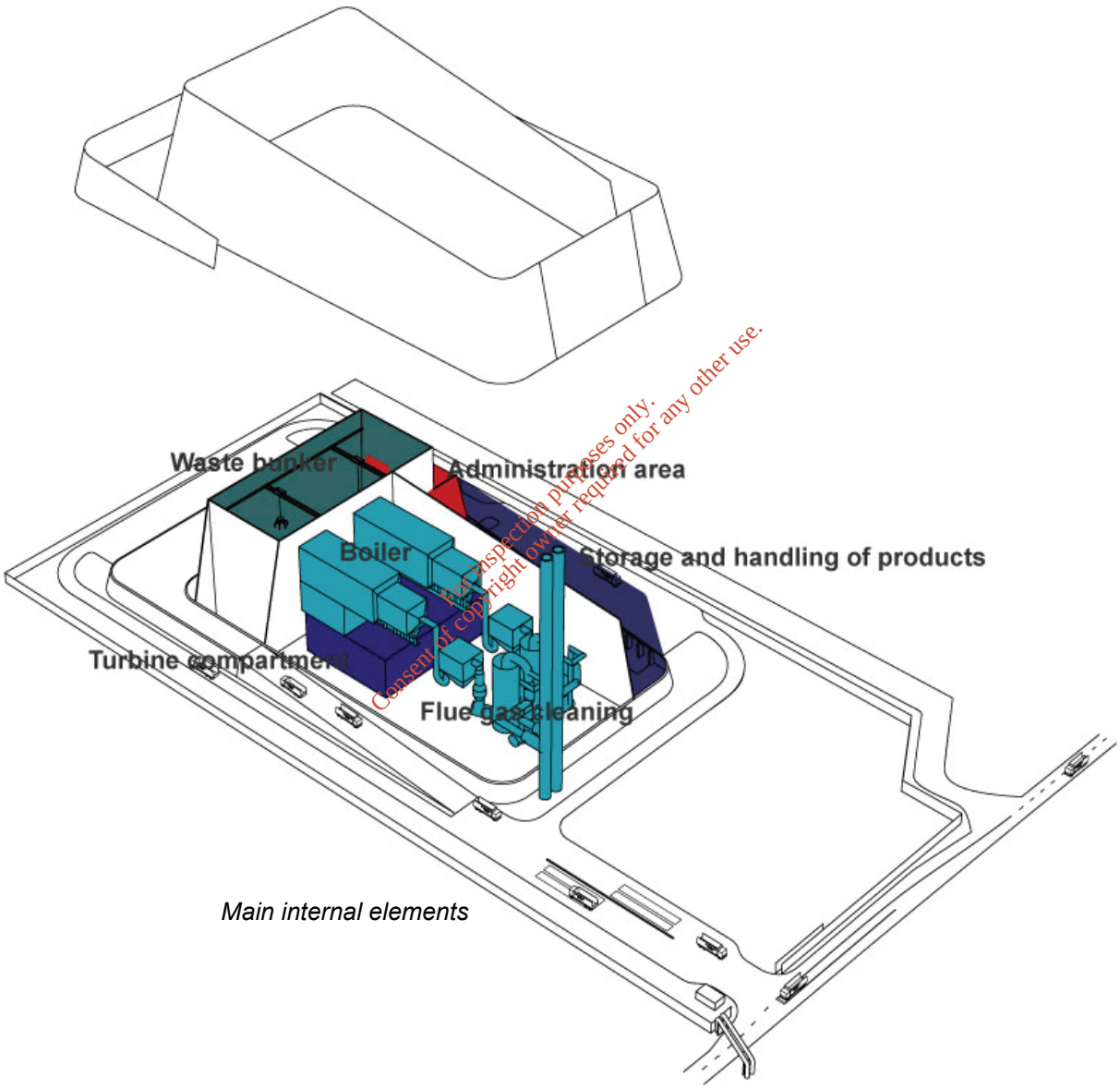
6.5.3. The main building occupies a central position on the Site and presents a strong architectural spiraling form, which envelops all of the critical elements of the waste to energy activities and operations. It comprises three principal elements: a base, the technical plant, and an enveloping screen.

- The base provides weight and robustness of the building. It anchors and directs the other elements so that the building frame will be seen as a whole. The base is seven metres in height and, among other elements, contains an elongated ramp providing for Heavy Goods Vehicle (HGV) access to and from the waste reception hall.




*Main external elements*

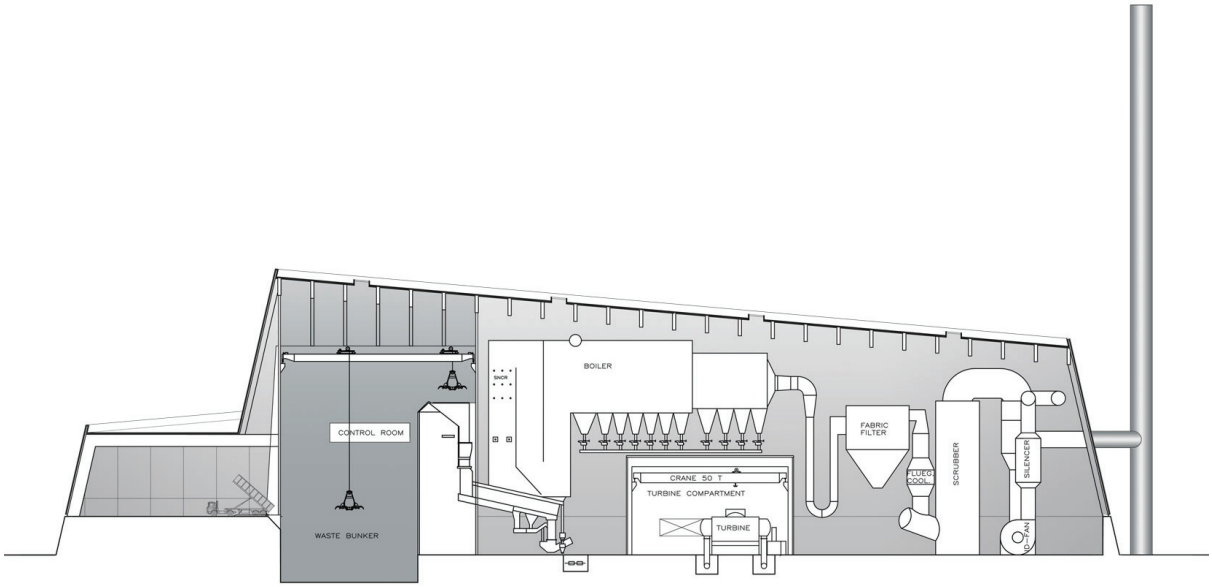
- The technical elements include the waste reception hall, waste handling, waste processing activities, boilers, turbines *etc*. together with the various administration and operational elements. While these are internal activities the main technical elements will be illuminated and it will be possible to view such elements through the glazing in the external screen. The control and administration area will sit as an independent component within the main building screen. This location faces toward the west offering impressive views to the city and Sandymount.




*Main internal elements*

*Main elements of Dublin WtE Facility*

**Figure 6.3 Longitudinal Cross Section of Dublin Waste to Energy**




6.5.4. The screen surrounds the technical plant in an organic, wrap-around manner with characteristic rounded corners and inward-sloping façades. The overall height of the structure is 57m AOD and it provides the building with a strong, contemporary architectural appearance. The screen is designed so that its structural divisions are equipped with distinctive glass areas through which the technical plant can be viewed. In particular, from Pigeon House Road, the large-scale technical flue gas cleaning equipment will be visible through the northern glass façade. In the evening this feature will be of particular note as internal lighting will illuminate the steel structures, walkways, scrubber towers, flue gas ducts *etc*.



6.5.5. Of particular note are the twin stacks to be located alongside the northern elevation of the proposed building. The stacks are slender and rise to 105m AOD in height – approximately half of the height of the two existing ESB stacks at Poolbeg Generating Station. In operation a plume will be visible from the stacks. The degree of visibility will vary greatly depending on climatic factors, including temperature and wind speed both of which will affect density and dispersion. Such plumes and the impact of various climatic conditions is already a feature associated with the existing stacks on the Poolbeg peninsula.

6.5.6. Other elements include an entrance security building, weighbridges, site fencing, landscape berming, planting of mature trees and general landscape works. A pump house is to be located on the northern side of Pigeon House Road. In addition two parallel 'in-water' and 'out-water' pipes - each approximately 1.0m in diameter - will arch up and over Pigeon House Road at the northeast corner of the main WtE Site area.

6.5.7. While the Site is visually flat it is proposed to construct four spiralling mounds fronting the northern elevation of the building. The berms, which rise to between 3 and 5m in height, will anchor the northern façade of the building as viewed from Pigeon House Road while maintaining a defined vista through to the central glazed element of the northern elevation.

6.5.8. Access to the Site will be though the northern boundary via Pigeon House Road. Thereafter all traffic (including waste vehicles, buses and cars) will proceed along a one-way clockwise manner around the Facility accessing the reception hall, the car parks / bus parks *etc*. as appropriate. The Site entrance and road network will be fully illuminated for normal operation of the Facility and as previously noted the northern elevation of the WtE Facility incorporates a major glazing element facilitating views through to internal operations.

### *Construction and Materials*

6.5.9. The main building will be steel frame construction housing the technical elements of the WtE Facility. The frames will be installed in a six-metre modular system between which the lightweight lacquered aluminium facade panels will be fitted. The modular system is expressed in the facades as narrow tracks and emphasises the rounded corners of the building, thereby accentuating the overall organic ”spiral-shell” shape. The base, including all the visible walls in the façade are proposed as dark grey concrete elements providing a clear contrast to the light metal facades of the building screen.

6.5.10. The roof covering will be of a greyish colour similar to the facade-colour with an absolute minimum of installations. Most plant will be fitted underneath the roof construction except for the fire vents and the access openings for the staff.

**Figure 6.4 View from South West**


## 6.6. Impact of the Proposed Development

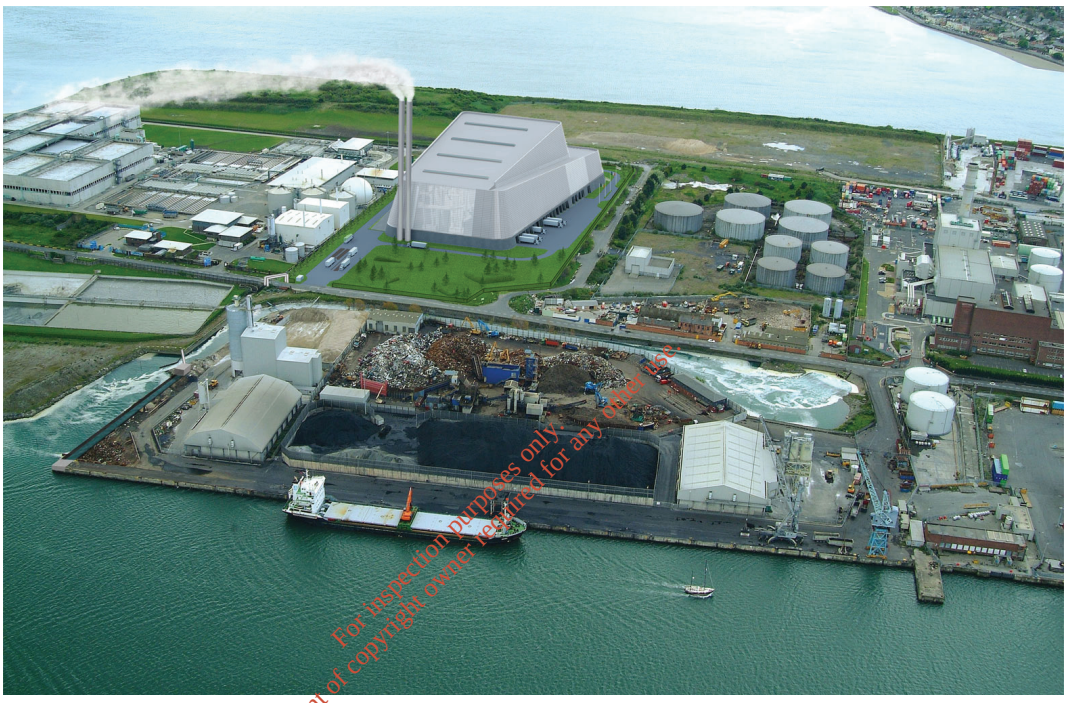
### *Introduction*

6.6.1. The proposed development is of visual significance and is located on a prominent peninsula and on a site, which is visually open relative to its surroundings. As a result this physically significant development will be visible from a wide range of areas around and across the arc of Dublin Bay. However, whilst the proposed development will undoubtedly be visible the nature of its landscape and visual impact will be strongly influenced by the inherent character of its existing industrial setting and the nature of existing views to and from this prominent coastal setting.

6.6.2. The proposed development may also be viewed as a major change in architectural approach to development as compared to existing development on the peninsula. While

the peninsula has many large and industrial buildings these are functional in nature and with the notable exception of exceptionally tall elements (*i.e.* Poolbeg Stacks) they constitute a visually disparate collection of container stacks, silos, warehouses, *etc*. Against this background the proposed development seeks to enclose the entire waste to energy process within a single structure of architectural landmark merit. In this way the main building may be considered a catalyst for the positive architectural rejuvenation / redevelopment of the peninsula.

**Figure 6.5 Aerial view of proposed Dublin Waste to Energy Facility; The picture both shows how the Dublin Waste to Energy will stand as a unique structural element in the landscape in clear contrast to the diversity and visual disparity of other industrial developments on Poolbeg Peninsula**





6.6.3. It is important to note that such redevelopment has been envisaged within Dublin City's Masterplan for Poolbeg. While recognising the existing and likely on-going industrial nature of the peninsula it is also clear that the Plan proposes a more complex and varied future for developments which includes potential for developing areas for housing purposes; for promoting development of areas as natural parks with amenity walks, playing fields, natural habitats, and the development of an eco-park concept. There are also plans to create a marina with rowing facilities and there is support for proposals for the development of an industrial archaeological heritage area with related tourism and recreational facilities.

6.6.4. If such redevelopment it to be realised then on-going industrial development should be of the highest quality capable of marking the commencement of new intentions for the area. The scale of the proposed WtE Facility means that the proposed building will be of major visual significance for the entire area. It will be a landmark building of original expression and simplicity, which will be visible from Clontarf through Dublin Port and Ringsend to Sandymount and further afield.

### *Impact on Landscape, Townscape, Seascape*

6.6.5. The proposed building constitutes a significant landmark development to be located on a visually robust peninsula of unique position and character within Dublin Bay. However, the peninsula includes a 'hard' core of the existing established industrial landscape of Dublin Port. As such, whilst of central and pivotal significance within the bay, the Site itself is of low visual sensitivity and of low sensitivity in terms of landscape, townscape

and seascape character. In effect, the Site is already dominated by an existing array of industrial or port-related uses and structures, which include a myriad of large buildings, silos, container stacks, warehouses *etc.,* all of which combine to give the predominant industrial character of the area.

6.6.6. Whilst the proposed development is significant in its own right it will not adversely alter the existing unique character of the Poolbeg peninsula within Dublin Bay. The peninsula will remain as an unaffected central and pivotal feature within the arc or sweep of the bay. Furthermore, the independent nature of the existing 210m high Poolbeg Stacks will be unaffected and they will retain their predominant landmark influence on the character of the peninsula and the bay.

6.6.7. At a site level the proposed WtE Facility will represent a significant change in the character of industrial development on the peninsula, particularly and most notably in contrast of architectural approach. Surrounding developments are a disparate collection of openly visual buildings, silos, container stores *etc*., while the Dublin WtE Facility proposes enclosing the technical plant within a large landmark-styled building. As a result the proposed development will represent a considerable contrast to its surrounds and will have significant influence on the character of its immediate setting. This influence will be most significant on the adjoining undeveloped lands, coastal walk and Ringsend Nature Park all along the more open south shore of the peninsula. From the south the development will present a dominant and single massing of façade closing-off what is currently more open areas though the central portion of existing industrial areas.

6.6.8. Overall, the proposed development will not have a significant impact in terms of the contribution of Poolbeg peninsula to the landscape, cityscape or seascape character of Dublin Bay. However, the proposed Facility will have a significant influencing presence on the immediate character of the peninsula, and particularly on the south shore areas. However, this is not considered to be of a negative nature. On the contrary, the proposed Facility has been designed to be a landmark structure, defining a new approach for architectural treatment of industrial development on this pivotal landscape/townscape/seascape site.



### *Visual impact*

6.6.9. The proposed WtE Facility will be visible from many areas both on the peninsula and within the wider setting of Dublin Bay and its landscape/cityscape context. In this context it is only the main building, which is considered to have any potential for appreciable landscape and/or visual impact. This building rises to 57m AOD and while it is of an individualistic and contemporary architectural design it will also be a structure of considerable visual mass. As a result, the Facility will have a strong visual presence especially when view in contracts to the more dispersed and disparate visual nature of its industrial surrounds. In this way the perception of any visual impact on the viewer will have a high a degree of subjectivity attached. This subjectivity will be be influenced by considerations of the project as a whole – particularly in terms of ones perception of terms such as ‘incineration’; ‘waste to energy’; siting; air quality; *etc*.

6.6.10. In order to assist in the presentation of the likely physical and visual nature of the proposed WtE Facility, 36 day-light Photomontages have been prepare from a wide variety of surrounding areas extending from Killiney Hill round through Sandymount, Poolbeg, Clontarf to Howth. In addition 3 night-time Photomontages have also been prepared. All of the views are included with Appendix 6.1 of the EIS. A selection of the Photomontages, within which the proposed WtE Facility is most openly visible, is included within this assessment for descriptive purposes.

6.6.11. The main building will be a visually prominent structure rising to 57m AOD. In addition the WtE Facility includes for the provision of twin stacks rising to 105m AOD. The proposed stacks are approximately one-half of the height of the Poolbeg Stacks and are also substantially more slender. As such, the proposed stacks will not have the visual dominance or presence, which the existing stacks have within Dublin Bay. Indeed the

peninsula contains many vertical features, including other stacks, which are of more comparable height to the proposed stacks – see Figure 6.6 Viewpoint 7.

6.6.12. In operation a plume will be visible from the stacks. The degree of visibility will vary greatly depending on climatic factors, including temperature and wind speed both of which will affect density and dispersion. However, such plumes and the impact of various climatic conditions is already a feature associated with the many existing stacks on Poolbeg peninsula.

Figure 6.6 Viewpoint 7


6.6.13. Viewpoint 7 – an open view south from Clontarf with the twin ESB – Power Generating Station stacks dominating the horizon and standing as a clear landmark on the Poolbeg Peninsula. These aspects apart, the diversity of industrial structures is significant where lower ESB stacks, harbour cranes and the Dublin Waste to Energy stacks are part of general visual mosaic of industrial development on peninsula. However, the Dublin Waste to Energy Facility stands as a single individualistic entity within the view.

6.6.14. Appreciable visual impact will arise from two distinct locations. Firstly, from locations on Poolbeg peninsula most especially from areas south and southeast of the Site and secondly, from proximate areas off the peninsula most especially from where the proposed Facility is viewed from directly north within Dublin Port (Viewpoint 36) or from beyond at Clontarf (Viewpoint 7); and from the southwest and south at Irishtown (Viewpoints 15 & 16) and Sandymount (Viewpoint 17).

**Figure 6.7 Viewpoint 17**



6.6.15. Viewpoint 17 – a clear view north toward the Poolbeg Peninsula from the promenade at Sandymount. The southern facade of the Dublin Waste to Energy Facility is clearly evident within the viewpoint displaying the structure at its full height of 57 meters AOD and 105 meters AOD high stacks. In the otherwise industrial diversity of volumes the Dublin Waste to Energy building stands as a complete shape. Just to the right of the Site lies Irishtown Nature Park where the ground levels rise to 20 meters AOD. The ESB – Poolbeg Generating Station stacks stands as the most dominant figure in the horizonsrising to a visually predominant 210 meter AOD.

6.6.16. The development has no direct impact on any surrounding landscape, amenity or recreational designation though the main building will be an imposing structure within views from Ringsend Nature Park; the south shore walk; portions of Sean Moore Park; Sandymount Bay and its associated promenade. However, given its strong architectural presentation the building may act as a catalyst for the envisaged rejuvenation / redevelopment of the industrial landscape of the peninsula.

6.6.17. The proposed WtE Facility will represent a significant visual intrusion when viewed from Irishtown Nature Park and from the south shore of the peninsula. From such proximate locations the full scale of the main building will be wholly appreciated and it will have a dominating visual influence on views north to the existing industrial lands. That considered, the proposed development will also be of visual interest and merit in being highly individualistic. Therefore, the proposed WtE Facility will have a significant visual impact from these open and recreational based areas. Many viewers will see this significant impact as being negative while others may consider its architectural styling to be a positive aspect.

6.6.18. As views move from the peninsula to the main coast at Clontarf, Irishtown and Sandymount the proposed development will be viewed more increasingly within the visual context of the whole of the peninsula with its existing industrial developments. While the proposed Facility will remain as a significant visual element, the visual expanse of contextual development will dilute the influencing and impacting nature of the main building. The visual impact will remain significant for the coastal promenade, strand and

bay at Sandymount. However, as the viewer moves away from the coast or further along the coast, the impact will quickly reduce as the development becomes an increasingly smaller part of the wider developed context.

6.6.19. Beyond areas which are located more immediately to the north, southwest and south, the proposed WtE Facility will have little visual impact on Dublin Bay. Views, where present ,from locations such as Howth, Sutton, Dollymount, Killiney Hill, Dun Laoghaire, the Dublin Mountains, Mount Merrion, Deerpark *etc*. are all of some considerable distance. As such, these views take in an expansive panorama of the city and the bay within which individual development on Poolbeg - with the obvious exception of the Poolbeg Stacks - is visually insignificant.

6.6.20. It is intended to illuminate the Site for normal operation during night-time. However, the Poolbeg peninsula is already an area of high illumination set within the backdrop of the city proper. As such the lighting associated with the proposed development will not give rise to any additional adverse impact. A feature of the WtE Facility is the proposal to have a large area of glazing on the north elevation. It will be possible to view illuminated internal plant through this area of glazing – thereby giving added interest and a positive visual experience to viewers from Pigeon House Road or from within port areas on the north side of the Liffey Estuary.

### *Impact on landscape planning*

6.6.21. The proposed development is sited within an area of existing industrial land use and zoning, an area identified as such within both the Dublin City Development Plan and the Draft Poolbeg Framework Plan. The development has no direct impact on any surrounding landscape, amenity or recreational designation though the main building will be an imposing structure within views from Ringsend Nature Park; the south shore walk; portions of Sean Moore Park; Sandymount Bay and its associated promenade. However, given its strong architectural presentation the building may act as a catalyst for the envisaged rejuvenation / redevelopment of the industrial landscape of the peninsula.



6.6.22. It is noted however, that because of other considerations of a non-landscape or visual nature, the proposed development may well be perceived as having a negative impact on the potential landscape planning context of the peninsula.

6.6.23. The proposed development will be visible within views from both the Fingal and Dun Laoghaire Rathdown County Council areas. However, the development is distant and located within the context of surrounding industrial and port-related uses. Within such context and setting the proposed development has no adverse impact on landscape planning aspects, including listed views and prospects identified within the Fingal and Dun Laoghaire Rathdown areas.

### *Worst-case impact*

6.6.24. A worst-case scenario considering failure of landscape and visual mitigation measures would not result in significant adverse impact as the measures are inherent within the siting and architectural treatment of proposed development (See Section 6.7 Mitigation Measures below). A further scenario could entail cessation of the project during construction thereby resulting in only partial completion of the Facility. Again while this may give rise to some visual diversion, such a scenario should not give rise to overly significant landscape or visual impacts given the robust nature of the existing industrial setting. Furthermore, given the zoning and location of the Site it is likely that a further redevelopment of the lands would eventually replace any partially finished status.

### *Summary*

6.6.25. The proposed building constitutes a significant individualistic development to be located on a visually prominent peninsula within Dublin Bay. While the development is largely in-keeping with the industrial zoning for the Site, the single major structure contrasts significantly with its more disparate surrounds. However, the principal landscape and visual impacts relate to areas on the peninsula rather than along the main coast. The proposed development will have a significant landscape and visual influence on the setting and views from areas such as Irishtown Nature Park and from the south shore of the peninsula. Significant visual impact will also extend across Sandymount Bay to the promenade from Sandymount to Irishtown.

6.6.26. For the wider bay area the proposed development will not result in significant landscape or visual impact. The central pivotal setting of peninsula will be retained unaltered and the Poolbeg Stacks will remain as the predominant vsiaul features of the peninsula and the setting for the bay.

## 6.7. Mitigation measures

### *Introduction*

6.7.1. At the outset it must be noted that the proposed development will comprise of a major structural element of noted visual prominence which given its scale and the nature of the Site, cannot be visually screened. In such scenario mitigation is best achieved in the consideration of avoidance, reduction, and remediation in the siting and design of the proposed development. Such considerations have informed the basis of the proposed WtE Facility and these are reflected in a number of ways.



6.7.2. The development is to be sited within an area of clearly established 'hard' core industrial development where appropriate land use zoning applies. The Site itself has a visually degraded appearance and has little or no landscape or visual sensitivity in its own right – albeit as part of the wider peninsula it occupies a central and pivotal landmark setting within Dublin Bay.

6.7.3. As the development cannot be screened it will undoubtedly be visually prominent from many areas. However, in mitigation the design proposes a main building of significant architectural merit in its own right. In this way the building is clearly a new departure in terms of recent development on the peninsula and in conjunction with the provisions of the Poolbeg Masterplan should set the trend for the rejuvenation of the architectural quality of the industrial elements on the peninsula.

6.7.4. The state-of-the-art building will utilise the latest technologies in modern materials and will be amongst the forerunner for the latest and most advanced buildings within its field. In particular, the design and layout includes elements which relate to:.

- Openness – the building is designed to reveal its function rather than hide it. Visibility and openness create insight into and an understanding of the concept "waste to energy".

- Landmark – with its sculptural simplicity the building should differ from the other industrial buildings in the area in an original expression – but without appearing monumental within its context. The plant will be visible from large parts of the city of Dublin, but the integrated form will give a positive supplement to the city skyline from many different angles.

- The surroundings – the building has been orientated on the Site in such a way that it can take into account any future changes in the Poolbeg area. By creating an attractive strong connection from north to south along the Site, the development seeks to define a building line and character.

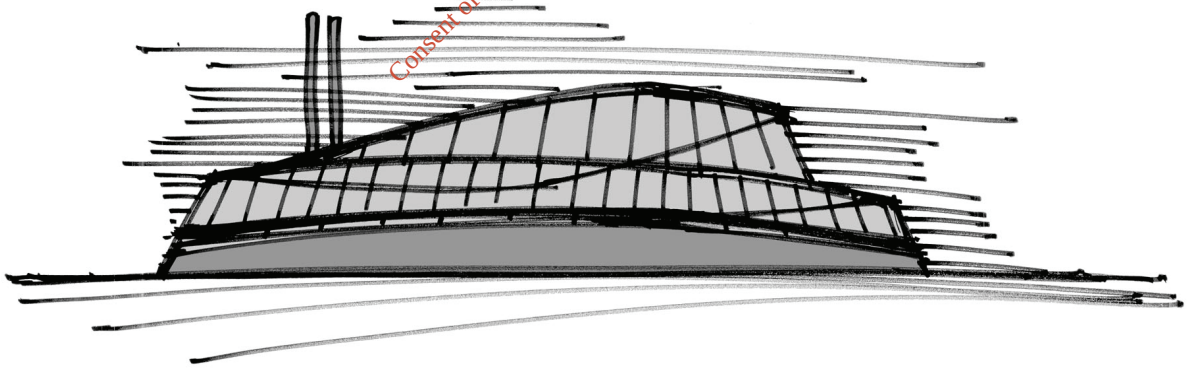
6.7.5. In terms of landscape restoration, it is proposed to establish a strong visual evergreen screen along the eastern, southern and western boundaries of the Site. This includes for dense hedgerow planting of Escallonias (*Escallonia* spp.) and Olearias (*Olearia* spp.) backed by Pine (*Pinus* spp.) trees in feature locations. While it is proposed to retain openness through the northern Pigeon House Road boundary, four spiralling berms will provide for definition and framing of views towards the glazed northern elevation. In this way the landscaping seeks to visually anchor the development, screening the low-level traffic movements, whilst setting-off the architectural treatment of the building.

6.7.6. A new line of Sycamore (*Acer pseudoplatanus*) trees will be established along the line of Shellybanks road so as to replace those existing trees, which will be lost during the course of construction of the WtE Facility.

## 6.8. Residual Impact

6.8.1. The proposed development will remain as an individualistic building of visual significance on the peninsula. In this context the building will continue to have particularly visual influence and hence impact. However, it has the potential to be viewed as a positive landmark building and as part of the envisaged framework for Poolbeg the proposed development has the potential to act as a catalyst for the positive architectural treatment of industrial development on this unique peninsula.





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# 7. Traffic and Transportation

## 7.1. Introduction

7.1.1. The proposed facility location has been described previously in Chapter 2. A Location Plan showing the surrounding road network is shown in Figure 7.1 of Appendix 7.2.

7.1.2. RPS Consulting Engineers (RPS) were commissioned by Dublin City Council (DCC) to carry out a Traffic Impact Assessment (TIA) of the proposed development. This Chapter contains full details of that assessment. An independent consultant, ILTP Consulting, was engaged by RPS to undertake a traffic appraisal of the development, with specific responsibility for the traffic modelling component. Their Report is contained in Appendix 7.1 of this Environmental Impact Statement (EIS).

7.1.3. The objectives of the Assessment were to:

- Assess future traffic flows, journey times and route patterns in the vicinity of the development, with particular emphasis paid to Heavy Goods Vehicle (HGV) movements.
- Determine the local and strategic traffic impacts of the Dublin WtE facility.
- Devise a preferred access strategy.
- Assess any potential adverse impacts of the proposed development and develop mitigation measures where required.
- Assess the local traffic impacts of construction traffic on the road network and identify mitigation measures, where appropriate.



## 7.2. Methodology

7.2.1. The traffic assessment was undertaken in accordance with the Institution of Highways and Transportation's (IHT) document 'Guidelines for Traffic Impact Assessment', September 1994, the National Roads Authority's Draft document 'Guidelines on Traffic Impact Assessments', June 2005 and the United Kingdom Highways Agency document 'Design Manual for Roads and Bridges' (DMRB).

7.2.2. An initial baseline study was undertaken by RPS in 2004 (Dublin Waste to Energy Project Baseline Monitoring – Main Report), which included an assessment of the existing traffic situation.

7.2.3. In the preparation of this EIS, a further review of the existing and future traffic conditions including traffic patterns and volumes on the local road network and on the strategic road network was undertaken. Future year traffic predictions on the local road network and on strategic roads were extracted from the Dublin Transportation Office (DTO) SATURN Model for the Opening Year of the Dublin WtE facility (2012) and the Design Year, 15 years post opening (2027).

7.2.4. This model takes account of future road improvements such as the M50 Motorway Upgrade Scheme and East Wall Road Improvement Scheme, new road infrastructure projects such as the Dublin Port Tunnel (DPT) and the DCC Heavy Goods Vehicle (HGV) Management Strategy.

7.2.5. The predicted traffic generated by the Dublin WtE facility was assessed in the context of the future year flows to ascertain what impact the Facility would have on the local and

strategic network. Comparisons have been made for both AM peak hour traffic and Annual Average Daily Traffic (AADT).

7.2.6. The traffic modelling in this EIS is based on the Dublin Transportation Office (DTO) model and predictions. Further developments, in particular future large scale residential and commercial development on the Poolbeg Peninsula have been taken into account to the extent now known.

7.2.7. The proposed strategy assumes that a certain quantity of waste from within a defined boundary will be delivered directly to the Dublin WtE facility via the local road network and the remainder will come from a number of transfer stations via the strategic road network.

7.2.8. Sensitivity testing was carried out on the "Worst Case" Scenario on the Strategic Road Network (WCSSRN), which assumed that all waste will come from a number of transfer stations to the Facility and the "Worst Case" Scenario on the Local Road Network (WCSLRN), which assumed that all waste will come directly to the Dublin WtE facility.

7.2.9. Determination and assessment of impacts of restricting opening hours for receipt of waste at the Facility was also undertaken.

7.2.10. According to the IHT Guidelines, a Traffic Impact Assessment (TIA) should normally be produced where one or other of the following thresholds are exceeded:

- traffic to and from the development exceeds 10% of the two-way traffic flow on the adjoining highway
- traffic to and from the development exceeds 5% of the two-way traffic flow on the adjoining highway, where traffic congestion exists or will exist within the assessment period or in other sensitive locations.

7.2.11. The NRA's "Draft Traffic and Transport Assessment Guidelines", June 2005, states, "The threshold approach should be used to establish the area of influence of the development. The study area should include all links and associated junctions where traffic to and from the development will exceed 10% of the existing two-way traffic, or 5% in congested or other sensitive locations. "The DTO's document "Traffic Management Guidelines" state the thresholds for transport assessments are as follows:

- Traffic to and from the development exceeds 10% of the traffic flow on the adjoining road
- Traffic to and from the development exceeds 5% of the traffic flow on the adjoining road where congestion exists or location is sensitive

7.2.12. It was considered that the 5% threshold would be the more conservative criteria to use. The proposed development was assessed in the context of the above guidelines and thresholds and in cases where the 5% thresholds were exceeded operational capacity assessments were undertaken as an additional measure of the traffic impact.

## 7.3. Existing Environment

### *Existing Road Network*

7.3.1. The main site is located immediately south of Pigeon House Road and east of Shellybanks Road.

7.3.2. South Bank Road and Whitebank Road are distributor roads for HGVs accessing the Poolbeg Peninsula and have very wide travel lanes with no road markings. Parking is permitted on these roads, although no parking spaces are actually designated.

7.3.3. The main access roads into and out of the area are via:

- Sean Moore Road
- East Wall Road
- North Wall Quay
- East Link Bridge
- Beach Road/Strand Road, and
- Church Avenue/Bath Avenue.

7.3.4. Sean Moore Road has one wide travel lane in each direction with additional turning lanes provided at its roundabout intersection with South Bank Road and East Link Road and at the signalised junction at Beach Road. A signalised pedestrian crossing is provided about midway between South Bank Road and Beach Road. Clanna Gael Fontenoy GAA Club is located directly off Sean Moore Road and the former Irish Glass Bottle Factory is also located off Sean Moore Road.

7.3.5. Roadworks are currently in place along East Wall Road as part of the East Wall Road Improvement Scheme to upgrade the road to two or three lanes in each direction (divided by a central median) and provision of additional turning lanes. Cycle lanes and footpaths on both sides of the road are also planned. This route provides access to Dublin Port and by the end of 2006 the DPT will connect into East Wall Road near Tolka Quay Road.

7.3.6. North Wall Quay is the main route connecting the northern port and the City Centre. There is one lane in each direction. A wide promenade is provided along the quayside of the road. Upon the opening of the DPT, HGV access along the city quays will be restricted.



7.3.7. East Link Bridge is a tolled bridge over the River Liffey. Access to the bridge is from East Wall Road at North Wall Quay and from Sean Moore Road at South Bank Road. There is generally one lane in each direction with additional lanes on both sides of the tollbooths.

7.3.8. Beach Road and Strand Road are narrow roads with one lane in each direction. Parking on the footpath on the residential side of the street sometimes causes bottlenecks for passing vehicles.

7.3.9. Church Avenue is a local road with one lane in each direction but facilitates truck movements between Sean Moore Road and Irishtown Road because 3-tonne weight restrictions are in place along Londonbridge Road and there is a height restriction as it turns into Bath Avenue due to an overhead railway bridge.

### *Traffic Surveys and Traffic Flows*

7.3.10. As part of the baseline monitoring, full, classified traffic counts were carried out by DCC at the following 6 locations listed below and full details of these are provided in the Dublin Waste to Energy Project Baseline Monitoring – Main Report.

| Junction | Location | Date of Count |
|---|---|---|
| 1 | Ringsend Road / South Lotts Road | 29/05/03 |
| 2 | Sean Moore Road / South Bank Road | 03/11/03 |
| 3 | Beach Road / Sean Moore Road | 10/11/03 |
| 4 | Beach Road / Church Avenue | 10/11/03 |
| 5 | East Wall Road / North Wall Quay | 28/01/03 |
| 6 | Irishtown Road / Church Avenue | 04/02/04 |

7.3.11. The counts were carried out between 8:00 AM – 6:30 PM (10.5 hours) to establish the full pattern of daily movements including the AM and PM peak hours (8:00 AM – 9:00 AM and 5:00 PM – 6:00 PM).

7.3.12. As part of the baseline monitoring, traffic counts were undertaken on March 11th 2004 to establish the 24 hour daily profile on:

- Sean Moore Road
- Beach Road
- East Wall Road
- Irishtown Road
- East Link Road

7.3.13. A full two way classified count was carried out at these locations over a 24 hour period to cover all the possible peaks throughout the day and night. The AM Peak and AADTs are shown in the Tables 7.1 and 7.2 below respectively



**Table 7.1 AM Peak (two way flows) on local road network**

| **AM Peak (Two Way Flows)** | | | |
|---|---|---|---|
| **2004** | Total (Veh) | HGV | % HGV |
| Location | | | |
| | | | |
| Sean Moore Road | 1,940 | 112 | 6% |
| East Link Bridge | 1,837 | 138 | 8% |
| East Wall Road | 1,730 | 339 | 20% |
| Beach Road | 1,768 | 59 | 3% |
| Irishtown Road | 1,140 | 63 | 6% |

**Table 7.2 Existing Traffic Flows on local road network**

| **AADT (Weekday)** | | | |
|---|---|---|---|
| **2004** | **AADT (Vehs)** | **AADT (Vehs)** | **% HGV** |
| **Location** | **Total (Veh)** | **HGV** | |
| | | | |
| Sean Moore Road | 22,282 | 1,492 | 7% |
| East Link Bridge | 22,580 | 2,183 | 10% |
| East Wall Road | 23,374 | 5,642 | 24% |
| Beach Road | 22,870 | 1,062 | 5% |
| Irishtown Road | 16,853 | 883 | 5% |

7.3.14. Figure 7.2 of Appendix 7.2 shows the existing (2005) weekday AADTs along the M50 Motorway.

### *Existing Uses on proposed site*

7.3.15. The proposed site is currently occupied by Clearway Disposals Ltd. and Hibernian Molasses Ltd. Traffic generation from these two businesses is shown in Table 7.3 below.

**Table 7.3 Existing Trip Generation at the Proposed Development Site**

| Entering Trips | | Exiting Trips | | Total Trips | |
|---|---|---|---|---|---|
| Total Vehicles | No. HGVs | Total Vehicles | No. HGVs | Total Vehicles | No. HGVs (%) |
| 97 | 32 | 107 | 33 | 204 | 65 (32%) |

7.3.16. Cars and light goods vehicles (LGVs) accounted for about 70% of movements into or out of Shellybanks Road, the remainder of which were HGVs. The two existing operations on the proposed site will no longer be traffic generators from the Site.

### *Accident Data*

7.3.17. The NRA accident data (1996– 2002) was extracted for sections of road in the vicinity of the proposed development for a 6 year period. The accidents recorded are shown in Figure 7.3 of Appendix 7.2. The recorded accident data does not include "material damage only" accidents, or accidents which were not reported to or recorded by the Gárda Siochana.



### *Public Transport*

7.3.18. Bus stops are located along Pigeon House Road, within walking distance of the Site. The area is, however, only currently served by one bus route – No. 1 that operates one service in the morning and one in the evening, a round trip between Parnell Square and the ESB Power Station, via Ringsend. The bus arrives in Poolbeg just before 8:00 AM in the morning and departs from the area at about 5:30 PM.

7.3.19. Other bus services including Routes No. 2 (Parnell Square to University College Dublin (UCD)) and No. 3 (Whitehall to UCD) are available on Irishtown Road.

7.3.20. Rail services at Landsdowne Road and Sandymount DART stations are about 2 km from the Site or about 30 minutes walking distance.

7.3.21. There are 8 services from Dublin Connolly to Landsdowne Road during the weekday morning peak 08:00-09:00 and again there are 8 services from Landsdowne Road to Dublin Connolly during the PM peak 17:00-18:00.

### *Pedestrian and Cycling Facilities*

7.3.22. A scheme to provide a cycle track and pedestrian promenade from Sutton to Sandycove is underway. Certain sections have been built including a link along Sandymount Strand, which will improve cyclist access to the peninsula.

7.3.23. Footpaths are provided along Pigeon House Road and Whitebank Road.

### *Schools and College*

7.3.24. The traffic surveys were all undertaken on days in which the local schools and Ringsend Technical College were open.

### *Dublin Port Ferries*

7.3.25. A number of ferries access Dublin Port daily with these timetables subject to change due to seasonal variations. These timetables can be sourced on www.dublinport.ie/Ferries.

### *Existing Transportation Planning and Policy*

7.3.26. Reference has been made to all relevant existing transportation planning and policy documents, including the Dublin South Bank Strategic Development Framework and Poolbeg Framework Plan Dublin South Bank 2003. Details can be found in Appendix 7.1.

### *Future Transport Strategy*

7.3.27. Dublin City Council's Draft HGV Management Strategy: As part of the traffic management plans for the Dublin Port Tunnel, DCC have devised a HGV Management Strategy. The primary objective of the strategy is to maximise the potential of the Dublin Port Tunnel in terms of removing port related HGV traffic from the city, to be achieved by:

- Maximising use of the DPT and minimising use of city streets by Port related traffic.
- Temporary management of over height HGVs to minimise adverse impacts on traffic flow, residential amenity and general environment of the city.



7.3.28. In April 2006 Dublin City Councillors voted to introduce the ban on five-axle HGVs in the city centre for the proposed hours – 7:00 AM to 7:00 PM in the canal cordon from November 2006, upon the opening of the Dublin Port Tunnel1, as proposed in the Draft HGV Management Strategy (2005).

7.3.29. Since April, Dublin City Council have subsequently decided and agreed to extend the cordon. A reproduction of the extent of the extended cordon is included in Appendix 7.1.

7.3.30. The implications of the HGV Management Strategy for the proposed development will be examined in Section 7.6.

### *Future Public Transport and Other Improvements*

7.3.31. Future public transport and other improvements for the general area:

- LUAS Line C1; and
- Dodder Bridge.

7.3.32. Additional pedestrian bridges across the River Liffey are planned for completion by 2011 connecting:

- North Wall Quay and Forbes Street; and

[1] Irish Independent "Larger Trucks will face an all-day ban from centre of capital by end of year" 11 April 2006

- Marlborough Street and Hawkins Street.

7.3.33. The combination of the HGV Management Strategy, new and improved roads and the provision of improved pedestrian, cycle and public transport facilities over the next few years will greatly improve accessibility to the area and allow for better traffic management.

### *Future Road Improvements*

7.3.34. The following road projects are scheduled to be completed before the opening of the Dublin WtE facility:

- DPT. The DPT is expected to be open to traffic by the end of 2006.
- East Wall Road Improvement Scheme.
- Samuel Beckett Memorial Bridge. (Guild Street to Macken Street) The bridge is anticipated to be opened by 2008.
- M50 Motorway Upgrade Scheme. The section between the N4 and N7 is due for completion by mid 2008 and the entire scheme by 2010.

## 7.4. Consultation with the General Public and Government Bodies

### *Consultation with the General Public*

7.4.1. During the preparing of the EIS for this project a number of public meetings were held to give the public an opportunity to express their opinions and concerns. Refer to Chapter 2.



### *Government Bodies*

7.4.2. In preparation of this study the DTO and the NRA made observations to An Bord Pleanála and to DCC on the proposed development. A summary of their observations is included in Appendix 7.1.

## 7.5. Proposed Development

### *Proposed Dublin WtE facility Operations Overview*

#### *Opening Hours*

7.5.1. The Facility will be in operation for 24 hours, 7 days a week, but it is proposed that it will be open to accept waste deliveries on Monday to Saturday from 8:00 AM to 10:00 PM. The Facility will therefore be open for waste acceptance 312 days per year.

#### *Deliveries*

7.5.2. It is proposed that deliveries to the Facility will primarily come from three licensed waste transfer stations located at Ballyogan in Dun Laoghaire-Rathdown County Council, Kilshane Cross in Fingal County Council and Ballymount in South Dublin County Council, as shown in Figure 7.4 of Appendix 7.2. In addition there are a number of private transfer stations located in close proximity to the M50 Motorway, which could potentially be used for bulk transfer to the Dublin WtE facility. All deliveries from the transfer stations will arrive in bulk transfer vehicles carrying an average payload of 20 tonnes.

7.5.3. Potential catchment areas of the transfer stations and the Dublin WtE facility are shown in Figure 7.5 of Appendix 7.2. Vehicles coming directly to the Facility will be Refuse Collection Vehicles (RCVs) and carry an average payload of 10 tonnes.

### *Staffing*

7.5.4. There will be approximately 64 staff members working in the Facility. This will include a number of shift workers. Staff levels are discussed in Chapter 5.

### *Residue Removal*

7.5.5. Solid waste residues from the thermal treatment process at the Facility will be transported by truck to off site locations. It is proposed that the Bottom Ash residue will be trucked to a docking location approximately 750 metres from the Dublin WtE facility.

7.5.6. The Flue Gas Treatment (FGT) residues will be brought by truck in sealed containers to a site off South Bank Road, approximately 1,300 metres from the Dublin WtE facility, where it will be stored and await shipping.

7.5.7. The routing to, and the location of the residue off-site storage areas is illustrated in Figure 7.6 of Appendix 7.2.

## ***Proposed Future Trip Generation***



7.5.8. Due to the variety of trip generators anticipated to come from the proposed development, the trip generation calculations have been broken down into three categories:

- Waste Deliveries
- Waste Residues
- Employees/Visitors.

### *Waste Delivery Trip Generation*

7.5.9. The Proposed Strategy discussed in Section 7.2 is to bring waste collected within a defined boundary directly to the Dublin WtE facility and all other waste would be brought to one of three local authority controlled transfer stations located close to the M50 Motorway. Where required, transfer facilities can also be provided by private operators. Consideration will also be given to the case where all waste would go directly to the Facility in 10 tonne payloads or all waste would travel to a transfer station and return to the Dublin WtE facility in 20 tonne bulk transfer vehicles.

7.5.10. The trip generation calculations and traffic impact assessments have been carried out for:

- The Proposed Strategy which considers waste deliveries coming from within a defined catchment area is illustrated in Figure 7.5 of Appendix 7.2, with the remaining waste coming via local authority and privately owned transfer stations.
- The “worst case” scenario on the strategic road network (WCSSRN) will consider all waste coming from the transfer stations to the Dublin WtE facility
- The “worst case” scenario on the local road network (WCSLRN) will consider all waste coming directly to the Dublin WtE facility.

7.5.11. It is estimated for the Proposed Strategy that there would be approximately 121 truck movements to and from the Facility on a daily basis and an average of 9 truck movements per hour, on the basis of a fourteen hour waste acceptance period.

7.5.12. The figure is based on various assumptions:

- 600,000 tonne capacity at the Dublin WtE facility
- Dublin WtE facility is open for waste acceptance 312 days a year
- Transfer station vehicles carry 20 tonne load capacity
- RCVs carry 10 tonne load capacity
- Waste collected within a defined catchment area (shown in Figure 7.5 of Appendix 7.2) would be delivered directly to the Dublin WtE facility and the remainder would be delivered via the transfer stations).
- Other assumptions were made with regard to the sources of waste delivery, the means of transportation of waste and the quantity of waste being delivered.

7.5.13. These assumptions form the basis of the Proposed Strategy.

7.5.14. A summary of the daily and average hourly trip generation, based on fourteen hours of waste acceptance, is shown in 7.4 below.

**Table 7.4 Proposed Strategy Waste Delivery Trip Generation Estimates**

| | Daily Total | | Average per Hour | |
|---|---|---|---|---|
| | Vehicles | PCUs[2] | Vehicles | PCUs |
| In | 121 | 363 | 9 | 27 |
| Out | 121 | 363 | 9 | 27 |
| Total | 242 | 726 | 18 | 54 |



## *Waste Residue Trip Generation*

7.5.15. Chapter 10 describes the types of waste residues from the proposed Dublin WtE facility. Table 7.5 below shows the waste residue trip generation calculations.

**Table 7.5 Waste Residue Trip Generation Calculations**

| | FGT | Bottom Ash |
|---|---|---|
| Waste generation (per week) | 350 tonnes | 2,500 tonnes |
| Waste capacity | 400 tonnes | 10,000 tonnes |
| Removal vehicle capacity | 20 tonnes | 30 tonnes |
| Frequency of waste removal | Weekly | Monthly |
| Truck trip generation associated with the removal | 18 truck trips[3] per week/ average of 3 truck trips per day | 333 truck trips per month[4] |
| Truck trip generation associated with delivery of truck | 1 truck trip per day[5] | 5 truck trips per day[6] |

2 A PCU (Passenger Car Unit) conversion factor of 3 was applied to a HGV in line with the DTO's Model assumptions

3 A Trip represents an inward vehicle movement and a corresponding outward vehicle movement. Where a delivery is noted it is equivalent to a trip.

4 Note this will only occur over about a 24-hour period, once a month.

5 Arrival and departure of 1 vehicle on site to perform the FGT removal, the movements are therefore independent of the residue removal process

6 Arrival or departure of 5 vehicles on site to perform the FGT removal, the movements are therefore independent of the Bottom Ash removal process).

### *Employee Trip Generation*

7.5.16. Table 7.6 below summarises the Employee Trip Generation, based on 64 employees including an estimated 29 daytime workers and three shifts.

**Table 7.6 Employee Trip Generation**

| | Daily Person Trips | Daily Vehicle Trips | AM Peak Hour Vehicle Trips | PM Peak Hour Vehicle Trips |
|---|---|---|---|---|
| Miscellaneous Employees | | | | |
| In | 29 | 20 | 20 | 0 |
| Out | 29 | 20 | 0 | 20 |
| Total | 58 | 40 | 20 | 20 |
| Shift Workers | | | | |
| In | 18 | 18 | 6 | 0 |
| Out | 18 | 18 | 6 | 0 |
| Total | 36 | 36 | 12 | 0 |
| | | | | |
| TOTAL | 94 | 76 | 32 | 20 |

7.5.17. Based on this information the majority of the employee trip generation is likely to coincide with typical traffic peak hours, that is, 29 person trips arriving in the morning peak and leaving in the evening peak. It is estimated that 87% of employees will arrive by car, at an average occupancy rate of 1.287, equating to 20 car trips in both peak hours. This is based on the application of the same modal split derived from the classified turning movement count undertaken at the junction of Pigeon House Road/ Shellybanks Road.

7.5.18. Employee trip generation outside of the AM and PM peak hours will be generated by shift workers and due to the lack of public transport services in the area during off-peak hours and the remoteness of the Site it is likely that most shift workers will come to work by car.

7.5.19. The shift workers have been included in the AM peak to provide for a robust traffic study.



### *Occasional Trip Generation*

7.5.20. Four truck trips will be required per month for delivery of lime, AC, NaOH and NH4OH (one truck trip for each element).

7.5.21. It is estimated that other traffic, for example, visitor trips will generate an additional 20 vehicle trips per day.

7.5.22. In order to service and maintain the Facility, the Operator anticipates that an overhaul will take place over one month, once every 18 months. During this phase of operation about 50 vehicles per day will be required. Regular operations at the Facility will continue during the overhaul.

## *Traffic Distribution and Assignment*

7.5.23. The routing of all trucks with four or more axles accessing the Dublin Port area, which will be in place in 2012 (Year of Opening for the Dublin WtE facility), will be dictated by the HGV Management Strategy, which is designed to keep large HGVs on the strategic network and away from local roads. The strategy will apply also therefore to all trucks delivering to the Dublin WtE facility from the transfer stations. All bulk transfer vehicles will be constrained to travel via the M50 Motorway and the Dublin Port Tunnel to and from the Dublin WtE facility.

[7] Based on total volumes through the junction of Pigeon House Road/Shellybanks Road

7.5.24. The proposed traffic distribution will therefore be as follows: All trucks leaving a transfer station will take the most direct route to the nearest M50 Motorway interchange. They will travel along the M50 Motorway and connect with the Dublin Port Tunnel on the M1 Motorway. Having left the DPT they will travel along East Wall Road, cross over the East Link Bridge, and through the tollbooths. Upon arriving at the Sean Moore Roundabout, all vehicles will turn left onto South Bank Road, left onto Whitebank Road and continue along Pigeon House Road until they reach the site entrance. The same route will apply in reverse to the return journey.

7.5.25. For RCVs travelling directly to the Dublin WtE facility, routes will depend on the actual collection routes to ensure optimum efficiency. Restricted access throughout the city centre dictated by the inner and outer orbital routes do however give an indication of route choices closer to the Poolbeg Peninsula. These routes are as follows: East Wall Road, North Wall Quay, and Sean Moore Road. On this basis the following distribution was applied:

- Sean Moore Road – 50%
- East Wall Road – 25%
- North Wall Quay – 25%

7.5.26. Dublin City Council agreed to extend the HGV Management Strategy cordon whereby there would be no surface street access to Dublin Port from 2007. This will include a 4 and 5 axle exclusion on Beach Road. Beach Road currently has a total daily figure of 1,062 HGVs, 442 of which were counted as 4 and 5 axle vehicles. These will be effectively removed from the road network on implementation of the HGV Management Strategy. The total daily number of RCVs that is expected to deliver directly to the Dublin WtE facility is estimated to be 50. It can be expected that a small percentage of these vehicles will come via Beach Road. It can be stated, however, that the removal of 442 HGVs, in comparison to a small number of RCVs, will represent a positive traffic impact overall.



7.5.27. To determine the amount of waste coming from the transfer stations the following proportions have been applied based on the transfer stations' annual capacities:

| | |
|---|---|
| Ballymount | 64% |
| Ballyogan | 24% |
| Kilshane Cross | 12% |

7.5.28. Additional waste could be brought to the Dublin WtE facility from private transfer stations in Dublin. The majority of the private waste facilities are located close to the M50 Motorway and any waste coming from these private facilities to the Dublin WtE facility will be subject to the same restrictions as the public transfer stations.

## 7.6. Potential Impacts of the Proposed Development

7.6.1. In order to determine what traffic conditions will be like in the Opening Year, 2012, and the Design Year, 2027, the Dublin Transportation Office's Multi Modal Traffic Model was utilised.

7.6.2. The DTO Model covers the whole of the Greater Dublin Area and incorporates all Public Transport Links. The DTO model includes all the measures outlined in Transport 21 including:

- The DPT
- Metro (North and West)

- Interconnector and opening of new Dublin City Centre Rail Station
- M50 Motorway Upgrade including barrier free tolling
- Extension of both LUAS Lines
- Kildare rail upgrade
- Electrification of lines to Balbriggan, Maynooth, Navan and Hazelhatch, and
- Upgrades to various regional road and rail links.

7.6.3. As the Eastern Bypass is only at feasibility stage in Transport 21 it has not been included in this modelling.

7.6.4. The DTO Model includes a combination of road and public transport improvements and demand management measures to meet future year travel demands for the region and is the most appropriate tool with which to predict future traffic flows. The Base DTO Model, from which all design year models are based, is validated on a regular basis using up to date traffic data. In addition, the DTO model also takes account of future development proposals for Dublin in accordance with the Development Plans of the four respective local authorities.

7.6.5. The DTO model only considers AM and Off Peak scenarios.

7.6.6. The DTO model has been used to assess both the strategic and local impacts of the Dublin WtE facility in the Year of Opening, 2012 and for a Design Year of 2027. The strategic road network being considered includes the Dublin Port Tunnel and the M50 Motorway while the local impacts will consider a number of locations including;

- Sean Moore Road
- East Wall Road
- South Bank Road
- East Link Road and Bridge, and
- North Wall Quay



7.6.7. In the first instance, 2012 and 2027 SATURN models were derived from the full multi-modal DTO model to determine traffic flows for the respective design years.

7.6.8. The traffic generated by the Dublin WtE facility was then assessed in the context of the future year flows to ascertain what impact the Facility will have on the local and strategic network. Comparisons were made for both AM peak hour traffic and AADT traffic.

### *SATURN Modelling Inputs*

7.6.9. The SATURN model considered two years, 2012 and 2027. These models are based on the 2001 DTO model. The future year modelling reflects the DCC HGV ban for the city centre for all 4 and 5 axle vehicles, which will be in place by the opening year. The model also reflects the NRA tolling strategy for the DPT which will allow HGVs to travel toll-free.

## *Model Validation*

7.6.10. Both the 2012 and 2027 models are based on the validated 2001 DTO Saturn Model. To assess how well the SATURN model validates the local road network, the 2001 model flows were compared with the recorded 2003 traffic flows.

7.6.11. Using a statistical tool called GEH statistic, a good level of comparison is observed at most locations. Accordingly, the overall the model is very well validated. It also shows that traffic levels in this area have not changed significantly since 2001 and comply with DMRB Guidelines. Refer to Appendix 7.1 for further details.

## *Traffic Impacts*

### *Daily Impacts –Proposed Strategy (Transfer Station and Direct Deliveries)*

7.6.12. Table 7.7 shows the effects of the Dublin WtE facility on the strategic road network in 2012 and 2027 with the Proposed Strategy (transfer station and direct deliveries) in place. The results show that the Dublin WtE facility has a negligible impact on the M50 Motorway with the greatest impact being 0.29%. Daily traffic flows in the DPT rise by 0.72% with the Dublin WtE facility in place, which is also considered negligible.

**Table 7.7 Daily Impacts on Strategic Road Network 2012 & 2027 –Proposed Strategy (Transfer Station and Direct Deliveries)**

| | 2012 | | | 2027 | | |
|---|---|---|---|---|---|---|
| **Location** | **Model AADT (PCUs)** | **WtE (PCUs)** | **% Diff** | **Model AADT (PCUs)** | **WtE (PCUs)** | **% Diff** |
| **Between Carrickmines & Sandyford** | 62,487 | 102 | 0.16% | 65,673 | 102 | 0.16% |
| **Between Sandyford & Ballinteer** | 51,380 | 102 | 0.20% | 51,706 | 102 | 0.20% |
| **Between Ballinteer & Scholarstown** | 75,707 | 102 | 0.13% | 76,926 | 102 | 0.13% |
| **Between Scholarstown & N81** | 87,942 | 102 | 0.12% | 89,762 | 102 | 0.11% |
| **Between N81 & Ballymount** | 103,870 | 102 | 0.10% | 110,410 | 102 | 0.09% |
| **Between Ballymount & Red Cow** | 146,349 | 372 | 0.25% | 150,969 | 372 | 0.25% |
| **Between Red Cow & N4** | 150,558 | 372 | 0.25% | 162,962 | 372 | 0.23% |
| **Between N4 & N3** | 189,356 | 372 | 0.20% | 222,660 | 372 | 0.17% |
| **Between N3 & N2** | 184,197 | 372 | 0.20% | 214,242 | 372 | 0.17% |
| **Between N2 & Ballymun** | 168,370 | 426 | 0.25% | 185,496 | 426 | 0.23% |
| **Between Ballymun & M1 Motorway** | 150,155 | 426 | 0.28% | 155,227 | 426 | 0.27% |
| **DPT** | 59,026 | 426 | 0.72% | 58,529 | 426 | 0.72% |



7.6.13. Table 7.8 shows the effects of the Dublin WtE facility on the local road network in 2012 and 2027 with the Proposed Strategy (transfer station and direct deliveries) in place. Each of the locations assessed show that the impact of the Dublin WtE facility is minimal with the greatest impact predicted on South Bank Road in 2012, which adds 4.53% to the daily traffic.

**Table 7.8 Daily Impacts on Local Road Network 2012 & 2027 –Proposed Strategy (Transfer Station and Direct Deliveries)**

| | 2012 | | | 2027 | | |
|---|---|---|---|---|---|---|
| Location | Model AADT (PCUs) | WtE (PCUs) | % Diff | Model AADT (PCUs) | WtE (PCUs) | % Diff |
| **East Wall Road** | 58,537 | 501 | 0.85% | 61,083 | 501 | 0.81% |
| **North Wall Quay** | 9462 | 75 | 0.79% | 4,826 | 75 | 1.53% |
| **East Link Bridge** | 34,730 | 576 | 1.63% | 37,632 | 576 | 1.51% |
| **East Link Road** | 24,187 | 576 | 2.33% | 26,285 | 576 | 2.14% |
| **Sean Moore Road** | 24,200 | 150 | 0.62% | 31,489 | 150 | 0.47% |
| **South Bank Road** | 15,287 | 726 | 4.53% | 30,854 | 726 | 2.30% |

*AM Peak –Proposed Strategy (Transfer Station and Direct Deliveries)*

7.6.14. Table 7.9 shows the AM peak hour effects of the Dublin WtE facility on the strategic road network in 2012 and 2027 with the proposed strategy (transfer station and direct deliveries) in place. The results show that the impact represents a negligible effect on traffic volumes. The largest increase in traffic flows resulting from the Dublin WtE facility is in the DPT; in particular the northbound direction, which will rise by up to 0.82% in 2012.

**Table 7.9 AM Peak Impact on Strategic Road Network 2012 & 2027 –Proposed Strategy (Transfer Station and Direct Deliveries)**



| | | 2012 | | | 2027 | | |
|---|---|---|---|---|---|---|---|
| Location | Dir. | Model Flow (PCUs) | WtE (PCUs) | % Diff | Model Flow (PCUs) | WtE (PCUs) | % Diff |
| **Between Carrickmines & Sandyford** | N | 2,573 | 3 | 0.12% | 2,724 | 3 | 0.11% |
| | S | 2,483 | 3 | 0.12% | 2,319 | 3 | 0.13% |
| **Between Sandyford & Ballinteer** | N | 1,485 | 3 | 0.20% | 2,046 | 3 | 0.15% |
| | S | 3,327 | 3 | 0.09% | 3,195 | 3 | 0.09% |
| **Between Ballinteer & Scholarstown** | N | 2,601 | 3 | 0.12% | 3,274 | 3 | 0.09% |
| | S | 4,134 | 3 | 0.07% | 4,131 | 3 | 0.07% |
| **Between Scholarstown & N81** | N | 3,883 | 3 | 0.08% | 4,497 | 3 | 0.07% |
| | S | 3,772 | 3 | 0.08% | 4,052 | 3 | 0.07% |
| **Between N81 & Ballymount** | N | 4,281 | 3 | 0.07% | 5,735 | 3 | 0.05% |
| | S | 4,062 | 3 | 0.07% | 4,561 | 3 | 0.07% |
| **Between Ballymount & Red Cow** | N | 4,289 | 12 | 0.28% | 6,403 | 12 | 0.19% |
| | S | 5,291 | 12 | 0.23% | 5,547 | 12 | 0.22% |
| **Between Red Cow & N4** | N | 4,650 | 12 | 0.26% | 6,041 | 12 | 0.20% |
| | S | 6,355 | 12 | 0.19% | 7,173 | 12 | 0.17% |
| **Between N4 & N3** | N | 5,174 | 12 | 0.23% | 6,321 | 12 | 0.19% |
| | S | 7,073 | 12 | 0.17% | 7,652 | 12 | 0.16% |
| **Between N3 & N2** | N | 5,562 | 12 | 0.22% | 6,489 | 12 | 0.18% |
| | S | 5,621 | 12 | 0.21% | 6,238 | 12 | 0.19% |
| **Between N2 & Ballymun** | N | 6,191 | 15 | 0.24% | 6,923 | 15 | 0.22% |
| | S | 4,143 | 15 | 0.36% | 4,443 | 15 | 0.34% |
| **Between Ballymun & M1 Motorway** | N | 5,299 | 15 | 0.28% | 6,549 | 15 | 0.23% |
| | S | 4,285 | 15 | 0.35% | 4,327 | 15 | 0.35% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **DPT** | N | 1,808 | 15 | 0.82% | 2,459 | 15 | 0.61% |
| | S | 2,425 | 15 | 0.61% | 2,050 | 15 | 0.73% |

7.6.15. Table 7.10 shows the effects of the Dublin WtE facility on the local road network in 2012 and 2027 with the Proposed Strategy (transfer station and direct deliveries) in place. The greatest relative impact is on South Bank Road, eastbound direction, in 2012, where the WtE traffic results in a 9.54% increase in traffic flows. The traffic flow forecasts for South Bank Road are relatively low and even with the Dublin WtE facility, remain within the capacity of the road.

**Table 7.10 AM Peak Impact on Local Road Network 2012 & 2027 –Proposed Strategy (Transfer Station and Direct Deliveries)**

| Location | Dir | 2012 Model Flow (PCUs) | % HGVs | WtE (PCUs) | % Diff | 2027 Model Flow (PCUs) | % HGVs | WtE (PCUs) | % Diff |
|---|---|---|---|---|---|---|---|---|---|
| **East Wall Road** | N | 2,266 | 14.60% | 18 | 0.79% | 2252 | 25.71% | 18 | 0.79% |
| | S | 2,003 | 9.77% | 18 | 0.89% | 1682 | 22.92% | 18 | 1.06% |
| **North Wall Quay** | E | 234 | 19.09% | 3 | 1.27% | 74 | 57.14% | 3 | 3.90% |
| | W | 349 | 7.59% | 3 | 0.85% | 84 | 57.14% | 3 | 3.45% |
| **East Link Road** | E | 1,209 | 14.01% | 21 | 1.71% | 1666 | 16.75% | 21 | 1.24% |
| | W | 1,548 | 10.03% | 21 | 1.34% | 1069 | 30.38% | 21 | 1.93% |
| **East Link Bridge** | N | 1,304 | 4.91% | 21 | 1.58% | 732 | 16.63% | 21 | 2.79% |
| | S | 860 | 8.53% | 21 | 2.38% | 1126 | 10.54% | 21 | 1.83% |
| **Sean Moore Road** | N | 728 | 0.00% | 6 | 0.82% | 873 | 0.00% | 6 | 0.68% |
| | S | 1,267 | 0.00% | 6 | 0.47% | 1277 | 0.00% | 6 | 0.47% |
| **South Bank Road** | E | 256 | 46.97% | 27 | 9.54% | 344 | 64.16% | 27 | 7.28% |
| | W | 585 | 16.13% | 27 | 4.41% | 1431 | 9.21% | 27 | 1.85% |



7.6.16. The Proposed Strategy (transfer station and Direct Deliveries) therefore achieves the optimum balance between daily and peak hour impacts on the strategic road network and impacts on the local road network. Due to the fact that because there is still some impact on the local road network, however, further investigations will be carried out in accordance with the NRA guidelines.

## *Sensitivity Testing*

7.6.17. As indicated in Section 7.2, a sensitivity testing of the Proposed Strategy was also carried out. Two extreme cases will be considered in this section that will assess the worst-case scenarios for impact on both the local and the strategic road networks.

### *Waste Delivery Trip Generation*

7.6.18. Using the trip generation calculations from the Proposed Strategy as a base, the trip generation calculations for the two cases were carried out.

7.6.19. The “Worst-case” scenario on the strategic road network (WCSSRN) assumes that all waste could come directly from the transfer stations. It is estimated that there would be approximately 96 trucks trips to and from the Facility on a daily basis, assuming that all waste is delivered via the transfer stations.

7.6.20. Similarly all waste could be delivered directly to the Dublin WtE facility; this option is referred to as “worst-case” scenario on the local road network (WCSLRN). This scenario would generate the greatest number of truck movements on the local road network. It is estimated that there would be approximately 192 truck trips to and from the Facility on a daily basis, should all waste come directly to the Dublin WtE facility. This is twice the number of truck movements than that generated in WCSSRN.

7.6.21. A summary of the daily and average hourly trip generation, based on 14 hours waste acceptance per day is shown in Table 7.11. The proposed strategy trip generation is also shown for ease of reference.

**Table 7.11 Waste Delivery Trip Generation Estimates**

| | | Daily Total | | Average per Hour | |
|---|---|---|---|---|---|
| | | Vehs | PCUs | Vehs | PCUs |
| **Proposed Strategy :** | In | 121 | 363 | 9 | 27 |
| **Direct and Transfer** | Out | 121 | 363 | 9 | 27 |
| **Station Deliveries** | Total | 242 | 726 | 18 | 54 |
| | | | | | |
| **WCSSRN :** | In | 96 | 288 | 7 | 21 |
| **Transfer Station** | Out | 96 | 288 | 7 | 21 |
| **Deliveries Only** | Total | 192 | 576 | 14 | 42 |
| | | | | | |
| **WCSLRN :** | In | 192 | 576 | 14 | 42 |
| **Direct Deliveries Only** | Out | 192 | 576 | 14 | 42 |
| | Total | 384 | 1152 | 28 | 84 |

7.6.22. As shown in Table 7.11 WCSLRN (Direct Deliveries Only) generates by far the greatest number of trips, while WCSSRN (transfer station Only) generates the least number of trips. This is because the transfer station vehicles carry twice the loading capacity of vehicles travelling direct to the Dublin WtE facility and, therefore, the number of trips and vehicles that would arrive at the Dublin WtE facility is reduced.



## *Traffic Assessment of Alternative Scenarios*

7.6.23. The following sections describe the daily and AM peak impacts of the worst case scenarios being considered.

### *Daily Impacts – WCSSRN (Transfer Station Deliveries Only)*

7.6.24. Table 7.12 shows the effects of the Dublin WtE facility on the strategic road network in 2012 and 2027 with WCSSRN (transfer station deliveries only) in place. While WCSSRN is the worse case scenario for the strategic network the impacts remain negligible. The DPT shows the largest increase as a result of the Dublin WtE facility at 0.97%.

**Table 7.12 Daily Impacts on Strategic Road Network 2012 & 2027 – WCSSRN (Transfer Station Deliveries Only)**

| | 2012 | | | 2027 | | |
|---|---|---|---|---|---|---|
| **Location** | **Model AADT (PCUs)** | **WtE (PCUs)** | **% Diff** | **Model AADT (PCUs)** | **WtE (PCUs)** | **% Diff** |
| **Between Carrickmines & Sandyford** | 62,487 | 138 | 0.22% | 65,673 | 138 | 0.21% |
| **Between Sandyford & Ballinteer** | 51,380 | 138 | 0.27% | 51,706 | 138 | 0.27% |
| **Between Ballinteer & Scholarstown** | 75,707 | 138 | 0.18% | 76,926 | 138 | 0.18% |
| **Between Scholarstown & N81** | 87,942 | 138 | 0.16% | 89,762 | 138 | 0.15% |
| **Between N81 & Ballymount** | 103,870 | 138 | 0.13% | 110,410 | 138 | 0.12% |
| **Between Ballymount & Red Cow** | 146,349 | 504 | 0.34% | 150,969 | 504 | 0.33% |
| **Between Red Cow & N4** | 150,558 | 504 | 0.33% | 162,962 | 504 | 0.31% |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Between N4 & N3** | 189,356 | 504 | 0.27% | 222,660 | 504 | 0.23% |
| **Between N3 & N2** | 184,197 | 504 | 0.27% | 214,242 | 504 | 0.23% |
| **Between N2 & Ballymun** | 168,370 | 576 | 0.34% | 185,496 | 576 | 0.31% |
| **Between Ballymun & M1 Motorway** | 150,155 | 576 | 0.38% | 155,227 | 576 | 0.37% |
| **DPT** | 59,026 | 576 | 0.97% | 58,529 | 576 | 0.97% |

7.6.25. Table 7.13 shows the effects of the Dublin WtE facility on the local road network in 2012 and 2027 with WCSSRN (transfer station deliveries only) in place. Each of the locations assessed show that the impact of the Dublin WtE facility is minimal with the largest impact on South Bank Road in 2012, which adds 3.63% to the daily traffic.

**Table 7.13 Daily Impacts on Local Road Network 2012 & 2027 – WCSSRN (Transfer Station Deliveries Only)**

| | 2012 | | | 2027 | | |
|---|---|---|---|---|---|---|
| **Location** | **Model AADT (PCUs)** | **WtE (PCUs)** | **% Diff** | **Model AADT (PCUs)** | **WtE (PCUs)** | **% Diff** |
| **East Wall Road** | 58,537 | 576 | 0.97% | 61,083 | 576 | 0.93% |
| **North Wall Quay** | 9,462 | 0 | 0.00% | 4,826 | 0 | 0.00% |
| **East Link Bridge** | 34,730 | 576 | 1.63% | 37,632 | 576 | 1.51% |
| **East Link Road** | 24,187 | 576 | 2.33% | 26,285 | 576 | 2.14% |
| **Sean Moore Road** | 24,200 | 0 | 0.00% | 31,489 | 0 | 0.00% |
| **South Bank Road** | 15,287 | 576 | 3.63% | 30,854 | 576 | 1.83% |



*Daily Impacts – WCSLRN (Direct Deliveries Only)*

7.6.26. There would be minimal effect of the Dublin WtE facility on the strategic road network in 2012 or 2027 with WCSLRN (direct deliveries only) in place. This is because it is assumed that the majority of these trucks will come via the local network. Vehicles may come via the M50 Motorway and or the DPT depending on their collection end point.

7.6.27. Table 7.14 shows the effects of the Dublin WtE facility on the local road network in 2012 and 2027 with WCSLRN (direct deliveries only) in place. Each of the locations assessed show that the impact of the Dublin WtE facility is minimal with the greatest impact on South Bank Road in 2012, which adds 7.01% to the daily traffic.

**Table 7.14 Daily Impacts on Local Road Network 2012 & 2027 – WCSLRN (Direct Deliveries Only)**

| | 2012 | | | 2027 | | |
|---|---|---|---|---|---|---|
| **Location** | **Model AADT (PCUs)** | **WtE (PCUs)** | **% Diff** | **Model AADT (PCUs)** | **WtE (PCUs)** | **% Diff** |
| **East Wall Road** | 58,537 | 288 | 0.49% | 61,083 | 288 | 0.47% |
| **North Wall Quay** | 9,462 | 288 | 2.95% | 4,826 | 288 | 5.63% |
| **East Link Bridge** | 34,730 | 576 | 1.63% | 37,632 | 576 | 1.51% |
| **East Link Road** | 24,187 | 576 | 2.33% | 26,285 | 576 | 2.14% |
| **Sean Moore Road** | 24,200 | 576 | 2.32% | 31,489 | 576 | 1.80% |
| **South Bank Road** | 15,287 | 1,152 | 7.01% | 30,854 | 1,152 | 3.60% |

*AM Peak – WCSSRN (Transfer Station Deliveries Only)*

7.6.28. Table 7.15 shows the effects of the Dublin WtE facility on the strategic road network in 2012 and 2027 with WCSSRN (transfer station deliveries only) in place. The results show that the impact represents a negligible effect on traffic volumes. The largest increase in traffic flows resulting from the Dublin WtE facility is in the DPT, in particular the northbound direction, which will rise by up to 1.15% in 2012.

**Table 7.15 AM Peak Impact on Strategic Road Network 2012 & 2027 – WCSSRN (Transfer Station Deliveries Only)**

| Location | Dir. | 2012 Model Flow (PCUs) | 2012 WtE (PCUs) | 2012 % Diff | 2027 Model Flow (PCUs) | 2027 WtE (PCUs) | 2027 % Diff |
|---|---|---|---|---|---|---|---|
| **Between Carrickmines & Sandyford** | N | 2,573 | 6 | 0.23% | 2,724 | 6 | 0.22% |
| | S | 2,483 | 6 | 0.24% | 2,319 | 6 | 0.26% |
| **Between Sandyford & Ballinteer** | N | 1,485 | 6 | 0.40% | 2,046 | 6 | 0.29% |
| | S | 3,327 | 6 | 0.18% | 3,195 | 6 | 0.19% |
| **Between Ballinteer & Scholarstown** | N | 2,601 | 6 | 0.23% | 3,274 | 6 | 0.18% |
| | S | 4,134 | 6 | 0.14% | 4,131 | 6 | 0.15% |
| **Between Scholarstown & N81** | N | 3,883 | 6 | 0.15% | 4,497 | 6 | 0.13% |
| | S | 3,772 | 6 | 0.16% | 4,052 | 6 | 0.15% |
| **Between N81 & Ballymount** | N | 4,281 | 6 | 0.14% | 5,735 | 6 | 0.10% |
| | S | 4,062 | 6 | 0.15% | 4,561 | 6 | 0.13% |
| **Between Ballymount & Red Cow** | N | 4,289 | 18 | 0.42% | 6,403 | 18 | 0.28% |
| | S | 5,291 | 18 | 0.34% | 5,547 | 18 | 0.32% |
| **Between Red Cow & N4** | N | 4,650 | 18 | 0.39% | 6,041 | 18 | 0.30% |
| | S | 6,355 | 18 | 0.28% | 7,173 | 18 | 0.25% |
| **Between N4 & N3** | N | 5,174 | 18 | 0.35% | 6,321 | 18 | 0.28% |
| | S | 7,073 | 18 | 0.25% | 7,652 | 18 | 0.23% |
| **Between N3 & N2** | N | 5,562 | 18 | 0.32% | 6,489 | 18 | 0.28% |
| | S | 5,621 | 18 | 0.32% | 6,238 | 18 | 0.29% |
| **Between N2 & Ballymun** | N | 6,191 | 21 | 0.34% | 6,923 | 21 | 0.30% |
| | S | 4,143 | 21 | 0.50% | 4,443 | 21 | 0.47% |
| **Between Ballymun & M1 Motorway** | N | 5,299 | 21 | 0.39% | 6,549 | 21 | 0.32% |
| | S | 4,285 | 21 | 0.49% | 4,327 | 21 | 0.48% |
| **DPT** | N | 1,808 | 21 | 1.15% | 2,459 | 21 | 0.85% |
| | S | 2,425 | 21 | 0.86% | 2,050 | 21 | 1.01% |



7.6.29. Table 7.16 shows the effects of the Dublin WtE facility on the local road network in 2012 and 2027 with WCSSRN (transfer station deliveries only) in place. The greatest impact is on South Bank Road, eastbound direction, in 2012, where the WtE traffic results in a 7.58% increase in traffic flows. There is no impact on Sean Moore Road, as all vehicles will come directly from the DPT to the Site via East Link Road and South Bank Road.

**Table 7.16 AM Peak Impact on Local Road Network 2012 & 2027 – WCSSRN (Transfer Station Deliveries Only)**

| Location | Dir. | 2012 Model Flow (PCUs) | 2012 WtE (PCUs) | 2012 % Diff | 2027 Model Flow (PCUs) | 2027 WtE (PCUs) | 2027 % Diff |
|---|---|---|---|---|---|---|---|
| **East Wall Road** | N | 2,266 | 21 | 0.92% | 2,252 | 21 | 0.92% |
| | S | 2,003 | 21 | 1.04% | 1,682 | 21 | 1.23% |
| **North Wall Quay** | E | 234 | 0 | 0.00% | 74 | 0 | 0.00% |
| | W | 349 | 0 | 0.00% | 84 | 0 | 0.00% |
| **East Link Bridge** | N | 1,209 | 21 | 1.71% | 1,666 | 21 | 1.24% |
| | S | 1,548 | 21 | 1.34% | 1,069 | 3 | 0.28% |
| **East Link Road** | E | 1,304 | 21 | 1.58% | 732 | 21 | 2.79% |
| | W | 860 | 21 | 2.38% | 1,126 | 21 | 1.83% |
| **Sean Moore Road** | N | 728 | 0 | 0.00% | 873 | 0 | 0.00% |
| | S | 1,267 | 0 | 0.00% | 1,277 | 0 | 0.00% |
| **South Bank Road** | E | 256 | 21 | 7.58% | 344 | 21 | 5.75% |
| | W | 585 | 21 | 3.47% | 1,431 | 21 | 1.45% |

*AM Peak – WCSLRN (Direct Deliveries Only)*

7.6.30. Table 7.17 shows the effects of the Dublin WtE facility on the local road network in 2012 and 2027 with WCSLRN (direct deliveries only) in place. As all RCVs are most likely to come via the local road network there is little impact on the strategic road network in this scenario.

7.6.31. The largest impacts will be seen on South Bank Road, eastbound direction, in 2012, when traffic flows are estimated to increase by 14.09%. Although this increase exceeds the NRA threshold in terms of impacts, the actual flows on the route are relatively low and the roadway has sufficient capacity to cope with the additional traffic generated by the development.

7.6.32. On North Wall Quay traffic flows, when presented in PCU, could increase by up to 12%. The model flows are low, therefore development traffic makes up a relatively high proportion of the overall low traffic volumes. The road capacity can be expected to cater for the increased traffic flows, therefore the traffic impact can be accommodated.



**Table 7.17 AM Peak Impact on the Local Road Network 2012 & 2027 – WCSLRN (Direct Deliveries Only)**

| Location | Dir. | 2012 Model Flow (PCUs) | 2012 WtE (PCUs) | 2012 % Diff | 2027 Model Flow (PCUs) | 2027 WtE (PCUs) | 2027 % Diff |
|---|---|---|---|---|---|---|---|
| **East Wall Road** | N | 2,266 | 11 | 0.48% | 2,252 | 11 | 0.49% |
| | S | 2,003 | 11 | 0.55% | 1,682 | 11 | 0.65% |
| **North Wall Quay** | E | 234 | 10 | 4.10% | 74 | 10 | 11.90% |
| | W | 349 | 10 | 2.79% | 84 | 10 | 10.64% |
| **East Link Bridge** | N | 1,209 | 21 | 1.71% | 1,666 | 21 | 1.24% |
| | S | 1,548 | 21 | 1.34% | 1,069 | 21 | 1.93% |
| **East Link Road** | E | 1,304 | 21 | 1.58% | 732 | 21 | 2.79% |
| | W | 860 | 21 | 2.38% | 1,126 | 21 | 1.83% |
| **Sean Moore Road** | N | 728 | 21 | 2.80% | 873 | 21 | 2.35% |
| | S | 1,267 | 21 | 1.63% | 1,277 | 21 | 1.62% |
| **South Bank Road** | E | 256 | 42 | 14.09% | 344 | 42 | 10.88% |
| | W | 585 | 42 | 6.70% | 1,431 | 42 | 2.85% |

7.6.33. The following conclusions can therefore be made with respect to the traffic impacts of the proposed Dublin WtE facility on the road network:

- The largest impact on the strategic road network is WCSSRN (transfer station deliveries only). The worst impact is on the DPT in 2012 but the Dublin WtE facility only contributes additional 576 PCUs or an increase of 0.97% on daily traffic and 21 PCUs or 1.15% increase in a northbound direction in the AM peak; the impact on the strategic road network, namely the M50 Motorway and the DPT is, therefore, negligible. Furthermore, the impact is negligible for each of the scenarios.

- The largest impact on the local road network is WCSLRN (Direct Deliveries only). The worst impact is on South Bank Road, increasing daily traffic flows by 7.03% in 2012 and reducing to 3.60% in 2027. In the AM peak hour flows in 2012 increase by 14. 09% in the eastbound direction, reducing to 10. 88% in 2027. The impacts of the Dublin WtE facility are reduced by 2027 because the traffic flows in the area have increased in line with development planned through the Poolbeg Framework Plan. The AM peak hour increase is quite significant although traffic levels are still quite low and there is still capacity on the route. This option is, therefore, undesirable.

7.6.34. The Proposed Strategy seeks to reduce the traffic impact on the local road network while also ensuring that the overall waste collection and management strategy is efficient.

## *Alternative Transportation Modes Considered.*



7.6.35. Alternative modes for transportation of waste to the proposed site were previously considered in the Dublin Waste to Energy Project Baseline Monitoring Main Report. These alternatives comprised the consideration of transport of waste to the proposed facility by rail and by sea.

### *Rail Option*

7.6.36. The northern area of Dublin Port is currently serviced by a rail line. In order to transport waste to the proposed site south of the river, it would be a requirement to construct a new bridge across the navigation channel to continue the rail line to the Site. It would also be a requirement to construct at least one transfer station along the rail line for the transfer of waste prior to transporting by rail.

7.6.37. In the absence of a bridge, a shunting and unloading area would be required on the north side of the Port to transfer waste onto barges before transporting across the Port. On the south side, additional handling facilities would be required to transfer waste from the barges to trucks and on to the Dublin WtE facility.

7.6.38. The logistics, costs, and extended environmental impacts would render the rail option unfeasible.

### *Sea Option*

7.6.39. The consideration of waste transport by sea would see significant migration of traffic from the Region to designated harbour areas. At each designated harbour, a transfer station would be required for storage and transfer of waste. The need to provide a number of transfer stations along the coast would have environmental, logistical and financial implications, and consequently, this option would not be considered feasible.

### *Key Findings of the Study*

7.6.40. The following are the key findings of the study thus far:

- The Proposed Strategy of transfer stations and direct deliveries has been identified from the traffic assessment as being the optimal transport solution
- There will be minimal traffic impacts on the M50 Motorway or the Dublin Port Tunnel at peak times or on a daily basis.
- Similarly there will be minimal traffic impacts on the local road network in the vicinity of the proposed WtE site during peak times or on a daily basis.
- RCV trips coming directly to the Dublin WtE facility would not be considered new trips, but will generate some additional trips in the immediate vicinity of the Site
- The DCC Draft HGV Management Strategy will reduce truck movements throughout the area, including along North Wall Quay, Beach Road, and East Wall Road.

7.6.41. Notwithstanding the findings of the study that the traffic impact of the proposed Dublin WtE facility is low and can be accommodated by the road network. A number of mitigation measures have been outlined.

### *Proposed Time Restrictions*



7.6.42. A potential mitigation measure considered prior to preparation of the traffic assessment was to restrict the opening hours of the Facility to off-peak hours. This proposition included accepting direct deliveries only between 10:00 AM and 4:00 PM and both direct and waste transfer station deliveries between 7:00 PM and 10:30 PM. This proposal was to provide for a situation whereby waste delivery times would not coincide with peak commuter traffic flows on the road network.

7.6.43. The trip generation in this scenario would amount to approximately 16 movements per hour during the day and 44 movements per hour in the evening, if the opening hours were assumed to be off peak only. The resulting trip generation figures are outlined in Table 7.18 below.

**Table 7.18 Summary of Hourly Truck Movements with Unrestricted (Option A) and Restricted (Option B) Hours**

| | | Option A | | Option B | | | |
|---|---|---|---|---|---|---|---|
| | | | | Day | | Evening | |
| | | Vehs | PCUS | Vehs | PCUS | Vehs | PCUS |
| **Preferred Strategy: Transfer Station and Direct Deliveries** | In | 9 | 27 | 8 | 24 | 22 | 66 |
| | Out | 9 | 27 | 8 | 24 | 22 | 66 |
| | Total | 18 | 54 | 16 | 48 | 44 | 132 |

7.6.44. The restriction of movements to the Dublin WtE facility to outside of peak traffic hours could be justified if the proposed development had a measurable traffic impact on the

strategic or local road network. The effect of such restrictions would be to concentrate truck movements to off peak hours and particularly between 7:00 PM and 10:30 PM.

7.6.45. The application of the NRA Draft Guidelines on the preparation of traffic and transport assessments confirms that the development as proposed (without time restrictions in place) will have no measurable traffic impact on the national road network at peak times. The DPT tolling and traffic management proposals are intended to encourage goods vehicles to use the DPT and restrict the use of the DPT to private cars particularly at peak periods, thus ensuring free flow conditions in the DPT at all times. There is no transport reason, therefore, for time restrictions on truck access to the Dublin WtE facility.

7.6.46. Journey times data shows that if the time restrictions imposed, that WtE traffic would be travelling on the road network during peak periods to arrive at the Dublin WtE facility for the 7:00 PM opening time. The proposed time restrictions would not therefore realise the objective of minimising truck movements on National road network the key objectives.

7.6.47. Access times to the Dublin WtE facility could also have other negative impacts such as the development of convoys on the road network or parking of trucks on the approaches to the Dublin WtE facility by arriving ahead of schedule.

7.6.48. With respect to the remainder of the road network, time restrictions would equally concentrate truck movements to off peak periods. Existing truck movements profiles for the local road show relatively constant truck movements throughout the day in the vicinity of the docks. Concentration of truck movements from the Dublin WtE facility activities would not offer a significant benefit.

7.6.49. The WtE traffic was also shown not to have any significant impact on the local road network. For these reasons this proposed mitigation measure affords no overall benefit to the local road network.



### *Other Traffic Impacts*

7.6.50. The DCC HGV Management Strategy will not have any significant impact on the operations of the development, as the only vehicles subject to the ban will be bulk transfer vehicles delivering waste from the transfer stations. As the transfer stations are located within close proximity to the M50 this will form the main haulage route, enforced by permit conditions. The smaller RCVs, which will deliver directly to the Dublin WtE facility, are not subject to the HGV Management Strategy and therefore will have no impact on these deliveries.

### *Operational Capacity Assessments*

#### *Sean Moore Roundabout*

7.6.51. The traffic analysis for the Proposed Strategy shows that the impact of the Facility is minimal on both the local and strategic road networks. The impact on South Bank Road however was shown to be greater than 5% in the AM peak. This is mainly due to the very low levels of background traffic on this link in the AM peak. An analysis using ARCADY (Assessment of Roundabout Capacity and Delay) has been carried out to test how the Sean Moore Road/South Bank Road/East Link Road Roundabout will operate under future year traffic flows. Details of this analysis are considered in Appendix 7.1.

7.6.52. Table 7.19 shows the Ratio of Flow to Capacity (RFC) for the 2012 and 2027 AM Peak with no WtE development in place. A RFC of greater than 0.85 or above is considered to be operating at capacity. Anything below 0.85 is within capacity.

**Table 7.19 Ratio to Flow Capacity at Sean Moore Road Roundabout without WtE Facility**

| 2012 | RFC | Queue (Veh) |
|---|---|---|
| **Sean Moore Road** | 0.43 | 1 |
| **Pigeon House Road** | 0.08 | 0 |
| **East Link Road** | 0.76 | 3 |
| **Pigeon House Road (N)** | 0.05 | 0 |
| **South Bank Road** | 0.35 | 1 |

| 2027 | RFC | Queue (Veh) |
|---|---|---|
| **Sean Moore Road** | 0.53 | 1 |
| **Pigeon House Road** | 0.10 | 0 |
| **East Link Road** | 0.42 | 1 |
| **Pigeon House Road (N)** | 0.04 | 0 |
| **South Bank Road** | 0.69 | 2 |



7.6.53. It can be seen that the Sean Moore Roundabout can cater for both 2012 and 2027 traffic flows. The busiest arm of the roundabout in 2012 is East Link Road, which shows an RFC of 0.76. In 2027, South Bank Road shows the highest RFC at 0.69.

7.6.54. Table 7.20 shows the Ratio of Flow to Capacity for the 2012 and 2017 AM Peak Models with the Dublin WtE facility in place. It can be see that the effects of the Dublin WtE facility on the roundabout are negligible in the AM Peak.

**Table 7.20 Ratio to Flow Capacity at Sean Moore Road Roundabout with WtE Facility**

| 2012 | RFC | Queue (Veh) |
|---|---|---|
| **Sean Moore Road** | 0.44 | 1 |
| **Pigeon House Road** | 0.09 | 0 |
| **East Link Road** | 0.78 | 4 |
| **Pigeon House Road (N)** | 0.06 | 0 |
| **South Bank Road** | 0.37 | 1 |

| 2027 | RFC | Queue (Veh) |
|---|---|---|
| **Sean Moore Road** | 0.58 | 1 |
| **Pigeon House Road** | 0.10 | 0 |
| **East Link Road** | 0.43 | 1 |
| **Pigeon House Road (N)** | 0.04 | 0 |
| **South Bank Road** | 0.70 | 3 |

### *Pigeon House Road New Site Access*

7.6.55. A new site access is to be provided off Pigeon House Road to the north east corner of the Site. It will incorporate a right turn lane into the Facility. Four weighbridges are to be provided - two for incoming vehicles and two for out going vehicles. The weighbridges will each have a capacity for approximately 60 vehicles per hour. This is well in excess of the number of vehicles per hour expected at the Facility and should ensure that vehicles will not have to queue on Pigeon House Road prior to entering the Facility.

7.6.56. The proposed access to the development has been assessed using PICADY Traffic Modelling Software. The results show that the ratio of flow to capacity is less than 10% for all approaches. The proposed access is therefore expected to operate freely with no detectable details occurring.

7.6.57. The main building will be located in the southern part of the Site, with a green landscaped area between it and Pigeon House Road. A service road will be provided around the perimeter of the main building. The weighbridges and ramp to the waste reception hall will be located due south of the entrance. A service yard will be provided on the western side of the main building for the trucks supplying process materials and removing ash and residues. Staff car parking will also be located in the southern part of the Site.

## 7.7. Construction Traffic Management.

### *Introduction*



7.7.1. The traffic impacts associated with the construction of the development will differ from those arising during the operational phase, and despite the impacts being of a temporary nature, these are considered below.

7.7.2. The construction contractor will decide the construction phasing and methodology in detail, but the activities described in Chapter 18 of the EIS are typical for a project of this type.

7.7.3. It is expected that construction work at the Site will commence in late 2008 and that construction and commissioning of the Dublin WtE facility will take about approximately 3 years.

7.7.4. Access to the Site during construction will be provided from Pigeon House Road at the location of the new site entrance to the north east of the proposed development.

7.7.5. Details of the number of employees, duration of construction truck movements and working hours are described in Chapter 18.

### *Construction Trip Generation*

#### *Construction Workers' Trip Generation*

7.7.6. During construction of the Facility, there will be some variation in the numbers working on site. Typically, the workforce on site will average 275. The peak level of site activity is expected to occur about fourteen months after the start of construction, when the installation of plant and equipment approaches its peak, and significant work on building and site works is still ongoing. It is estimated that the total site workforce will reach a peak of about 500 at this time. Of these 330 workers will be work on site during the day shift.

### *Construction Period*

7.7.7. The peak level of site activity is anticipated about fourteen months after construction commences, when the installation of plant and equipment approaches its peak and significant work on building and site works is still ongoing. It is at this time, that the total site workforce may reach a peak of 500.

7.7.8. Due to space restrictions on-site and on the surrounding roads it will not be possible for all employees to drive to work. The workforce will be encouraged to use public transport, and contractors will be required to provide transport to the Site for their workforce to ensure that construction workers do not create additional demand for parking in the vicinity of the Site or cause obstruction on the adjacent road network. The level of public transportation provision is poor and the contractor will be required to provide a shuttle bus service to bring workers to and from the Site.

7.7.9. The estimated modal split for day shift construction workers is provided in Table 7.21 below. These are based on modal split targets of 50:50 Car to Other Modes, and an average car occupancy of 1.35 and the provision of a private shuttle bus service. The modal split for night shifts is more likely to involve a higher number of car trips.

**Table 7.21 Estimated Day Shift Construction Workers' Trip Generation**

| | Mode Split | No. of Person Trips | Peak Vehicle Trips |
|---|---|---|---|
| | | In | |
| **Car** | 50% | 165 | 122 |
| **Bus** | 45% | 149 | |
| **Cycling/Walk** | 5% | 16 | |
| **Total** | 100% | 330 | |



7.7.10. As such, the total number of employees who will arrive by car (driving themselves, car sharing or picked up and dropped off) amounts to approximately 165. Therefore about 165 employees will travel by other modes such as public transport, private bus, walking or cycling.

### *Construction Vehicles Trip Generation*

7.7.11. Construction materials are expected to arrive during both the day and night time. During daytime, a maximum of 240 truck movements are anticipated and 120 truck movements are expected when night working is in progress. This includes excavation works and all other construction related activities.

7.7.12. A summary of the construction vehicle trip generation is shown in.

**Table 7.22 Worst Case Construction Related Daily Trip Generation**

| | In | Out | Total |
|---|---|---|---|
| | | | |
| **Construction Deliveries (day time)** | 120 | 120 | 240 |
| **Construction Deliveries (night time)** | 60 | 60 | 120 |
| **Total** | 180 | 180 | 360 |

7.7.13. The figures above represent an estimate of construction vehicle numbers for Year 2. The corresponding figures for Years 1 and 3 are expected to be half of those of Year 2.

7.7.14. There will be approximately 10 movements in and 10 movements out of the Site per hour at peak times, assuming that deliveries are spread evenly throughout the day.

### *Construction Impacts*

7.7.15. The trip generation calculations presented above, represent the worst case. During the second half of Year 2 and the beginning of Year 3, whilst the mechanical and electrical erection is taking place, the number of construction workers will be at a peak level. Fewer workers will be required at the civil works and commissioning level. Therefore construction staff peaks and construction traffic peaks will not necessarily coincide.

7.7.16. The start and finishing times of construction workers will not occur during the peak commuter periods. The arrival and departure of construction workers should, therefore, have minimal impact on the local road network. It is important to note that the existing use on the proposed site generates in the order of 204 two way movements per day of which 32% represent HGVs. This traffic will no longer be on the road network at the construction phase of the Dublin WtE facility but will be replaced by 240 two-way construction movements, the net impact of which is minimal.

7.7.17. The DCC HGV Management Strategy may have implications for the removal of earthworks and delivery of materials during the construction period.

7.7.18. A number of mitigation measures have been identified, as outlined in Section 7.8.

## 7.8. Mitigation Measures

### *Operational*



7.8.1. Proposed mitigation measures will be as follows as follows:

- As a condition of planning all bulk transfer vehicles delivering waste to the Dublin WtE facility from the transfer stations will be required to utilise the M50 Motorway and the DPT, thus minimising the traffic impacts on national and local routes. This is in line with the proposals outlined in the DCC Draft HGV Management Strategy. However the condition should be implemented irrespective of a HGV strategy. The control of haul routes will be enforced through the waste collection permit system.

- As the opening of the DPT may change traffic patterns in the area to what is anticipated in the DTO Model, it is recommended that “before” and “after” traffic monitoring be carried out on the effects of the Port Tunnel. Further remedial measures will be identified as necessary following this monitoring.

- The proposed locations for the removal of Bottom Ash and FGT residue have been selected to minimise disruption to the local road network and provide safe and efficient exportation of the residues by boat.

- Where possible the removal of waste residue should not coincide with service overhauls.

- The provision of a right turn lane into the Dublin WtE facility will minimise disruption to the flow of traffic along Pigeon House Road and provide additional capacity at the junction.

- The provision of two weighbridges in each direction and their location on the entry road at a sufficient distance from the entrance will not cause unnecessary queuing along Pigeon House Road for trucks waiting to enter the Site.

- Similarly the provision of car access separate to the weighbridges allows the segregation of cars and trucks and will maintain free flow for cars entering and exiting the development within the Site.

- All road works will be subject to an independent Road Safety Audit in accordance with appropriate guidelines.

7.8.2. Public Transport, Pedestrian and Cycling Mitigation Measures

- Greater use of public transport, walking and cycling will be encouraged as the preferred modes to travel to and from work.

### *Construction Mitigation Measures*

7.8.3. To minimise disruption to the local community and other road users the following mitigation measures are proposed:

- The Contractor will be required to provide a shuttle bus service to bring workers to and from the Site.
- Tracked excavators will be moved to and from the Site on low-loaders and will not be permitted to drive on the adjacent streets.
- Dust and dirt will be controlled on adjacent roads and wheel washing will be provided on site. Public roads outside the Site will be regularly inspected for cleanliness and cleaned as necessary.
- Sustainable construction practices shall be implemented and as such, the contractor will seek to reduce the quantities of waste material being carried off the Site to a minimum
- Where possible construction materials will be delivered outside of peak commuter traffic hours.
- HGVs will be required to use routes such as the DPT and the M50 Motorway when travelling to and from the Site.
- Within the necessary constraints of performance, durability and cost, construction materials will be sourced from local suppliers and manufacturers where feasible.
- Where possible, materials will be delivered by boat to a nearby dockside location
- For wide loads exceeding the thresholds laid out in the Road Traffic (Construction and Use of Vehicles) Regulations 2003, requiring delivery or removal from the Site, an application will be made to DCC for an Abnormal Load Permit. Where possible wide load movements to and from the Site will be restricted to evening or night time to minimise disruption to traffic on the strategic and local road networks.
- It is anticipated that a significant proportion of the workforce will be from the Dublin area, but a specialist workforce from overseas may be employed to install some of the main process equipment. It is recommended that these employees be grouped together, where possible, to facilitate better use of the proposed services.
- The Operator will be required to prepare and submit a Construction Traffic Management Plan approved by the Roads Authority.

7.8.4. Exhausts emissions from vehicles operating within the Site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by insuring that emissions from vehicles are minimised through regular servicing of machinery

- Mud spillages on roads and footpaths outside the Site will be cleaned regularly and will not be allowed to accumulate.

- A Construction Management Team will be on-site throughout the construction phase to monitor the Contractor's performance and ensure that the proposed mitigation measures are implemented and that impacts and nuisance are kept to a minimum.

## 7.9. Residual Impacts

### *Operational*

7.9.1. The Dublin WtE facility has been assessed taking account of the recommended mitigation measures detailed in this TIA and the results showed that no operational difficulties are expected. It can be stated, therefore, that the overall impact of the Dublin WtE facility in terms of traffic impact will be "imperceptible" (as defined under the 'EPA Guidelines for Information to be Contained in Environmental Impact Statements') and there will be no residual impacts.

### *Construction*

7.9.2. The overall impact of the construction stage of the project in terms of traffic is considered to be "slight" (as defined under the EPA Guidelines for Information to be contained in Environmental Impact Statements).

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# 8. Air quality and climate

## 8.1. Introduction

8.1.1. The proposed Dublin WTE Facility has commissioned an extensive and detailed examination of air emissions from the proposed waste management facility in Poolbeg, Dublin 4. As described in detail elsewhere, the waste management facility will be based on conventional moving grate incineration technology. The waste is tipped into a bunker prior to being fed into the furnace. In the furnace the waste is incinerated, producing heat, bottom ash and combustion gases.

8.1.2. The combustion of waste produces a number of emissions, the discharges of which are regulated by the EU Directive on Waste Incineration (2000/76/EC). The emissions to atmosphere which have been regulated are:

- Nitrogen Oxides ($NO_x$)
- Sulphur Dioxide ($SO_2$)
- Total Dust (including $PM_{10}$ and $PM_{2.5}$)
- Carbon Monoxide (CO)
- Total Organic Carbon (TOC)
- Hydrogen Fluoride (HF) and Hydrogen Chloride (HCl)
- Dioxins/Furans (PCDD/PCDFs)
- Cadmium (Cd) & Thallium (Tl)
- Mercury (Hg)
- and the sum of Antimony (Sb), Arsenic (As), Lead (Pb), Chromium (Cr), Cobalt (Co), Copper (Cu), Manganese (Mn), Nickel (Ni) and Vanadium (V).



8.1.3. In addition, Polycyclic Aromatic Hydrocarbons (PAHs) have been assessed as incineration is a potential emission source for this group of compounds.

8.1.4. The scope of the study consists of the following components:

- Review of maximum emission levels and other relevant information needed for the modelling study;
- Identification of the significant substances which are released from the Site
- Review of background ambient air quality in the vicinity of the plant
- Air dispersion modelling of significant substances released from the Site
- Particulate deposition modelling of Dioxins & Furans, Polycyclic Aromatic Hydrocarbons (PAHs) and heavy metals released from the Site
- Identification of predicted ground level concentrations of released substances at the Site boundary and at sensitive receptors in the immediate environment
- A full cumulative assessment of significant releases from the Site taking into account the releases from all other significant industry in the area based on the Prevention of Significant Deterioration (PSD) approach
- Evaluation of the significance of these predicted concentrations, including consideration of whether these ground level concentrations are likely to exceed the most stringent ambient air quality standards and guidelines
- Impact of greenhouse gas (GHG) emissions from the facility has been assessed.

## 8.2. Existing Air Quality & Climate

### *Air Quality*

8.2.1. An extensive baseline survey was carried out in the region of the proposed Dublin WtE Site over the period July 2003 to December 2005. The survey focused on the significant pollutants likely to be emitted from the facility and which have been regulated in Council Directive 2000/76/EC. The substances monitored were NO2, NOX, PM10, PM2.5, benzene, SO2, heavy metals, HCl, HF and PCDDs/PCDFs. The air monitoring program was used to determine long-term average concentrations for these pollutants in order to help quantify the existing ambient air quality in the Poolbeg region of Dublin. NO2 and SO2 were also monitored at a number of additional locations to give some spatial representation of the levels of these species. Full details of the baseline monitoring are contained in Appendices 1.5, 1.6 and 1.7 and a summary of the monitoring results are outlined in Table 8.1 and 8.2.

8.2.2. Sampling for all species was carried out at a monitoring station located at the Irish Glass Bottle Co. Ltd., Ringsend, Dublin 4. The fixed monitoring station was located approximately 12 metres east of the Sean Moore Road. The fixed monitoring station (M1) and the additional monitoring stations (M2 - M7) selected for the spatial assessment of $NO_2$ and $SO_2$ is shown in Figure 8.1.

8.2.3. A summary of the baseline results is shown in Figure 8.2 and compares the results to the relevant ambient air quality standards. Levels of sulphur dioxide ($SO_2$), benzene, hydrogen fluoride (HF) and hydrogen chloride (HCl) were all significantly below their respective limit values.

8.2.4. Average concentrations of antimony (Sb), arsenic (As), cadmium (Cd), cobalt (Co), chromium (Cr), copper (Cu), mercury (Hg), manganese (Mn), nickel (Ni), lead (Pb), thallium (Tl) and vanadium (V) measured were also significantly below their respective annual limit values.



8.2.5. The data does however indicate that levels of $NO_2$, $PM_{10}$ and $PM_{2.5}$ do approach the limit value and thus have been further explored below. The maximum 24-hour $PM_{10}$, levels exceeded the 24-hour limit value (50 $\mu g/m^3$ not to be exceeded more than the 35 days per annum ($90^{th}$%ile)) with 48 exceedences over the 320 monitoring days ($85^{th}$%ile). Outlined below are detailed results and assessments for these parameters.

#### *$NO_2$*

8.2.6. The $99.8^{th}$%ile of the hourly concentrations measured during the July 2003 to July 2004 period was 108 $\mu g/m^3$, and during the August 2004 to August 2005 period was 93.8 $\mu g/m^3$. These levels reach 54% and 47% respectively of the EU limit value of 200 $\mu g/m^3$. The average $NO_2$ concentration measured over the July 2003 to July 2004 period monitoring period was 33.3 $\mu g/m^3$, and during the August 2004 to August 2005 period was 27.3 $\mu g/m^3$, both of which are below the annual EU limit value of 40 $\mu g/m^3$. Thus, the concentration over the period averaged 30 $\mu g/m^3$.

8.2.7. A passive diffusion tube survey was also carried out to determine the spatial variation in $NO_2$ levels in the region of the proposed scheme (see Figure 8.1). An examination of the variation in $NO_2$ concentration between stations indicates that the highest recorded annual $NO_2$ concentrations were measured at roadside locations in the region of Poolbeg (M1, M3, M4 & M5). Average levels at these locations were similar, ranging from 29.6 - 30.6 $\mu g/m^3$. As expected, Bull Island (M6) was significantly lower than the other six locations averaging around 16 $\mu g/m^3$. The results indicate that a general background level across Dublin accounts for a significant fraction of the measured level. The roadside increment, due to road traffic in the immediate vicinity of the monitoring station, leads to a relative minor increase in concentration when compared to urban background locations.

For example, both M7 (Belgrove Road) and M2 (Irishtown Nature Reserve) would be considered urban background locations and both recorded similar annual average $NO_2$ concentrations of approximately 23 - 26 μg/m$^3$. The four stations in closer proximity to road traffic (of varying magnitude) had an additional roadside increment of approximately 4 -6 μg/m$^3$ indicating that the roadside increment would account for approximately 15 - 20% of the total measured annual average $NO_2$ concentration at these locations.

### *$PM_{10}$*

8.2.8. A total of 320 24-hour measurements of $PM_{10}$ were recorded during the 2003/04 and 2004/05 monitoring campaigns. The monitored concentrations ranged from 4 to 148 μg/m$^3$ with 48 exceedences of the 24-hour EU limit value of 50 μg/m$^3$. The average level of $PM_{10}$ measured over the complete monitoring period was 34 μg/m$^3$, which is below the EU annual limit value of 40 μg/m$^3$. The 90$^{th}$%ile of daily $PM_{10}$ concentrations for the complete monitoring period is 57 μg/m$^3$, which exceeds the limit vale of 50 μg/m$^3$.

8.2.9. The temporal variation in PM10 is not marked, with average concentrations measured in 2003/04 similar to those measured in 2005. A slight seasonal variation in levels is shown in the 2005 data, with an average of 37 μg/m$^3$ over the January - April 2005 period compared to 31 μg/m$^3$ in September - December 2005. With regard to the 90th%ile of daily concentrations, peak levels were measured in the months of November and February in the 2003/04 monitoring campaign and February, March and November in the 2004/05 monitoring campaign. This indicates that exceedences of the 24-hour limit value are more likely in the winter and spring months.

### *PM2.5*

8.2.10. PM2.5 concentrations were measured at the fixed monitoring station located in Poolbeg over a 60 day period. The average level of PM2.5 measured over the complete 60-day sampling set was 11 μg/m$^3$, which is significantly lower than the proposed concentration cap of 25 μg/m$^3$.



8.2.11. A comparison between the daily PM2.5 concentration and PM10 concentration for the complete data set showed a positive correlation between PM2.5 and PM10 concentrations. The daily ratio of PM2.5 to PM10 varied significantly over each monitoring period ranging from 0.19 - 0.47, and with an average ratio of 0.33.

**Dioxins/Furans (PCDDs & PCDFs)**

8.2.12. Background levels of Dioxins/Furans (PCDD/Fs) occur everywhere and existing levels in the Poolbeg region have been extensively monitored over two one-month periods as part of the 2003/04 and 2004/05 monitoring campaigns. Monitoring was carried out over four 4-5 day periods spread over each one month monitoring period. No ambient air quality concentration or deposition standards currently exist for PCDD/Fs.

8.2.13. Table 8.2 shows the range of concentrations measured in ambient air in Poolbeg over the monitoring period. Levels at Poolbeg show some variations between monitoring periods with mean results in monitoring period two three times higher than the overall average. The mean PCDD/PCDF concentration measured over the four one-month periods during 2003 - 2005 indicates that results are slightly higher than measurements elsewhere in Ireland, with an upper limit of 56.2 fg/m$^3$ compared to previous measurements ranging from 2.8 – 46 fg/m$^3$. However, previous measurements have been in rural or industrial zoned land whereas the current Site is urban with vehicle, home heating & power stations in close proximity. Measured average levels are similar to those measured recently at an urban site in UK in Middlesbrough, and significantly lower than those measured in Manchester over the period 2000 - 2003(1).

## *Climate*

8.2.14. Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) in April 1994 and the Kyoto Protocol in 1997(2,3). For the purposes of the EU burden sharing agreement under Article 4 of the Kyoto Protocol, Ireland agreed to limit the net anthropogenic growth of the six GHGs (see Table 8.3 and Table 8.4) under the Kyoto Protocol to 13% above the 1990 level over the period 2008 to 2012(4). Anthropogenic emissions of GHGs in Ireland included in the Kyoto Protocol are mainly derived from fossil fuels. Combustion of fossil fuels for energy purposes is the greatest source of emissions at 95% of CO2 and 66% of total emissions (2004 data)(6). Waste represented 2.7% of total emissions in 2004 and is envisaged to represent 1.5% of total emissions by 2010(5,6). Emissions from waste consist mainly of CH4 with small amounts of other GHGs.

8.2.15. The Intergovernmental Panel on Climate Change (IPCC) has outlined detailed guidelines on compiling National Greenhouse Gas Inventories. The guidelines are designed to estimate and report on national inventories of anthropogenic greenhouse gas emissions and removals in order to ensure compliance with the Kyoto Protocol. Anthropogenic refers to greenhouse gas emissions and removals that are a direct result of human activities or are a result of natural processes that have been affected by human activities(6,7). The carbon from biogenic sources such as paper and food waste are not considered anthropogenic sources and do not contribute to emission totals considered in the Kyoto Protocol(7,8).

8.2.16. In relation to solid waste disposal sites (SWDSs) including municipal landfills, detailed guidelines have been outlined for the calculation of GHG emissions(7,8). The main GHG emission from SWDSs is methane. Even though the source of carbon is primarily biogenic, CH4 would not be emitted were it not for the human activity of landfilling the waste, which creates anaerobic conditions conducive to CH4 formation. Although CO2 is also produced in substantial amounts, the primary source of CO2 derives from the decomposition of organic material derived from biomass sources which are re-grown on an annual basis. Hence, these CO2 emissions are not treated as net emissions from waste in the IPCC Methodology(8).



8.2.17. Similarly, in relation to incineration, a large fraction of the carbon in waste combusted (paper, food waste) is derived from biomass raw materials which are replaced by re-growth on an annual basis. Thus, these emissions should not be considered as net anthropogenic $CO_2$ emissions in the IPCC Methodology[8]. On the other hand, some carbon in waste is in the form of plastics or other products based on fossil fuel. Combustion of these products, like fossil fuel combustion, releases net $CO_2$ emissions. Thus, in estimating emissions from waste incineration, the desired approach is to separate carbon in the incinerated waste into biomass and fossil fuel based fractions and thereafter to use only the fossil fuel fraction in calculating net carbon emissions[7,8]. Other relevant gases released from combustion are net GHG emissions including $CH_4$ and $N_2O$.

8.2.18. The nature of municipal waste landfilled in Ireland has been catalogued in the National Waste Database Report 2004(9). It is estimated that, as a worst-case, 0.206 of the MSW waste incinerated is of fossil fuel origin and is thus a net contributor to greenhouse gas emissions. This estimate has been used as outlined in Annex 1 of Appendix 8.2 for estimating the net GHG emissions from the incineration of 600,000 tonnes/annum of municipal, commercial and/or industrial waste.

**Figure 8.1 Approximate location of air monitoring stations**

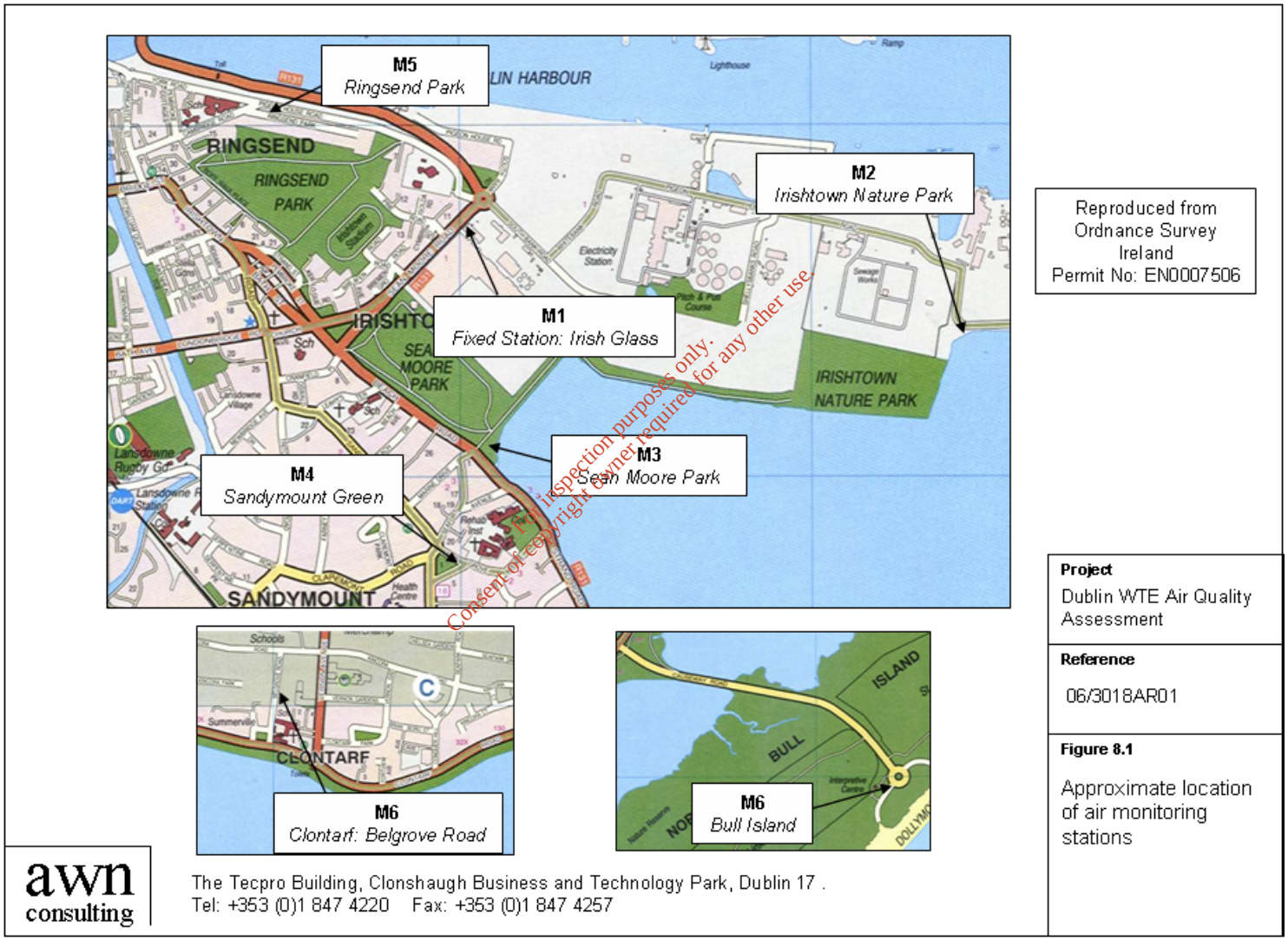

**Table 8.1 Summary of Baseline Ambient Air Monitoring Results (excluding PCCD/Fs)**

| Pollutant | Monitoring Period | Averaging Period | Average Concentration | Limit Value |
|---|---|---|---|---|
| Nitrogen Dioxide ($NO_2$) | July 2003 - August 2005 (Chemiluminescent Analyser - continuous data) | Annual | 30.5 $\mu g/m^3$ | 40 $\mu g/m^3$ |
| Nitrogen Dioxide ($NO_2$) | July 2003 - August 2005 (Chemiluminescent Analyser - continuous data) | 99.8$^{th}$%ile of 1-hr Values | 101 $\mu g/m^3$ | 200 $\mu g/m^3$ |
| Nitrogen Dioxide ($NO_2$) | July 2003 - August 2005 (Diffusion Tubes - 24 monthly results at Six Locations) | Annual | Ranged from 16.0 $\mu g/m^3$ on Bull Island to 30.6 $\mu g/m^3$ at Sandymount Green | 40 $\mu g/m^3$ |
| $PM_{10}$ | July 2003 - August 2005 (314 24-hr samples) | Annual | 34 $\mu g/m^3$ | 40 $\mu g/m^3$ |
| $PM_{10}$ | July 2003 - August 2005 (314 24-hr samples) | 90$^{th}$%ile of 24-hr Values | 57 $\mu g/m^3$ | 50 $\mu g/m^3$ |
| $PM_{2.5}$ | September 2003 - October 2005 (60 24-hr samples) | Annual | 11 $\mu g/m^3$ | 25 $\mu g/m^3$ |
| Sulphur Dioxide ($SO_2$) | July 2003 - August 2005 (Diffusion Tubes - 24 monthly results) | Annual | 4.8 $\mu g/m^3$ | 20 $\mu g/m^3$ |
| Sulphur Dioxide ($SO_2$) | January 2004 - March 2005 (Diffusion Tubes - 2 monthly results at Two Locations) | Annual | Ranged from 4.7 $\mu g/m^3$ on Belgrove Road to 11.7 $\mu g/m^3$ at Irishtown Nature Reserve | 20 $\mu g/m^3$ |
| Benzene | July 2003 - August 2005 (Diffusion Tubes - 16 weekly results) | Annual | 2.0 $\mu g/m^3$ | 5.0 $\mu g/m^3$ |
| HCl | August 2003 - August 2005 (Nylon Membrane Filter - 16 weekly results) | Annual | 0.18 $\mu g/m^3$ | 20 $\mu g/m^3$ |
| HF | August 2003 - August 2005 (Nylon Membrane Filter - 16 weekly results) | Annual | 0.01 $\mu g/m^3$ | 0.3 $\mu g/m^3$ |
| Hg | August 2003 - August 2005 (ICP - 16 weekly results) | Annual | 0.001 $\mu g/m^3$ | 1.0 $\mu g/m^3$ |
| Cd | August 2003 - August 2005 (ICP - 16 weekly results) | Annual | 0.001 $\mu g/m^3$ | 0.005 $\mu g/m^3$ |
| As | August 2003 - August 2005 (ICP - 16 weekly results) | Annual | 0.001 $\mu g/m^3$ | 0.006 $\mu g/m^3$ |
| V | August 2003 - August 2005 (ICP - 16 weekly results) | Annual | 0.005 $\mu g/m^3$ | 5.0 $\mu g/m^3$ |
| Ni | August 2003 - August 2005 (ICP - 16 weekly results) | Annual | 0.006 $\mu g/m^3$ | 0.020 $\mu g/m^3$ |

**Table 8.2 Summary of Baseline PCCD/PCDFs Ambient Air Concentrations**

| Pollutant | Averaging Period | Minimum PCDDs/PCDFs (I-TEQ) ($fg/m^3$) | Maximum PCDDs/PCDFs (I-TEQ) ($fg/m^3$) |
|---|---|---|---|
| ***August / September 2003 Monitoring*** | | | |
| PCCD/PCDFs | 28/08/03 – 31/08/03 | 1.4 | 7.1 |
| PCCD/PCDFs | 03/09/03 – 08/09/03 | 3.3 | 3.3 |
| PCCD/PCDFs | 08/09/03 – 12/09/03 | 14.3 | 14.3 |
| PCCD/PCDFs | 15/09/03 – 19/09/03 | 12.1 | 12.1 |
| **PCCD/PCDFs** | **4-Week Average** | **7.8** | **9.2** |
| ***February/ March 2004 Monitoring*** | | | |
| PCCD/PCDFs | 11/02/04 – 16/02/04 | 157.9 | 157.9 |
| PCCD/PCDFs | 16/02/04 – 20/02/04 | 75.3 | 75.3 |
| PCCD/PCDFs | 23/02/04 – 27/02/04 | 304.6 | 304.6 |
| PCCD/PCDFs | 03/03/04 – 08/03/04 | 175.6 | 175.6 |
| **PCCD/PCDFs** | **4-Week Average** | **178.4** | **178.4** |
| ***October / November 2004 Monitoring*** | | | |
| PCCD/PCDFs | 15/10/04 - 18/10/04 | 17.7 | 19.7 |
| PCCD/PCDFs | 20/10/04 - 24/10/04 | 6.8 | 9.1 |
| PCCD/PCDFs | 26/10/04 - 29/10/04 | 0.60 | 8.1 |
| PCCD/PCDFs | 05/11/04 - 09/11/04 | 10.5 | 12.0 |
| **PCCD/PCDFs** | **4-Week Average** | **8.9** | **12.2** |
| ***August / September 2005 Monitoring*** | | | |
| PCCD/PCDFs | 19/08/05 - 23/08/05 | 39.1 | 40.1 |
| PCCD/PCDFs | 23/08/05 - 26/08/05 | 5.1 | 7.3 |
| PCCD/PCDFs | 26/08/05 - 30/08/05 | 11.9 | 13.3 |
| PCCD/PCDFs | 01/09/05 - 05/09/05 | 37.5 | 39.0 |
| **PCCD/PCDFs** | **4-Week Average** | **23.4** | **24.9** |
| **2003 - 2005 Monitoring Data Average** | | **54.6** | **56.2** |