



Dublin Light Rail Environmental Impact Statement

Line B1

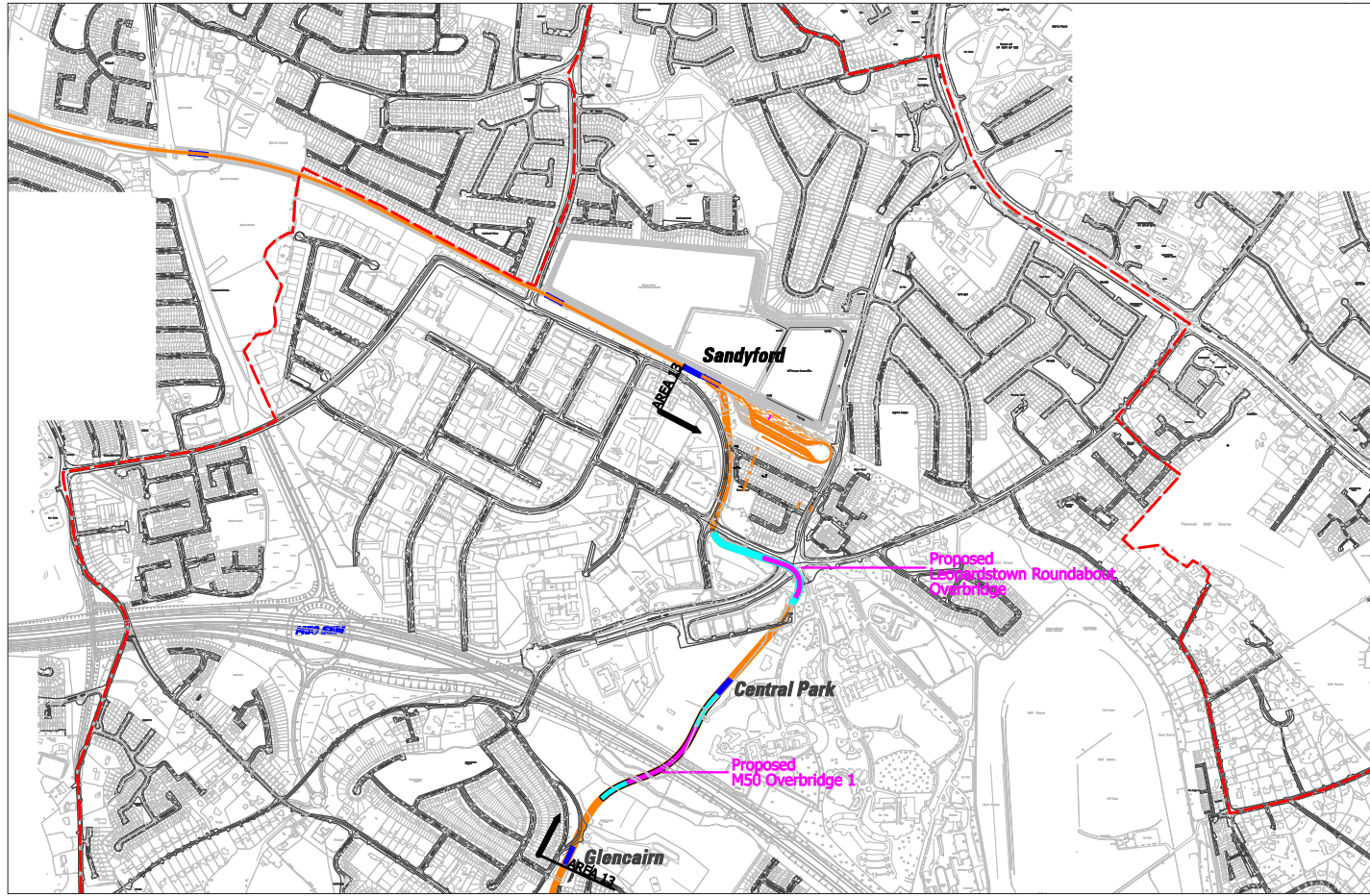
Sandyford Industrial Estate to
Cherrywood

Volume 2

Area

13

Sandyford Industrial Estate to
Murphystown Road



area **13**

Sandyford Industrial Estate to Glencairn stop

ENVIRONMENTAL IMPACT STATEMENT

The Environmental Impact Statement is being published in three separate Volumes as follows:

Volume 1 Chapters 1, 2, 3, 4, 5, 6, and 8

Volume 2 Chapter 7 (Environmental Impact – Areas 13 to 15)

Volume 3 Chapter 9 (EIS Non-Technical Summary)

This Environmental Impact Statement (EIS) relating to Line B1 of the Dublin Luas Light Rail Transit (LRT) Project is set out in nine Chapters, titled as follows:

Chapter 1 Introduction

Chapter 2 Public Consultation

Chapter 3 Consideration of Alternatives Luas line B1

Chapter 4 Description of the Proposed Luas Line B1

Chapter 5 Aspects of the environment considered

Chapter 6 Interactions

Chapter 7 Environmental Impact Areas 13 to 15 inclusive

Chapter 8 Difficulties encountered in compiling this EIS

Chapter 9 Non Technical Summary

The preparation of an Environmental Impact Statement requires the co-ordination and synthesis of associated yet diverse elements of the overall assessment. To facilitate this process, a schematic structure is used in order to provide a coherent documentation of the various aspects of the environment considered. An outline of the Grouped Format structure of the Environmental Impact Statement is detailed below.

1 Receiving Environment (Baseline Situation)

A description of the specific environment into which the proposal will fit, taking account of other developments likely to occur. The particular aspects of the environment are discussed in terms of their context, character, significance and sensitivity.

2 The Characteristics of the Proposal

A projection of the specific “load” on the particular aspects of the environment which the proposal would be likely to generate. This is set out at the commencement of each of the three individual areas in Volume 2.

3 The Potential Impact of the Proposal

- a) The potential impact of the proposal also comprises a general description of the possible types of impacts which proposals of this kind would be likely to produce.
- b) This includes a consideration of the “Do-Nothing” impact. The “Do-Nothing” impact describes the environment as it would be in the future if no development of any kind is carried out.

4 Remedial or Reductive Measures

A description of any specific remedial or reductive measures considered necessary and practicable resulting from the assessment of potential impacts described at (3a) above.

5 The Predicted Impact of the Proposal

- a) An assessment of the specific direct and indirect impact of the proposal arrived at by adding to the receiving environment (as in (1) above), the loading of the proposal (as in (2) above) and the remedial or reductive measures (as in (4) above).
- b) Also considered is a “Worst Case” scenario, arising where a development, or its mitigation measures substantially fail.

6 Monitoring

A description of any monitoring of effects on the environment which might be necessary in both the construction and operational phases, covering the monitoring methods, and the agencies responsible for their implementation.

ENVIRONMENTAL IMPACT STATEMENT STUDY TEAM

The Environmental Impact Statement was prepared on behalf of the Railway Procurement Agency (RPA) by a study team led by RPS McHugh Planning and Environment, who were responsible for the overall study management and co-ordination as well as for Land Use Planning and Development, Demography and Employment, Property, Local History and Interactions. The other members of the study team are as follows:

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Arc Digital Photographic Ltd.
Railway Procurement Agency (RPA)

AVAILABILITY OF THE EIS

Copies of this Environmental Impact Statement including the Non-Technical Summary may be purchased by any member of the public during normal office hours at the following locations:

- Railway Procurement Agency (RPA), Parkgate Street, Dublin 8
- Dublin Transportation Office, Hainault House, Floor 3, 69-71 St. Stephen’s Green, Dublin 2

The EIS may be purchased as a complete document for a sum of €50.00 (Volumes 1, 2 & 3).

Alternatively, reports on each of the three individual Areas of the Line B1 alignment discussed in Chapter 7 (Volume 2) of the EIS dealing with particular areas and topics may be purchased individually for a sum of €10.00 each.

Copies of Volume 1 may be purchased for €30.00 each.

Copies of the Non-Technical Summary (Volume 3) of this EIS may be purchased at any of the above locations for a sum of €3.00 each.

A CD version of the whole EIS (Vol 1; Vol 2 Area 13, 14 and 15 and NTS) for €5.00.

This EIS is also available to download through the RPA website at www.rpa.ie

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Sandyford Industrial Estate to Glencairn stop (Murphystown Road)



Photomontage of Luas bridge over the Leopardstown Road / Brewery Road roundabout

Luas Line B1 THE PROPOSED DEVELOPMENT

Luas Line B1 comprises the construction, installation and operation of a twin tracked light rail transit system between Sandyford Industrial Estate and Cherrywood including the provision of track, cable supports, overhead power lines, stops, sub-stations and trams, as well as associated works. This route comprises an extension of the existing Green Line linking St. Stephen's Green in Dublin City Centre to Sandyford Industrial Estate, which commenced operation in June 2004. Luas Line B1, which is the subject of the Railway Order application which this EIS accompanies, runs for a distance of approximately 7.6km from the Sandyford Stop, adjacent to the Luas Sandyford Depot at the north-eastern corner of the Sandyford Industrial Estate, to the planned District Centre at Cherrywood via the Central Park scheme, Ballyogan Road, Carrickmines and Laughanstown, terminating at the Cherrywood Science and Technology Park. This alignment includes two bridge crossings of the reservation of the South Eastern Motorway (SEM); one spans from the lands of Central Park and links over the Leopardstown Valley to Murphystown Road; the other spans from a point north of Ballyogan Road to a point south of the alignment of the former Harcourt Street rail line, west of Glenamuck Road in Carrickmines. It also includes an elevated crossing of the Brewery Road/Leopardstown Road Roundabout and the Wyattville Link Road, an underpass at Glenamuck Road Bridge and the planned Cherrywood Spine Road.

Luas Line B1 runs predominantly off-street, or along a dedicated reservation. It will provide residents, workers and visitors within its catchment area with a fast and efficient public transportation service.

For ease of local identification and interest, Luas Line B1 has been divided into three Areas. This document concerns **Area 13**, running from Sandyford Industrial Estate (Blackthorn Avenue) to Glencairn stop (Murphystown Road). The aim of this document is to highlight the specific environmental impact arising for the area from the construction, maintenance and operation of the proposed Luas Line B1, and the remedial measures that will be employed to reduce or remedy any likely significant adverse impacts.

Area 13 Sandyford Stop to Burton Hall Road

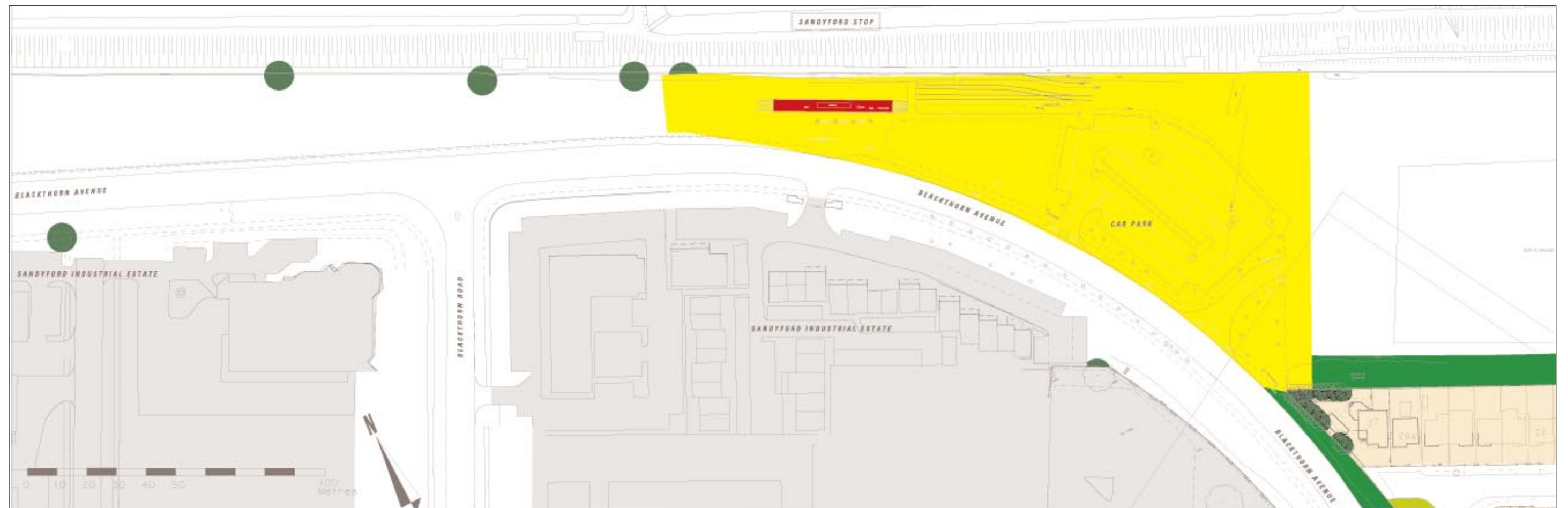


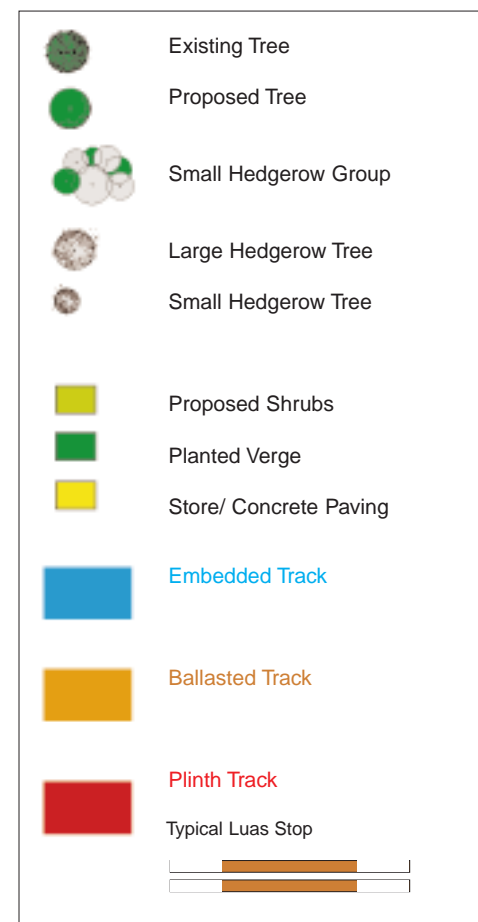
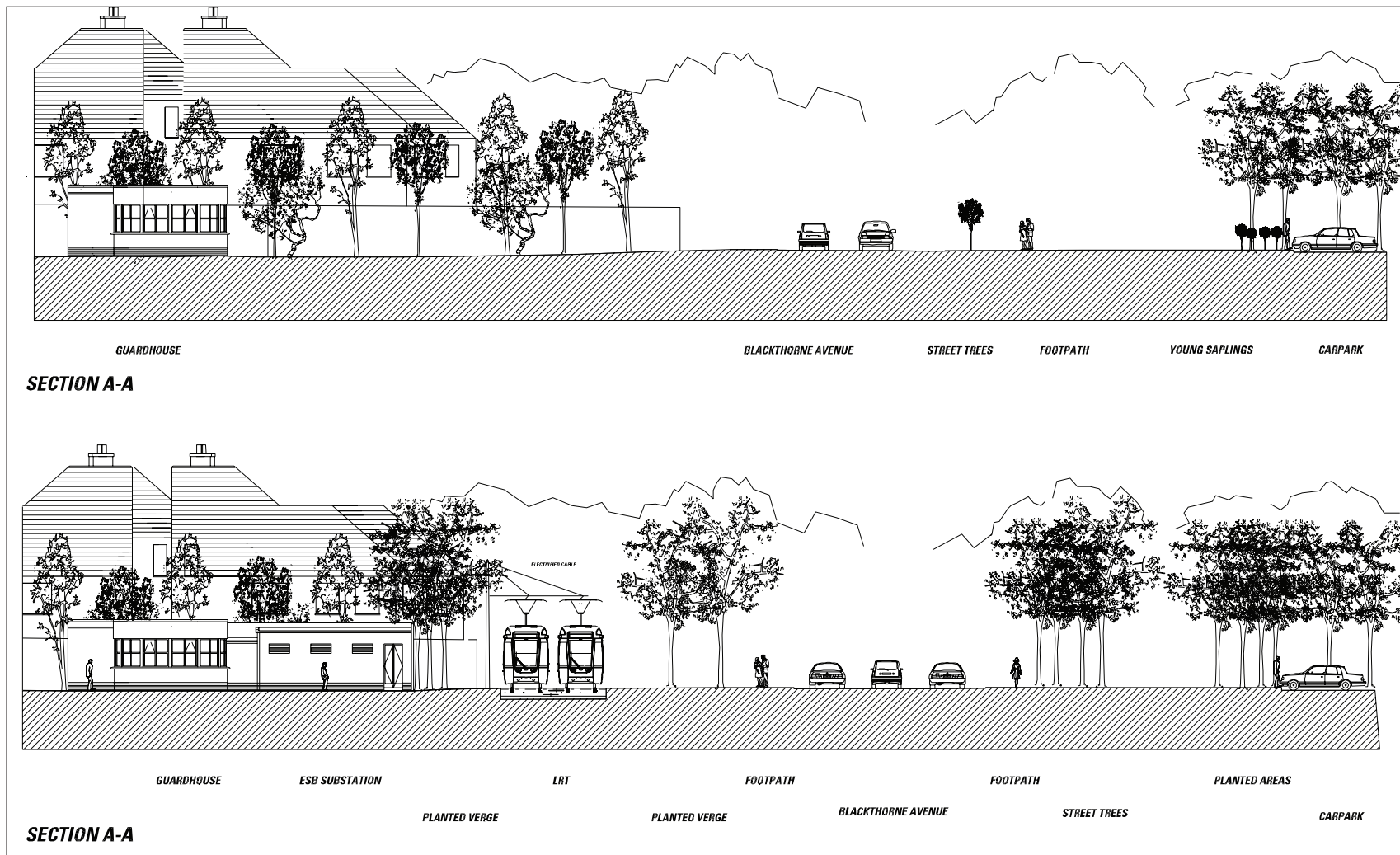
The Luas line B1 alignment commences at the Sandyford stop on Blackthorn Avenue at the north-eastern part of the Sandyford Industrial Estate, and immediately to the south of the existing Stillorgan Reservoirs. The Sandyford Luas Depot is located immediately to the east of the Sandyford stop. The existing Sandyford stop comprises a major public transport interchange, with facilities for bus and taxi setdown/take-off, as well as a "kiss and ride" pull-in area. Various areas of the Depot may be used as temporary construction compounds and assembly areas.

The Luas Line B1 alignment runs generally parallel to the eastern side of Blackthorn Avenue. This road, which is one-way southbound, comprises the eastern boundary of the Sandyford Industrial Estate. The alignment traverses the western section of the existing property of No. 27 Woodford, immediately to the east of Blackthorn Avenue. This will require the removal of existing lamp standards on this side of the road. It will require the demolition of the existing western boundary and garage of the property, which is at a remove from the residence, as well as the provision of a new boundary treatment in this general area.

A new footpath is proposed to be provided along the eastern side of the alignment along Blackthorn Avenue.

The Luas Line B crosses Burton Hall Road at grade, in the vicinity of the existing junction with Blackthorn Avenue. This junction, which comprises the eastern entrance to the Sandyford Industrial Estate, is facilitated by the new traffic management measures which were undertaken on behalf of Dun Laoghaire-Rathdown County Council. This involved the signalling of the junction of Burton Hall Road with Blackthorn Avenue and a one-way westbound movement on Burton Hall Road, west of this junction. There is no right-turn onto Blackthorn Avenue from Burton Hall Road. Consequently, Blackthorn Avenue has become one-way southbound.





Area 13 Burton Hall Road to Central Park



Having crossed Burton Hall Road, the Luas Line B1 alignment turns south-eastwards and follows the northern boundary of the FAAC Electronics Ltd. complex. A temporary construction compound and assembly area will be located immediately to the south of the alignment at this location. The construction of the alignment will require the removal of the existing lamp standards, a bus stop and soft landscape treatment on the southern side of this road.

The alignment ascends a ramp for approx. 125m, before crossing the Leopardstown Road/Brewery Road roundabout by means of an overbridge approx. 180m in length, with clearance between this structure and road level being 5.3m or greater. The alignment curves south-westward over the roundabout and enters the Central Park development at its north-eastern boundary, adjacent to the entrance to the existing IDA South County Business Park.

Luas Line B1 then adjoining the southeast boundary of the permitted extension to the Central Park scheme.



Existing Burton Hall Roundabout



Photomontage of Proposed bridge over Burton Hall Roundabout



Area 13 Central Park



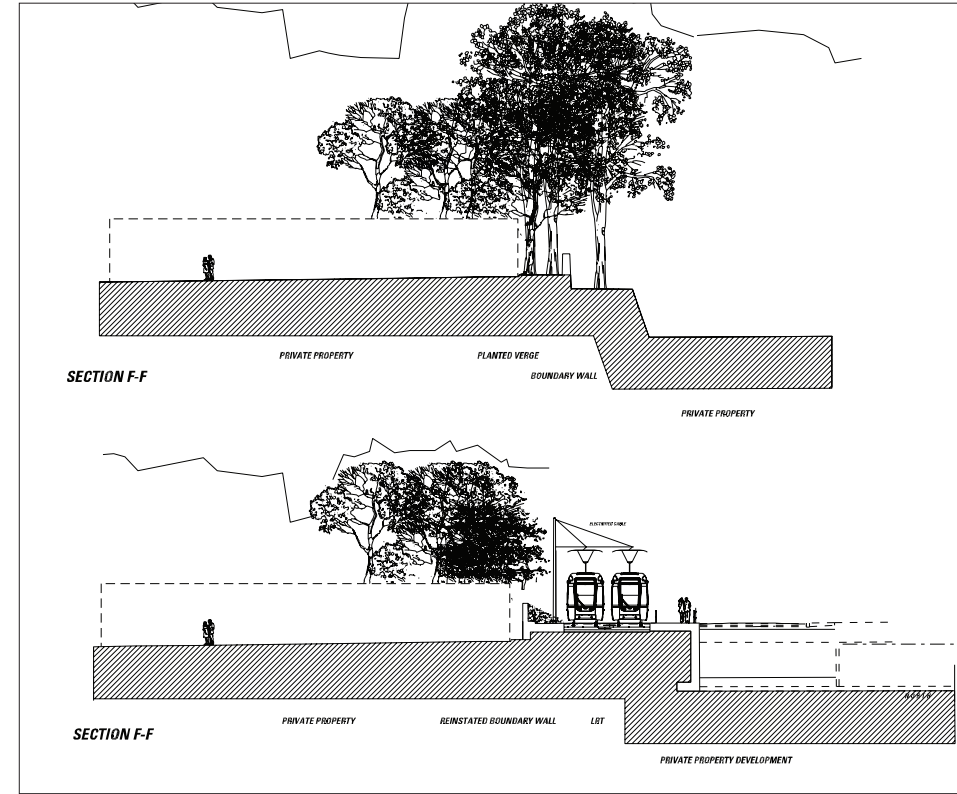
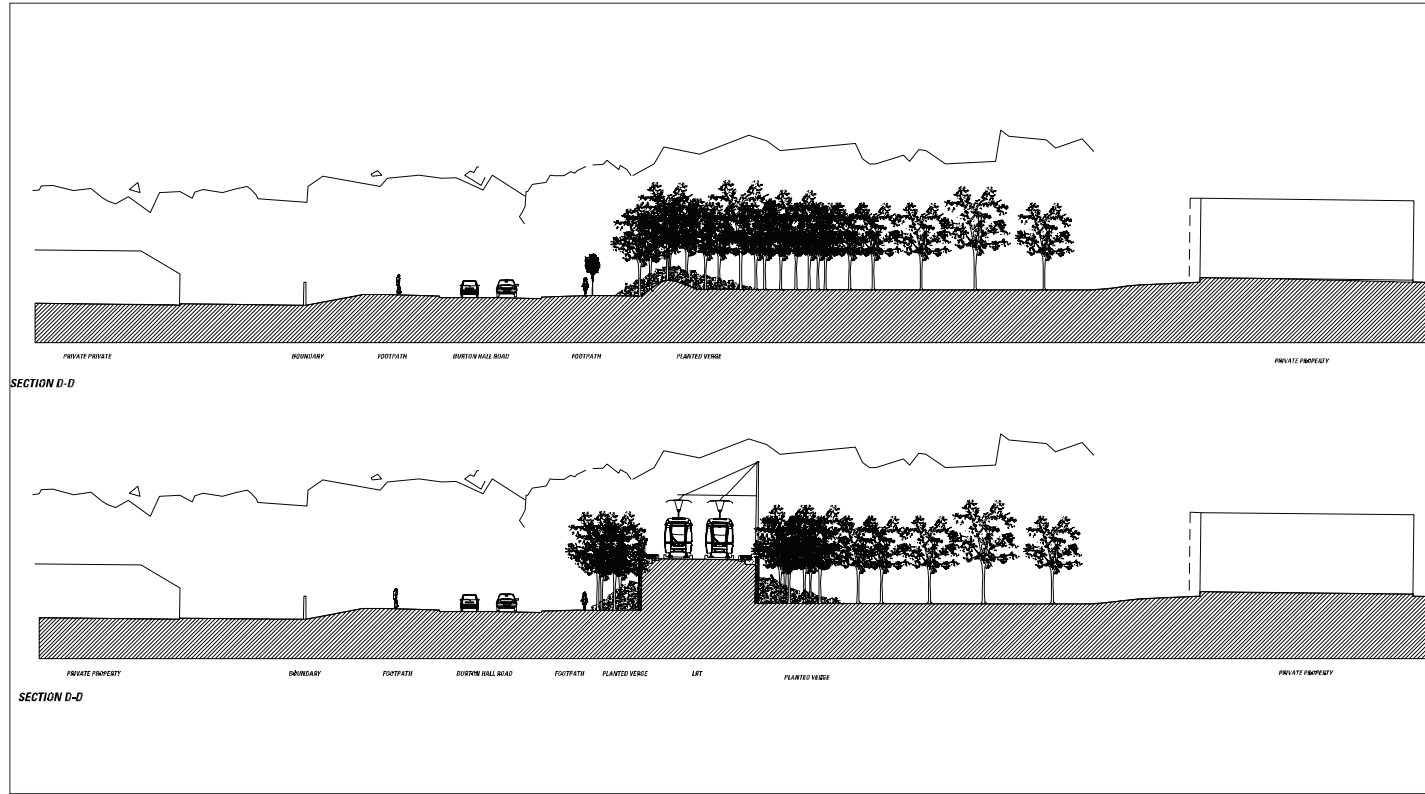
The Luas Line B1 runs in an existing reservation on a raised structure adjacent to the southeast boundary of the permitted extension to the Central Park scheme, at the boundary between the lands of Central Park and the Leopardstown Park Hospital. In recent years a 50-bed extension facility was constructed on the northern grounds of the hospital, in close proximity to the Luas alignment. In addition a 5 metre wide access road was constructed across the front grounds of the hospital, in proximity to the boundary wall, which is approximately 3m in height.

A stop is to be located at the southern edge of the Central Park development, in the vicinity of the planned plaza area. Pedestrian access will be provided to this stop both from the Hospital lands and the IDA South County Business Park to the east, as well as from Leopardstown Road.

The construction of the trackbed in this area will require some cut and fill on the rising ground. In addition, a ramped pedestrian access is to be provided to the Central Park stop from the existing avenue serving Leopardstown Park Hospital and the western side of the IDA South County Business Park.

The existing boundary wall, as well as a number of existing trees at this boundary will be removed to facilitate the alignment. This is due to the fact that the permitted development scheme at Central Park did not provide a significant corridor between the permitted built form and the existing south-eastern boundary wall to provide for the Luas Line B1. A new wall of similar character will be reinstated to the south-east of the existing wall, within the lands of Leopardstown Park Hospital (which has been significantly extended in recent years). New landscape and tree planting will also occur in this vicinity.





Area 13 From Central Park over the South Eastern Motorway (SEM) to Glencairn Stop



South of the planned Central Park Stop, Luas Line B1 ascends a ramp and crosses by way of a planned bridge over the reservation of the SEM, and the adjoining Leopardstown Valley. This bridge, with associated ramps on either side, will be approx. 400m in length. The trackbed will be elevated, with clearance between the structure and the road level of the Motorway being 5.3m or greater. A temporary construction compound and assembly area, primarily associated with the construction of this bridge will be located immediately to the north of the SEM in the vicinity of the planned Luas Leopardstown Bridge.

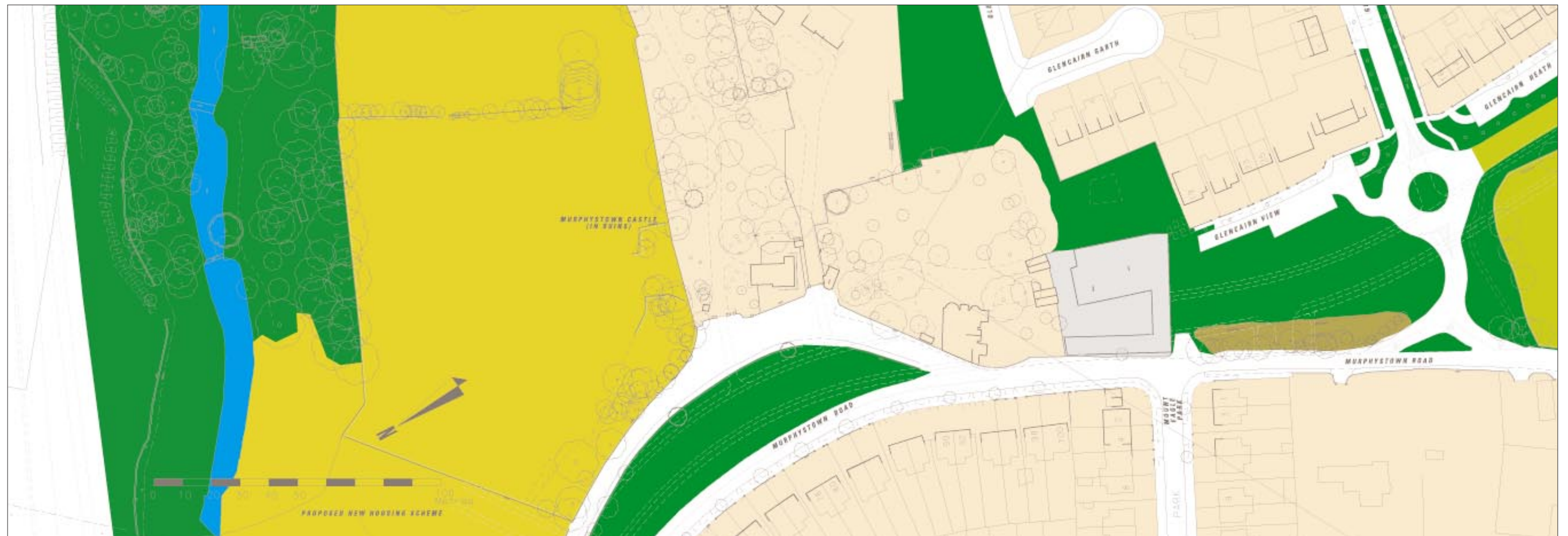
The alignment converges with the existing ground level in the vicinity of the boundary of the property Glencairn. Murphystown Castle, a significant item of archaeological interest is located within the north-eastern portion of this property, in relative proximity to the Luas Line B1 alignment. The Luas alignment runs southwards past the main gates of "Glencairn". This requires the removal of a portion of the existing castellated boundary wall of this property.

Luas Line B1 will run at grade adjacent to the eastern side of Murphystown Road. It is an objective of the Statutory Development Plan that this existing narrow road is significantly upgraded by means of the construction of a new road parallel to the existing carriageway, and constituting a major access route between Ballyogan Road and the SEM

Sandyford Interchange. A temporary construction compound and assembly area will be located to the west of the Luas alignment on the northern side of Murphystown Road.

Luas Line B1 follows the indicative eastern side of the preferred route alignment of the planned Murphystown Parallel Access Road. A stop is to be located on the eastern side of this alignment, on the lands of the existing property of *Clonlea House*, a protected structure. A sub-station serving Luas Line B1 is to be provided immediately adjoining, and to the east of, the Glencairn stop.

The demolition of Clonlea House is required to facilitate the construction of the Luas Line B1 alignment. However, such demolition will be required in any case to facilitate the construction of the planned Parallel Access Road.





Existing view towards Glencairn from Murphystown Road



Photomontage of proposed Glencairn Luas Stop



7.13.1

Human Beings



7.13.1.1 INTRODUCTION

Human beings constitute a primary element of the 'environment' and any potential impact on human beings by the Luas Line B1 proposal must therefore be carefully assessed. The principal concern is that human beings should experience no significant unacceptable diminution in aspects of 'quality of life' as a consequence of the construction and operation of the proposed development. This assessment of 'Human Beings' considers demography and employment, land use planning and development, vehicular and pedestrian traffic and safety and community severance.

7.13.1.2 DEMOGRAPHY & EMPLOYMENT

The key demographic and employment characteristics of Area 13 which are examined include: - the size and changing size of the population, number and size of households, employment and social profile, work and school travel patterns, and car ownership rates.

The Electoral Division (ED) is the smallest administrative area for which population statistics are published by the Central Statistics Office. There are four EDs within the catchment of Area 13 (Stillorgan-Leopardstown, Stillorgan-Merville, Dundrum-Balally and Glencullen).

The majority of this assessment is based on the 2002 Census of Population data, which is the most recent source of official data available on an Electoral Division (ED) basis.

7.13.1.2.1 Receiving Environment

Demography

In 2002, the population of the four EDs of Area 13 was 20,372 persons compared to 15,537 persons in 1991. This represents an increase of 31.1% since 1991. In comparison, the overall Luas Line B1 catchment increased by 31.8% over the period.

Table 7.13.1.2.1: Population Area 13, Luas Line B1 and DTO Area, 1991 - 2002

	Area 13	Total Luas Line B1	DTO Area
1991	15,537	24,557	1,350,595
1996	18,809	28,981	1,405,671
2002	20,372	32,367	1,535,446

SOURCE: Census of Population 1991, 1996, 2002

Table 7.13.1.2.2: Population Change Area 13, Luas Line B1 and DTO Area, -1991-2002 (%)

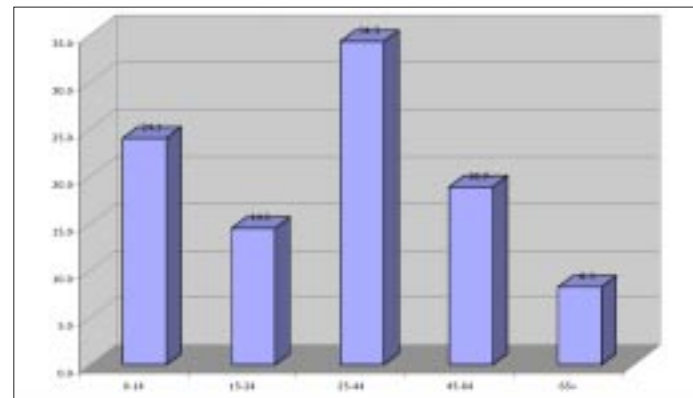
	Area 13	Total Luas Line B1	DTO Area
1991-96	21.1	18.0	4.1
1996-02	8.3	11.7	9.2
1991-02	31.1	31.8	13.7

SOURCE: Census of Population 1991, 1996, 2002

Age Profile

In 2002 67.7% of the population of the EDs of Area 13 were aged between 15 and 64 years of age i.e. the working age groups. This is almost identical to the working age population of the Luas Line B1 Study Area as a whole, which stood at 67.6% in 2002.

Fig. 7.13.1.2.1: Area 13 Age Profile as % of Total Population 2002



SOURCE: Census of Population, 2002

Households

In 2002, there were a total of 6,452 households in the four EDs incorporating Area 13; this represents an increase of 11.6% over the 6-year period from 1996. In the overall B1 Study Area, there was an increase of 1,285 households or 14.3%. In 2002, average household size in these EDs stood at 3.1 persons. This remained unchanged from the average household size in 1996. The average household size of the overall Luas catchment area was 3.1 in 2002, down from 3.2 in 1996. In Area 13 in 2002, 16.6% were one-person households, up from 16% in 1996. This is slightly higher than the proportion of one-person households in the overall B1 Study Area which was 16.2% in 2002. The proportion of dwelling types which are flats/bedsits/apartments has increased from 1.6% in 1996 to 8.3% in 2002, representing a significant move towards increased residential density. The overall Luas catchment area saw a smaller increase from 1.3% to 5.2% over the same time period.

Table 7.13.1.2.3: Household Statistics, Area 13 and Luas Line B1 2002

	Area 13	Total Luas Line B1
Total number of households	6,452	10,284
Average household size (persons)	3.1	3.1
% of single private households	16.6%	16.2%
% of flats/bedsits/apts	8.3%	5.2%

SOURCE: Census of Population, 2002

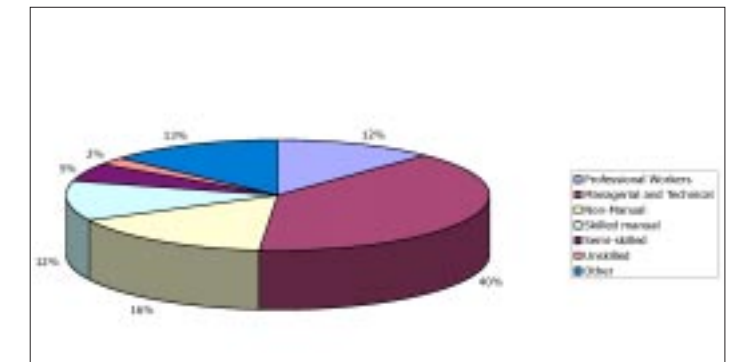
Employment

In 2002, a total of 9,154 persons residing in the EDs incorporating Area 13 were recorded as being at work total of 445 persons were unemployed, creating an unemployment rate of 2.9%. There were variations in the unemployment rate throughout Area 13, with Dundrum-Balally recording the highest unemployment rate of 3.7% and Stillorgan-Merville recording the lowest rate of 1.3%. An examination of the occupational structure of those 'at work' in Area 13 shows that 23% of the total were classed as professional, technical and health workers, while 6% were classed as manufacturing workers.

Social Deprivation

Social class can be an indicator of the socio-economic character of an area. In 2002, 52% of the resident population in the EDs incorporating Area 13 were categorised as being of Social Classes 1 or 2, i.e. the as being of Social Classes 1 or 2, i.e. the highest social classes, generally representing professional and managerial occupations. 7% were classed as being of social class 5 or 6, comprising semi-skilled and unskilled manual labour, including low level service occupations.

Fig.7.13.1.2.2: Area13 Social Class



Social Class 2 etc. as defined in the Census of Population 2002

Travel Mode and Car Ownership

In 2002 60.5% of the population over 5 years of age of the EDs incorporating area 13 travel to work/school college by car (be they drivers or passengers). This compares to a figure of 63% for the overall Luas Line B1 catchment area. 17.7% travel to work/school/college by public transport. In the overall Luas catchment area as a whole this proportion is 18.3% This compares with a figure of 19.7% for the DTO area as a whole.

Table 7.13.1.2.4: Car Ownership Rates, 1991 and 2002 (per 100 households)

	1991	2002
Area 13	125	156
Luas Line B1	132	159

SOURCE: Census of Population, 1991, 2002



7.13.1.2.2 Potential Impact of the Proposal

Construction Phase

Demography

No potential impact on demography is expected to occur during construction of the proposed development. Whilst the resident, working and visiting populations of Area 13 may experience temporary general disturbance and inconvenience due to construction works associated with the route alignment, these will not affect demography, but rather are related to issues such as traffic and community severance, which are addressed elsewhere in this EIS. No potential impact on the structure of households and household size is anticipated in Area 13 during construction of Luas Line B1.

Employment

The construction of the Luas will generate temporary employment opportunities, which would be open to suitable members of the labour force from the Area 13 population (as well as to all suitable members of the labour force throughout the Dublin Region and beyond). Associated and indirect employment could also be created during the construction phase, for example in local retail services, building suppliers etc.

Travel Mode and Car Ownership

Car ownership amongst the resident population is not expected to alter significantly as a result of construction activities of Luas Line B1. The potential impact on traffic is dealt with at section 7.13.1.4 of this EIS.

Operational Phase

Demography

The Area 13 resident population will benefit from the introduction of a permanent efficient public transport service through this area. However, no change in demography as a direct consequence of the operation of Luas Line B1 is anticipated. No significant impact on households is anticipated as a result of the operation of Luas Line B1. However, it is envisaged that the delivery of Luas Line B1 will facilitate higher density development and the realisation of the development objectives for Area 13 as outline in the

Dun Laoghaire-Rathdown County Development Plan 2004-2010.

Employment

There is likely to be a consolidation and augmentation of the core established economic sectors of industry and office uses in the area.

Travel Mode and Car Ownership

Car ownership amongst the resident population is not anticipated to alter significantly as a result of the operation of the Luas. However, travel mode will be potentially impacted upon with some shift away from private cars to public transport use by the residential working and visitor populations.

'Do Nothing' Scenario

Under a "do-nothing" scenario, no significant impact will occur to the overall number, age profile or average household size of the resident, working and visitor populations.

7.13.1.2.3 Remedial or Reductive Measures

Construction Phase

Appropriate information and management procedures will be introduced before and during the construction phase for the resident, working and visitor populations. This will include traffic management and access measures. A Construction Team representative will be available during the construction phase for consultation with local residents and businesses.

Operational Phase

No remedial or reductive measures are necessary in terms of demography and employment during the operation of the Luas Line B.

7.13.1.2.4 Predicted Impact of the Proposal

Construction Phase

Demography

No significant impact on demography in terms of population and household size or structure are predicted.

Employment

Employment opportunities will be created directly and indirectly during the construction phase of Luas Line B1.

Travel Mode and Car Ownership

Car ownership amongst the resident population will not alter significantly as a result of the construction of Luas Line B1.

Operational Phase

Demography

There is no significant predicted impact on the overall size, age profile, or average household size of the resident population as a result of the operation of Luas Line B1 through the established residential and employment areas of Area 13.

Employment

Consolidation and growth of the working population is likely given the increased accessibility of this area. A beneficial impact is predicted.

Travel Mode and Car Ownership

There will be some shift away from private cars to public transport use by the working and visitor populations. Overall however, car ownership will not alter significantly with the operation of Luas Line B1.

7.13.1.2.5 Monitoring

Appropriate information review and update will be carried out during the construction of Luas Line B1.

7.13.1.2.6 Reinstatement

No reinstatement measures are required in respect of demography and employment.



7.13.1.3 LAND USE PLANNING AND DEVELOPMENT

7.13.1.3.1 Receiving Environment

Land Use Structure

The Sandyford Industrial Estate continues to evolve as the primary employment centre of South County Dublin, with some 20,000 persons currently employed there. Other significant employment centres located in immediate proximity to the Sandyford Industrial Estate include the Stillorgan Business Park to the west, Central Park on the southern side of the Leopardstown road and the IDA South County Business Park, on the south-eastern side of the Leopardstown Road/Brewery Road roundabout.

The current employment population of the Sandyford/Leopardstown area is estimated at between 45,000 and 60,000 persons. There is still existing capacity for further industrial development within the Sandyford Industrial Estate and the wider environs. It is recognised that the provision of new development in this area cannot continue in the absence of significantly improved public transport infrastructure to the area. In this regard, it is considered essential that new development is phased in accordance with the provision of non-private transport infrastructure including Luas, public bus and private shuttle bus services. The Luas Green Line serving Sandyford Industrial Estate, which commenced operation in June 2004, is widely recognised as an essential element in consolidating the future economic cohesiveness and success of this employment area.

In terms of residential land use, there are three existing residential areas located within Area 13 comprising Woodford estate, The Gallops and Leopardstown Heights. Woodford estate is situated on the eastern side of Blackthorn Avenue, and accessed from Brewery Road. The Gallops and Leopardstown Heights developments are located on either side of Murphystown Road. In addition there is a current planning for a large residential scheme, adjacent to the planned Luas B1 at Glencairn, bounded by the Murphystown Road and the SEM alignment. Other

undeveloped lands in this vicinity are zoned under the Stepside Action Plan 2000 to provide for future new residential communities.

This will provide for new growth and expansion of existing residential land uses in the area in the near future.

The Leopardstown Race Course complex is located to the south-east of the Leopardstown Road/Brewery Road roundabout, and comprises a major amenity land use in this area. In addition to the racecourse facilities themselves, the Complex includes a golf course and driving range, public bars and a night club, function and conference rooms, and a fitness centre and children's leisure centre.

Statutory Development Plan Context

Dun Laoghaire Rathdown County Development Plan 2004-2010

The Statutory Development Plan for the administrative area including Area 13 is the Dun-Laoghaire Rathdown County Development Plan -2004-2010. A core emphasis of the Plan is 'to plan for and co-ordinate appropriate sustainable development in Dun Laoghaire-Rathdown based on high quality residential, working and recreational environments and sustainable transportation patterns'.

The principal land use zoning objectives in the vicinity of the Area 13 alignment are listed below.

- 'To protect and/or improve residential amenity' (A)
- 'To provide for economic development and employment'(E)
- 'To preserve and provide for open space and recreational amenities' (F)

Public Services are permitted in principle in Zones A, and E, and are 'open for consideration' in Zone F.

Chapter 11 of the 2004-2010 Plan outlines a number of six year roads objectives and associated transportation objectives specific to Area 13 which include:

- SEM and associated roads.
- Murphystown Road - parallel road, to be a cul-de-sac

with Kilgobbin Road on completion of the SEM.

- Cycle routes along Ballyogan Road, Kilgobbin Road, Sandyford Road to green Route.

Chapter 14 of the development Plan also contains a number of specific local objectives in relation to roads and transport within Area 13, as follows: -

- To encourage the development of high density apartment development in brownfield and other locations in Sandyford Business Estate and Central Park s part of mixed use developments focussed on transport nodes and residential services.
- To facilitate the widening of the M50 from the proposed Sandyford interchange to the South Dublin County boundary, from two lanes to three within the existing land footprint'.
- To provide for a proposed Luas stop at Central Park.
- To provide for a proposed Luas stop at Glencairn.

There are a number of protected structures within Area 13 which include the main building of Leopardstown Park Hospital on Leopardstown Road, Clonlea House and Glencairn House, all on Murphystown Road.

The Action Plan recognises the logic of routing a Luas alignment from Sandyford Industrial Estate through the proposed Stepside Action Plan Area. The route shown in the Action Plan, running along the alignment of the Ballyogan Road would bring all parts of the Stepside Plan Area within 1 kilometre of a fixed-line public transport corridor, thus facilitating a greater density of residential development. The 2004-2010 Development Plan states that the promotion of a higher density environment which facilitates and encourages a reduction in private car usage is being achieved

"by ensuring ready access, primarily by walking and cycling, to as wide a range of local facilities that a community of this size would typically demand or require - retail and community services, education provision, actively managed open space and public

transport."

Relevant Planning Application Decisions

A number of recent applications for permission in the immediate vicinity of the Luas Line B1 alignment have been determined by the Planning Authority, including those set out in detail below. In addition new of development has been permitted within the Sandyford Industrial Estate, Central Park and IDA South County Business Park, primarily comprising the provision of high-specification industrial/office-based industrial floorspace.

Blackthorn Avenue/Burton Hall Road

Under Planning Reg. Ref: D00A/342, permission was granted to Gineste Ltd. for development of 39 no. apartments in 3 storey plus attic blocks on a site at Blackthorn Avenue, Carman Hall, Sandyford Industrial Estate. Condition no. 15 of that permission required the site boundary to maintain a 10 metre corridor along Blackthorn Avenue in order to accommodate a Luas reservation.

Under Ref: D00A/150, Bord Gais Eireann was refused permission for erection of a natural gas pressure reduction station on the eastern side of Blackthorn Avenue, on the grounds that such development would be premature pending finalisation of the route of the Luas Line B1 alignment.

Under Reg. Ref. D01A/0152, Irish Life Assurances PLC., sought permission for development comprising demolition of existing building on site and erect 12,784 sq.m of office based industry/ offices in 2 no. blocks (4 storey plus penthouse and 6 storey with 8 storey tower with underground parking and new vehicular access on existing Carrolls site at Burton Hall Road, Sandyford Industrial Estate. Dun Laoghaire Rathdown County Council issued a Final Grant of Permission for the development on the 9th April 2002. Development has not commenced on this site.

Under Reg. Ref. D01A/0153 permission was granted to Irish life Assurances PLC., for development comprising demolition of existing building on site and the erection of 15,891 sq.m of office based industry/ offices in 3 no. blocks (4 storey plus penthouse with semi basement and 4 storey plus penthouse



and 5 storey plus penthouse) with underground parking and vehicular access on existing Langdon site at Burton Hall Road, Sandyford Industrial Estate. Development has not commenced on this site.

Central Park/Leopardstown Park Hospital

Under D98A/886, permission was granted to the Clyde Road Partnership for the construction of a mixed-use commercial and employment-related development of some 163,159 sq. metres in 13 no. buildings ranging in height from five storeys with penthouse to eight storeys with penthouse; a 160 no. bedroom hotel; car parking of up to 4,669 no. spaces, and associated development on a site area of some 8.36 hectares at Rocklands, Leopardstown Road (now known as Central Park). A number of subsequent applications have been granted permission for alterations to the original scheme and for additional mixed use development which has resulted in a significant intensification of use on the overall lands. The first phase of development is now complete.

Under Ref. D00A/528, permission was granted for a single storey extension to the Leopardstown Park Hospital. This permitted the phased demolition of hospital buildings attached to the original Leopardstown Park House, which is a Protected Structure, and the construction of new hospital buildings on part of the grounds near the boundary with Central Park. A number of subsequent minor permissions have been granted for additional development within the hospital grounds. The blocks range in height from 5-8 storeys with a 17 storey tower element and a crèche facility. Also proposed are 639 car parking spaces and 670 no. bicycle spaces. The Planning Authority have recently issued a request for Additional Information in relation to the proposed scheme.

Murphystown Road

Under Planning Reg. Ref. D04A/1115 Glencairn Developments sought permission for development, at a site at Glencairn bounded by the SEM and Murphystown Road, comprising 405 no. apartments in 6 no. blocks consisting of 71 no. bedroom units, 292 no. two bedroom units and 42 no. three bedroom units.

The South-Eastern Motorway (SEM)

The South Eastern Motorway (SEM), currently under construction, is the final link in the Dublin C- Ring and involves the construction of approximately 9.5kms of 2 X 2 lane motorway which will link the Southern Cross Route at Ballinteer to the M11 Shankill/Bray By-Pass. The scheme includes the construction of six interchanges and ancillary roads, as well as the upgrading of existing roads.

7.13.1.3.2 Potential Impact of the Proposal

Construction Phase

The section of the Luas Line B1 which is to be constructed adjacent to existing public roads has the potential to temporarily cause significant localised disruption and inconvenience to traffic flow associated with adjoining land uses, by reason of interference, noise and other disturbance.

Operational Phase

The proposed development of the Luas Line B1 would generally comply with current Statutory and strategic planning policy, which supports the construction of a light rail network between Sandyford Industrial Estate and Cherrywood, and ultimately linking to the City Centre.

The Luas Line B1 would link Sandyford Industrial Estate, the main existing employment centre of South Dublin, with the significant planned employment and residential areas of Carrickmines-Cherrywood and Stepside. A fast and efficient public transport system will be available for people residing or employed in the vicinity of the Luas Line B1.

'Do-Nothing' scenario

If the Luas Line B1 did not proceed, the Development Plan policy and DTO Strategy to provide a light rail network between Sandyford Industrial Estate and Cherrywood would not be fulfilled.

7.13.1.3.3 Remedial or Reductive Measures

Construction Phase

Remedial or reductive measures include ensuring the retention of appropriate access to existing land uses along the route during construction. This will involve ongoing consultation and liaison with occupiers and owners of adjoining lands, and local traffic management measures.

Operational Phase

Traffic management measures will be put in place to facilitate the operation of the Luas Line B1. These management measures will be subject to the approval of Dun Laoghaire-Rathdown County Council, as Road Authority.

7.13.1.3.4 Predicted Impact of the Proposal

Construction Phase

Any short-term impact arising during the construction phase will be temporary, mitigated where practicable to do so, and in any event are deemed to be acceptable in the interest of the common good and of the proper planning and development of the area.

Operational Phase

As the provision of proposed Luas Line B1 alignment complies with the policies and objectives of current Statutory and strategic planning objectives, a significant positive impact is predicted.

7.13.1.3.5 Monitoring

During the construction phase there will be ongoing monitoring of the impact/disturbance to existing land use and activities. Public consultation and ongoing local liaison procedures will be put in place in the area to deal with any queries affecting land uses in the area. Dun Laoghaire-Rathdown, as the Planning Authority, will monitor the land use and development impacts of the Luas Line B1 in the course of its Statutory obligations under the Development Control and Development Plan processes.

7.13.1.3.6 Reinstatement

Reinstatement of pavement and street surfaces as far as is practicable will be carried out as part of the construction phase.

7.13.1.4 VEHICULAR AND PEDESTRIAN TRAFFIC AND SAFETY

7.13.1.4.1 Receiving Environment

The existing road network within Area 13 is undergoing a major transformation, brought about largely by the completion of the Southern Cross motorway and the ongoing construction of the South Eastern Motorway,

Blackthorn Avenue which is a 3 lane road, permitting one-way flow towards the junction with Burton Hall Rd, is 12.0 metres in width with a footpath on its western side. Burton Hall Road, between Blackthorn Avenue and the Leopardstown Roundabout is a 4 lane road with footpaths and bus lay-bys on both sides.

Brewery Road, a two-lane single carriageway has been reconstructed and widened in recent years between the N11 and Leopardstown Roundabout.

Traffic Flows

Current road traffic patterns in the area are dominated by the employment districts of Sandyford Industrial Estate, Stillorgan Industrial Park, and the Central Park Office Complex, particularly during the morning peak hour. Traffic volumes (0800-0900 hrs) in the area are as shown in Table 7.13.1.4.1

Table 7.13.1.4.1: Current AM Peak Road Traffic Volumes Area 13

Road	Location	Two Way Volume (pcu)
Blackthorn Avenue	Burton Hall Road	1330
Burton Hall Road	East of Blackthorn Avenue	2786
Burton Hall Road	West of Blackthorn Avenue	2125
Burton Hall Road	South of Blackthorn Avenue	149
Brewery Road	Leopardstown Road	1567
Leopardstown Road	East of Leopardstown	1709
Leopardstown Road	West of Leopardstown	2379
South County Business	Leopardstown Road	322



Queuing of vehicles is regularly observed at the approaches to the Leopardstown roundabout, reflecting both the limited capacity of this roundabout and also its use as a major route into the Sandyford Industrial Estate and the South County Business Park.

Predominant movement in the morning peak hour is into the Industrial Estate from Leopardstown Road (690 pcu) and from Brewery Road (659 pcu).

It is noted that at the time of writing direct access from Leopardstown Road onto the M50 via the Sandyford Interchange had opened and comparison of count information suggest traffic volume reductions in the order of 20% on Burton Hall Road in both the morning and evening peak hours. This reflects what had been the case prior to opening of this M50 link, whereby vehicles bound for the M50 from Leopardstown/Brewery Roads had to access the motorway via the Industrial Estate and Drummartin Link Road. This movement has now shifted over to Leopardstown Road, thus reducing traffic volumes on Burton Hall Road.

Pedestrian Movements

Pedestrian provision within Area 13 comprises controlled crossings at the junction of Burton Hall Road and Blackthorn Avenue, uncontrolled crossings at Leopardstown Roundabout and a good network of footpaths. The east side of Burton Hall Road does not have a pedestrian footway.

Existing pedestrian movements in the area during the day (0700-1900 hrs) are modest and are shown in Table 7.13.1.4.2 below. Table 7.13.1.4.2: Daily Pedestrian Movements Area 13

Location	Pedestrian Numbers
Blackthorn Avenue	224
Burton Hall Road-(west of junction with Blackthorn Ave)	310
Burton Hall Road - (east of junction with Blackthorn Ave)	193
Burton Hall Road - (south of junction with Blackthorn Ave)	111
Brewery Road - (north of Leopardstown R'bout)	154
Leopardstown Road (east of Leopardstown R'bout)	002
Leopardstown Road - (access to Sth. County Business Park)	004
Leopardstown Road (west of Leopardstown R'bout)	124

At the Blackthorn Avenue/Burton Hall Road junction, it was observed that the predominant movement was along Burton Hall Road with 64% of total pedestrian movements recorded. At the Leopardstown Road roundabout, pedestrian movements across Brewery Road and Leopardstown Road (west) accounted for 72% of all recorded movements.

Cycle Facilities

Cycle facilities within Area 13 are limited. Brewery Road has a cycle track on both sides, linking the Leopardstown roundabout with the N11 cycle track to the city. Recorded cyclist movements are shown in Table 7.13.1.4.3.

Table 7.13.1.4.3: Daily Cyclist Numbers in Area 13

Location	Cyclist Numbers
Blackthorn Avenue- (north of Burton Hall Road)	62
Burton Hall Road-(west of junction with Blackthorn Ave)	85
Burton Hall Road - (east of junction with Blackthorn Ave)	52
Burton Hall Road - (south of junction with Blackthorn Ave)	08
Brewery Road - (north of Leopardstown R'bout)	03
Leopardstown Road (east of Leopardstown R'bout)	010
South County Business Park	014
Leopardstown Road (west of Leopardstown R'bout)	043

At the junction of Blackthorn Avenue / Burton Hall Road, 145 cycle movements were recorded over the twelve hour survey period (07.00 to 19.00). The survey indicates that 43% of recorded cycle movements at this junction originated from Blackthorn Avenue.

Accident History

The Dublin Transportation Office has provided NRA accident data for the five year period from 1998 to 2002 for the following roads:

Table 7.13.1.4.4: Accident Data for the period 1998 to 2002 Area 13

	Minor Injury	Serious Injury	Fatal	Total	Motorcyclist involved	Pedestrians involved
Blackthorn Ave	5			5	1	
Brewery Rd.	4	1		5	4	
Burton Hall Rd.	6	1		7	2	
Leopardstown Rd.	14	4	1	21	5	2

There have been no accidents recorded on Brewery Road since 2000. On Leopardstown Road, though 21 accidents have been recorded since 1998, only 4 of these were recorded in 2001 and 1 accident in 2002 the remainder having occurred up to 2001. This time period corresponds with the opening of a dual carriageway on the Leopardstown Road which would appear to indicate a fall-off in the accident rate.

7.13.1.4.2 Potential Impact of the Proposal

Construction Phase

The construction of the project would be accomplished in phases - the diversion of utility apparatus, construction of structures and the construction of the trackbed and operational control systems. The general sequence of construction activities for Area 13 is described in Section 7.13.10. Within Area 13, the effect of construction activity on vehicular and pedestrian traffic is likely to centre on a number of key areas such as crossing Burton Hall Road, and the bridge construction over the Leopardstown roundabout.

The construction of abutments and placement of bridge decks at the grade-separated crossing of the Leopardstown Road/Brewery Road roundabout overbridge may have significant effects on vehicular and pedestrian traffic. This proposal will require a well defined programme of construction activity having due regard to traffic circulation patterns, access requirements for local businesses and pedestrian movements, A co-ordinated approach to the traffic management of these issues, involving all of the statutory authorities, is therefore essential to avoid significant impacts on road users, businesses and residents in this vicinity.

Operational Phase

Traffic Flows

Table 7.13.1.4.5 below indicates the likely scale of projected traffic changes in year 2016 with Luas and is compared with the network in 2016 without Luas Line B1.

Table 7.13.1.4.5: Projected Traffic Volumes 2016 Area 13

Road	Location	Two-Way AM Traffic Volume (pcu)No-Luas	Two-Way AM Traffic Volume (pcu) With-Luas	% Change
Blackthorn Ave	Burton Hall Road	919	964	+5%
Burton Hall Road	East of Blackthorn Ave.	2291	2198	-4%
Burton Hall Road	West of Blackthorn Ave.	1749	1809	+4%
Brewery Road	North of Leopardstown R'bout	1092	887	-19%
Leopardstown Road	East of Leopardstown R'bout	1717	1779	+4%
Leopardstown Road	West of Leopardstown R'bout	3201	3152	-2%

A minor increase in traffic flow along Brewery Road is predicted as a consequence of the introduction of Luas Line B1. However the availability of Luas means that strategic or longer distance traffic that would have used routes such as the N11 and SEM can now make use of Luas. This in turn frees up previously congested routes for localised demand which results in some minor increases in traffic volumes along routes such as the Brewery Road.

At a more localised level, the location of a stop to the rear of the Central Park scheme would provide employees of both that development and the businesses within the IDA South County Business Park with a high quality transportation system for journeys to and from work as well as work related journeys throughout the day.

Under the proposal for Luas Line B1, the Park and Ride provision at the Sandyford Stop is being removed. Current monitoring of patronage figures for the Park and Rides at Stillorgan stop on the Green Line indicates that there is ample capacity to accommodate the vehicles displaced from the Sandyford Park and Ride site. The extension of the system out to Cherrywood and its proposed routing



along Ballyogan Road will directly serve those commuters that would otherwise have had to avail of the Park and Ride at Sandyford.

The enhanced arrangement for the Sandyford Stop incorporates a bus set-down and taxi rank area allowing direct interchange between bus, taxi and Luas transport modes.

The junction of Blackthorn Avenue/Burton Hall Road has been assessed for capacity upon implementation of the Luas in this area in the future year 2016. This has revealed that although there is a minor increase in queue lengths, degrees of saturation and delays these are not significant and the junction remains well within its practical capacity. On Burton Hall Road east of the junction, the queue length increases over the 'do-nothing' scenario as a consequence of Luas by just 3 vehicles in 2 lanes and so still remains well within the queuing space available back to the Leopardstown Roundabout.

It is concluded that an at-grade Luas crossing at this location will not yield any significant levels of congestion in excess of the situation without Luas.

Pedestrian Safety

The Luas Line B1 adjacent to Blackthorn Avenue will be complemented by the provision of a pedestrian footpath along the eastern side of the road, contributing to the pedestrian facilities in this area.

The approaches to the grade separated crossing of the Leopardstown Road/Brewery Road roundabout will be clearly defined and segregated from pedestrian movement, thereby ensuring that there are no safety implications for pedestrians.

Direct pedestrian access to the Central Park Stop from the South County Business Park and Leopardstown Hospital will be provided by means of a new pedestrian footway. Pedestrian access will also be available to the stop from Leopardstown Road.

Cyclists

The proposed alignment through the junction of Blackthorn Avenue/Burton Hall Road would mean cyclists exiting

Blackthorn Avenue on to Burton Hall Road having to cross the track at a shallow angle. A signposted cycle route will be provided in this area in association with the road authority to encourage cyclists to cross the Luas alignment at a greater angle.

Cycle parking arrangements are being provided at most stops along Luas Line B1.

'Do-Nothing' Scenario

Under a 'do-nothing' scenario, the South County Business Park and the major development at Central Park would not have direct access to a major public transport system, and the current reliance on the private car or limited bus services as the primary mode of transport would continue. Congestion levels would continue to rise with the attendant environmental consequences.

Pedestrian amenity would reduce along some routes due to the increased volumes of traffic were the scheme not to be implemented.

7.13.1.4.3 Remedial or Reductive Measures

Construction Phase

Traffic management measures will be implemented in agreement with the Road Authority and statutory agencies to ensure a co-ordinated response to the construction activity. Temporary pathways and cycleways, recognising the requirements of the mobility impaired will be provided where necessary, adjacent to the construction activity.

There will be some short-term disruption associated with the road crossing at Burton Hall Road. Existing traffic lane arrangements will be maintained as far as is practicable and construction work phased to minimise impacts on traffic circulation. Construction of the bridge works at the Leopardstown Road/Brewery Road roundabout will also result in short term disruption arising out of specific activities. Minor amendments to the existing slip road access arrangements serving the property *Glencairn* will also be required.

Information outlining construction activities will be disseminated to local residences and businesses in advance of start-up such that prior arrangements regarding access and delivery and associated diversionary routings may be made available. Local liaison committees will be established to assist in this exercise.

Operational Phase

Traffic signal phasing at the junction of Burton Hall Road and Blackthorn Avenue will be optimised to balance both the needs of access into the Sandyford Industrial Estate while at the same time securing the operational integrity of Luas Line B1 and the safety of other road users, including pedestrians and cyclists.

New signage and road markings will complement the operation of Luas Line B1.

7.13.1.4.4 Predicted Impact of the Proposal

Construction Phase

Predicted impacts on both vehicular and pedestrian traffic flows and safety will be slight, with those impacts principally arising out of temporary works associated with the provision of road crossings and bridge works. These impacts will be short term.

Operational Phase

There are no permanent diversions of road traffic required, and the facilities for pedestrians will be enhanced through provision of a pedestrian footway on the east side of Blackthorn Avenue providing safer access to the Luas stop at Sandyford. The reduction in road traffic movements and the installation of additional cycle parking due to the implementation of Line B1 will improve pedestrian and cyclist amenities in this area.

The tramway crossing of Burton Hall Road will result in no significant adverse impacts on traffic movements and results in a slight reduction in junction capacity for road vehicles at this location when compared with the situation in the future year without the scheme.

The appropriate degree of tram priority will be discussed and agreed with the Local Authority prior to implementation.

7.13.1.4.5 Monitoring

A local liaison committee will be established to assist in the implementation of the Luas Line B1. In addition, Dun Laoghaire Rathdown County Council, will continue to monitor road traffic subsequent to the introduction of Luas Line B1 and will implement appropriate alterations to traffic movements, as they may deem to be necessary from time to time.

7.13.1.4.6 Reinstatement

It is intended that Luas Line B1 should continue to operate indefinitely.

7.13.1.5 COMMUNITY SEVERANCE

7.13.1.5.1 Receiving Environment

Principal Activities and Nodes

Retail and commercial facilities serving the wider vicinity are primarily located in Stillorgan and Sandyford/Balally. Other neighbourhood-scale retail outlets are located on Blackthorn Drive, Leopardstown Road, and in Sandyford and Stepside Villages.

Leisure and recreational facilities within and immediately adjacent to Area 13 include Leopardstown Race Course and Entertainment Complex (including Westwood Gym), Leopardstown Golf Course and Driving Range, Stillorgan Ten-Pin Bowling and Leisure Centre, Glenalbyn Swimming Pool, the Ormonde Multiplex Cinema and Ballawley Park. There are also a number of existing sports grounds within the catchment area including those on Blackthorn Avenue, Brewery Road and Kilmacud Road Upper.

Religious institutions and places of worship closest to the alignment are located in Stillorgan, Sandyford, Blackthorn Drive and Upper Kilmacud Road. Institutions in the vicinity of the Area 13 catchment include the Leopardstown Park Hospital and the Sunshine Children's Home both accessed off Leopardstown Road, the St. John of God Brothers facilities on Stillorgan Road and at Burton Hall, and St. Joseph's House on Brewery Road.



7.13.1.5.2 Potential Impact of the Proposal

Construction Phase

Pedestrian

Associated temporary inconvenience from construction works, including construction traffic movements, would potentially impact on the pedestrian, resident, working and visiting communities along Luas Line B1, particularly in the vicinity of Burton Hall Road, Blackthorn Avenue and Murphystown Road, where construction will occur in closest proximity to the public carriageway. This is addressed in more detail in Section 7.13.1.4 - *Traffic* of this EIS.

Vehicular

Temporary minor inconvenience for vehicles is anticipated during the construction of the Luas line, particularly in the vicinity of the Sandyford Industrial Estate, and the northern end of Murphystown Road. This would potentially impact on the pedestrian resident working and visiting communities of the area. Given that the Area 13 Luas Line B1 route will be primarily off-street, the impact on community severance in terms of vehicular traffic is not anticipated to be significant. This is addressed in more detail in Section 7.13.1.4 - *Traffic* of this EIS.

Operational Phase

Pedestrian

The overall provision of Luas Line B1 will not injure pedestrian movements by way of increased severance, as the alignment will not interfere with any existing pedestrian facilities. Moreover, a new formal pedestrian route will permit direct access to the Central Park stop from the South County Business Park, the Leopardstown Park Hospital and Leopardstown Road. This will result in a beneficial impact for the local resident, working and visiting communities.

Vehicular

There may be potential for a slight impact on traffic flow where the Luas Line B1 alignment intersects with Burton Hall Road, due to the requirement for a signal controlled junction with Blackthorn Avenue in this vicinity. Overall, no significant impact in terms of community severance is anticipated.

'Do Nothing' Scenario

Under a 'Do-Nothing' Scenario, existing pedestrian movement through this area would remain. However, it would result in a lost opportunity to provide improved modal linkage at the existing public transport interchange in the vicinity of the Sandyford stop.

7.13.1.5.3 Remedial and Reductive Measures

Construction Phase

Pedestrian

Facilities for pedestrians will also be provided at the intersections of the Luas Line B1 alignment with Burton Hall Road, during construction of the trackbed at this location. The adoption of appropriate site and construction management measures any such inconveniences can be readily ameliorated.

Vehicular

Remedial or reductive measures include the introduction by Dun Laoghaire-Rathdown County Council of appropriate traffic management procedures, which more properly manage traffic flow in the areas of the Burton Hall Road/ Blackthorn Avenue junction and along Murphystown Road.

Operational Phase

Pedestrian

New crossing points and pedestrian access ways will positively benefit the pedestrian community environment. Otherwise, no remedial or reductive measures are required in respect of community severance.

Vehicular

Traffic management measures at the junction of Burton Hall Road and Blackthorn Avenue, and along Murphystown Road will assist in negating any potential impact in terms of community severance.

7.13.1.5.4 Predicted Impact of the Proposal

Construction Phase

Pedestrian

With the implementation of remedial and reductive measures, no likely or significant impact is predicted during the construction phase in terms of pedestrian-related community severance.

Vehicular

No likely or significant impact on community severance is predicted in terms of community severance to vehicle users.

Operational Phase

Pedestrian

A beneficial impact on pedestrian movement is predicted for the residential, working and visiting communities of the area during the operation of Luas Line B1, as a result of remedial measures detailed above.

Vehicular

No likely or significant severance impact for vehicle users is predicted during the operation of Luas Line B1.

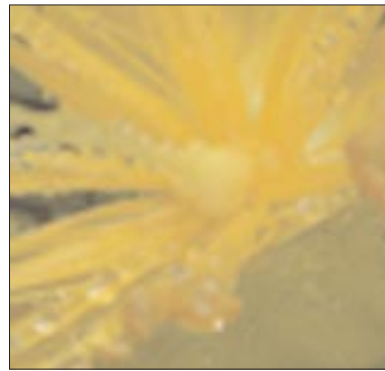
7.13.1.5.5 Monitoring

A Construction Team representative will be appointed in order to deal with any issues arising during the construction of this project.

7.13.1.5.6 Reinstatement

No reinstatement measures are required in respect of community severance.

Flora and Fauna



7.13.2.1 INTRODUCTION

Area 13 of Luas Line B1 extends from Sandyford depot to Murphystown Road.

7.13.2.2 FLORA

7.13.2.2.1 Receiving Environment

The habitats present on and adjoining the alignment of Luas Line B1 Area 13 are as follows:

- Spoil and bare ground ED2
- Houses, buildings and gardens
- Amenity grassland GA2
- Neutral grassland GS1
- Immature woodland WS2
- Broadleaved woodland WD1
- Treelines WL2
- Hedgerow WL1
- Landscape planting (ornamental/non-native shrub) WS3
- Ponds FL8.

No rare or protected plant species occur on the alignment or in the temporary construction areas.

Spoil and bare ground

This habitat is present in the area currently being developed at Central Park on Leopardstown Road, within the land take area for the M50 which is currently under construction, and within temporary car-parking areas associated with these developments. A very sparse flora (< 50% vegetation cover) is present in some areas of this habitat, and consists of common colonising species of bare ground including toad rush, willowherb species, groundsel, sow thistle, and annual meadow-grass.

Houses, Buildings and gardens

Private gardens on and adjoining the alignment were not surveyed.

Amenity grassland

Amenity grassland occurs in the grounds of Leopardstown

Park Hospital and IDA Business Park, private gardens, and in narrow strips along Blackthorn Avenue, Burtonhall Road, and at Murphystown Road. There is also a small area within the Luas Line B depot. It is dominated by ryegrass, with daisy, white clover, ribwort plantain and other common weed species of lawns occurring frequently.

Neutral grassland

Neutral grassland on and adjoining the alignment is represented by small areas of land which were formerly in agricultural use, and which had not been managed intensively prior to going out of farming use. The main area of this habitat in Area 13 is a field at Glencairn adjoining Murphystown Road. This habitat is grass dominated and is relatively species poor, reflecting its former agricultural use. The dominant grasses were cocks-foot, meadow foxtail, Yorkshire fog, ryegrass and red fescue. Dicotyledon species present were creeping buttercup, creeping thistle, meadow buttercup and ribwort plantain, with bush vetch, dandelion and hogweed.

Immature woodland

Landscape tree planting along Blackthorn Avenue and Burtonhall Road is classified as immature woodland. Tree species present are cherry, oak, birch, horse chestnut, beech and holly. The ground is covered with bark mulch, and there is little ground flora apart from a sparse cover of cleavers, herb robert, creeping bent-grass, dandelion and yellow clover.

Broadleaved woodland

There are three areas of mixed broadleaved woodland of planted origin impacted by Area 13 of Luas Line B1.

The woodland adjoining the Central Park development on Leopardstown Road is dominated by mature beech, oak, sycamore and horse chestnut. Recently planted saplings of ash, beech, and Acer cultivars are also present. The shrub layer includes privet, holly, *Viburnum tinus*, and snowberry. The ground flora is dominated by ivy, other woodland species present occasionally are lords and ladies, cleavers, celandine, wood anemone and winter heliotrope.

The woodland at Glencairn is located in a small, steep sided

valley with occasional outcrops of granite bedrock. Ornamental ponds are located centrally in this small valley (see below). Mature trees present are beech, oak, horse chestnut and ash. There is a sparse shrub layer of holly, and developing bramble cover. Laurel is present in the northeastern part of the woodland, outside the alignment and temporary land take area. The ground flora is dominated by hogweed and creeping buttercup, with abundant celandine. Other species present include bluebell, primrose, sweet woodruff, cow parsley, wood avens, herb robert, cleavers, and bush vetch, with occasional opposite-leaved golden saxifrage and remote sedge. The nuisance plant Japanese knotweed is present within the temporary land take area near the southern pond bank.

A small area of woodland at Murphystown Road, beside the entrance to Glencairn, includes sycamore, beech, horse chestnut and Scot's pine. The ground flora here is dominated by tall herbaceous species: hogweed, alexanders and cow parsley, with creeping buttercup and occasional bramble and nettle.

Treelines

Lines of mature trees are present at Burtonhall Road, and along the boundary wall between the Leopardstown Park Hospital and the Central Park development site (Appendix 13C Map 2). The treeline to the south of Burtonhall Road, includes oak, Scot's pine, beech, ash and sycamore, with a shrub layer of hawthorn, holly, Portugese laurel, *Viburnum tinus* and bramble.

The mature trees along the boundary wall between the Leopardstown Park Hospital and the Central Park development area are oak, sycamore, ash, horse chestnut and lime, with occasional holly, elder and elm saplings. The ground flora underneath this treeline, where present, includes cow parsley with occasional nettle, false brome, hogweed and ivy, merging into a relict strip of neutral grassland on the Central Park side of the wall.

Hedgerow

There are two short sections of hedgerow lying perpendicular to the alignment (Appendix 13C Map 2) The hedgerow is intermittent with and dominated by hawthorn,

with some elder and bramble. The Leopardstown Park Hospital hedge includes two early mature ash, while the Central Park hedge includes one mature oak tree.

A section of an early mature hedge/treeline of cypress in a private garden at Woodford lies within the alignment.

Landscape planting

Landscape planting of ornamental shrubs along the southern side of Burtonhall Road includes Berberis, *Viburnum tinus*, *Rosa rugosa*, *Cornus*, and cherry, with lower shrubs of *Potentilla*, *Cistus*, *Spiraea*, *Lonicera pileata* and Eleagnus, with Bergenia. On Blackthorn Avenue there are further small areas of young landscape planting on the alignment, at the entrance to Sandyford depot and car-parking area, and along the pedestrian access from Brewery Road. Species present are mainly non-native and include *Mahonia*, *Cotoneaster*, *Rosa rugosa*, beech and *Berberis*. Native species present are hawthorn and oak.

Ponds

Ornamental ponds lie along the course of a small stream (the Racecourse Stream, a tributary of the Loughlinstown River) in the Glencairn and adjoining Leopardstown Park Hospital grounds. At Glencairn, the ponds have a silty bed with leaf litter, and are shaded by the surrounding woodland. A sparse flora of broad-leaved pondweed, brooklime and common water starwort was recorded. The small floating plant common duckweed is also present. Remote sedge occurs occasionally on the banks.

7.13.2.2.2 Characteristics of the Proposal

The proposed Luas Line B1 involves the construction of two bridges in area 13, crossing Leopardstown Road the South Eastern Motorway section of the M50, and the wooded valley at Glencairn. Elsewhere, the alignment will run at grade.

7.13.2.2.3 Potential Impact of the Proposal

Construction phase

The Luas Line B1 lies largely on land which is already developed, currently under construction (including Central Park and the South-eastern motorway section of the M50),



and for which development is proposed or approved. There are some remaining areas of semi-natural grassland and woodland habitats between Leopardstown Road and Murphystown Road. The main impact of Luas Line B1 on flora therefore arises on the mature treeline along the boundary between the Central Park site and Leopardstown Park Hospital, and on the three woodland areas where some of the existing tree cover will be removed. Some trees in the mature treeline along the boundary of the Central Park site have been damaged by storms and by excavation within their root spread area.

There is a potential for the pond at Glencairn and the watercourse downstream to be impacted by spillages of oils, fuels, and run-off from fresh concrete. These impacts are assessed as locally significant. There is a potential for the nuisance plant species Japanese knotweed to be spread inadvertently during construction work at Glencairn.

Immature woodland, a short section of cypress hedge/treeline, and landscape planting at Burtonhall Road and Blackthorn Avenue will also be impacted. These impacts are assessed as slight, since the species impacted are immature trees and non-native ornamental shrubs. Common plants of recolonising bare ground will also be impacted, with imperceptible impacts.

Operational phase

Minor shading will impact on aquatic vegetation in the pond at Glencairn, and on woodland ground flora, arising from the bridge crossing. This impact is assessed as imperceptible.

'Do Nothing' Scenario

In a 'Do Nothing Scenario', flora and habitats in the vicinity of the alignment will continue to be lost to or impacted by other approved developments.

7.12.2.2.4 Remedial or Reductive Measures

Construction phase

The main reductive measure is to minimise the felling of mature trees in the woodland areas impacted by the alignment. Where possible, obstructing branches will be removed rather than entire trees. Where space permits,

replacement trees of the same species mix will be planted in woodland and immature woodland areas impacted by the alignment. New landscape planting will include native species.

It is recommended that Japanese knotweed in the temporary construction area at Glencairn is controlled by spot treatment with Glyphosate prior to the commencement of construction work, to prevent the potential spread of this nuisance species along the watercourse or to other areas. Small sections of root and stem of this plant can develop to form new colonies. Treatment with herbicide should take place when the plant is in active growth, and may require repeat treatments.

Construction sites will be strictly managed to minimise the risks of contaminants and silt reaching watercourses. Concrete products, oils and fuels will be stored in bunded designated areas.

Potential Route Deviation

Any lateral deviations in the existing proposed alignment would be subject to the mitigation measures given above.

Operational phase

No additional remedial measures are required for flora during the operational phase.

7.12.2.2.5 Predicted Impact of the Proposal

The main impacts of the proposed development are the loss of mature trees in woodland areas and treelines on the alignment. This impact is assessed as significant in the short term. New planting will mature in the medium to long term. Overall impacts on flora arising from the proposed development are assessed as moderate in the medium to long term. Cumulative impacts of current and approved developments on flora in the vicinity of the alignment are assessed as significant in the locality. Predicted impacts arising from any lateral route deviations are similar to those outlined above.

7.13.2.2.6 Monitoring

No monitoring is required.

7.13.2.2.7 Reinstatement

No additional reinstatement is required.

7.13.2.3 FAUNA

7.13.2.3.1 Receiving Environment

Birds

Bird fauna on the alignment is species poor in the Blackthorn Avenue/Burtonhall Road area, with wren and blackbird the commonest species recorded, with rook, woodpigeon, starling, greenfinch, robin, jackdaw and magpie also present in the area. The greatest diversity was recorded in the woodland along the ornamental ponds at Glencairn, where a pair of kestrels was breeding during the 2001 survey. The nest appeared to be located in a group of two horse chestnut and two beech trees directly on the alignment. Other bird species present here were blue tit, coal tit, great tit, chaffinch, greenfinch, robin, blackbird, wren, dunnoek, song thrush, woodpigeon, rook, magpie and grey crow. These species will also make use of amenity and neutral grassland habitats. Moorhens make use of aquatic habitats in the ponds at Glencairn.

Mammal

Badger setts were recorded in the South County Business Park and Glencairn lands in the EIS for the South Eastern Motorway section of the M50; no setts were found on the Luas alignment or in its immediate vicinity. Occasional badger feeding signs were observed during surveys for Luas Line B1 in Glencairn woodland and the adjoining neutral grassland, but no additional setts were located. Foxes make use of the alignment area, grey squirrels and possibly red squirrels are also present at Glencairn. Hedgehog and field mice are likely to occur, and pygmy shrews were heard in neutral grassland.

A bat survey was carried out in July 2001 in order to identify and locate signs of bat use of mature trees along

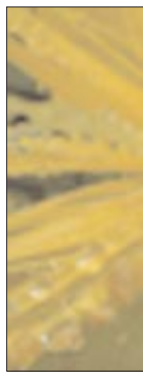
the alignment in Glencairn and along the boundary between the Central Park site and in the Leopardstown Hospital grounds, and also to identify the bat species present in the immediate area and the nature of any roosts. Bats species identified with the aid of bat detectors were as follows:

- Pipistrellus pygmaeus (55KHz) Soprano pipistrelle
- Pipistrellus pipistrellus (45kHz) Common pipistrelle
- Myotis daubentoni Daubenton's bat
- Myotis nattereri Natterer's bat (Red Data Book Listed)
- Nyctalus leisleri Leisler's bat

Brown long-eared bats *Plecotus auritus* are also almost certainly an element of the bat fauna in this area. There are ample opportunities for feeding and roosting for these bats. Both pipistrelle species were active along the mature trees of Leopardstown Hospital/Central Park boundary during the 2001 survey. There was also a relatively high level of Leisler's bat activity along these trees. The trees provide a shelter belt and food source for a variety of insects, upon which the bats feed. Natterer's bats were identified feeding at the woodland areas close to the hospital entrance and in Glencairn. Daubenton's bats were recorded feeding over the ponds downstream of the Luas B1 Area 13 alignment.

Bats of the genus *Myotis* (probably *Myotis nattereri* based on the ultrasonic signals detected) were noted to be roosting in a beech tree within the grounds of Glencairn. This tree (tagged Tree No. 116) is still in situ, now located close to the edge of the M50 under construction but not included in the land take area.

It is noted that the South Eastern Motorway section of the M50 has been constructed since the bat survey was carried out in 2001. The road severs the woodland habitats at Glencairn from the treeline of the Leopardstown Hospital/Central Park boundary, and bat activity and flightlines in the general area may have been affected as a result. Because of seasonal factors, it has not been possible to repeat a bat survey for inclusion in this EIS. However, it is likely that bats are still using the woodland area at Glencairn, and many of the mature trees present have splits and cavities suitable for use as roosts by bats.



The treeline along the Leopardstown Hospital/Central Park boundary may also still be used by bats.

7.13.2.3.2 Characteristics of the Proposal

The proposed Luas Line B1 involves the construction of two bridges in Area 13, one crossing the Leopardstown Road roundabout and the other crossing the SEM and the wooded valley at Glencairn. Elsewhere, the alignment will run at grade.

7.13.2.3.3 Potential Impact of the Proposal

The main impact of Luas Line B1 on habitats for fauna arises on the mature treeline along the boundary between the Central Park site and Leopardstown Park Hospital, and on the three woodland areas where some of the existing tree cover will be removed. Mature trees in these areas have the potential to be used as roosts by bats, as well as providing feeding habitat. All bat species are legally protected. Potential impacts on bats arise as follows:

- Removal of trees may directly affect bats by killing them during felling, or by the removal of roost sites that may be used at different times of the year
- The proposal will introduce lit vehicles and noise, and may reduce the viability of the area for bat feeding and commuting, in addition to loss of feeding habitat arising through the removal of mature trees.

Impacts on fauna, including bat fauna, arising from Luas Line B1 can not easily be separated from cumulative impacts and habitat loss arising from existing and proposed development in the general area. A tree used as a nest site by kestrel in 2001 will be removed at Glencairn, as it lies directly on the alignment, but this species will also lose feeding habitat over a larger area as a result of other developments and may be displaced in any event. Landscape planting will replace some of the habitat lost in the medium and long term. Some severance of badger feeding areas will arise from Luas Line B1, but no setts will be impacted by the proposal. Significant severance of badger territory has already arisen due to the SEM. Overall impacts of Luas Line B1 on fauna are assessed as slight, in the context of overall rates of habitat change in the general area.

There is a potential for the pond at Glencairn and the watercourse downstream to be impacted by spillages of oils, fuels, and run-off from fresh concrete. These impacts are assessed as locally significant on the limited aquatic fauna likely to occur in this section of the watercourse.

Potential Route Deviation

Any lateral route deviation could result in a lesser or greater number of mature trees being impacted by the proposal, with potential implications for individual bat roosts.

'Do- Nothing' Scenario

In a 'Do Nothing Scenario' in respect of Luas Line B1, fauna in the general area of the alignment will be impacted by other developments including the operational phase of the SEM.

7.13.2.3.4 Remedial or Reductive Measures

Construction phase

A bat survey will be carried out at the appropriate time of year (preferably June to August) prior to the commencement of construction, to assess the current usage of woodland and mature trees in the immediate vicinity of the Area 13 Luas B1. Buildings and mature trees scheduled for demolition at Clonlea House will be included in the bat survey. Mature trees due for removal will be examined for bat roosts prior to felling. It is necessary to seek derogation from the National Parks and Wildlife Service to exclude bats from a roost, if roosts are found to be in use in any trees scheduled for felling, or buildings scheduled for demolition. Any process of exclusion required will be undertaken by a licensed bat expert. Seasonal constraints on felling may apply, to minimise the risk of death and injury to bats. Bat survey results may indicate additional mitigation measures including the provision of bat boxes to replace roosts which may be lost because of tree felling.

Lighting should only be provided where necessary for safe movement. Bat activity may be inhibited by lights, particularly in the more sensitive species brown long-eared bats and Natterer's bats. Lights should be directed at the areas where they are required, avoiding overspill into woodland areas. However, it should be noted that the operation of the SEM will result in a new source of lighting in this area.

The main reductive measure for fauna is to minimise the felling of mature trees in the woodland areas impacted by the alignment. Where possible, obstructing branches will be removed rather than entire trees. Where space permits, replacement trees of the same species mix will be planted in woodland and immature woodland areas impacted by the alignment. New landscape planting will include native species; ornamental shrubs such as *Pyracantha*, *Berberis darwinii* and *Cotoneaster* will also be included as berried shrubs which provide feeding for birds. Tree felling and hedgerow removal will, where possible, be restricted to the period September to February inclusive to minimise impacts on breeding birds, although it should be noted that mitigation measures for bats may require additional constraints on the timing of tree felling. Construction sites will be strictly managed to minimise the risks of contaminants and silt reaching watercourses. Concrete products, oils and fuels will be stored in designated areas.

Potential Route Deviation

Any changes to the schedule of trees to be felled, or buildings impacted by the proposal, will be notified to a licensed bat expert, who will carry out bat surveys and attend tree felling as described in the mitigation measures above.

Operational phase

No additional remedial measures are required for fauna during the operational phase.

7.13.2.3.5 Predicted Impact of the Proposal

With the implementation of the remedial measures detailed above, the predicted impact of Luas B1 on fauna is assessed as slight in the local context. The implementation of the stated remedial measures in respect of bats should ensure their proper and appropriate protection, with the result that impacts will be slight.

Any post-planning deviation in the route alignment should not result in additional impacts on fauna, provided that the mitigation measures are implemented.

7.13.2.3.6 Monitoring

Monitoring of bats will be undertaken during the construction phase

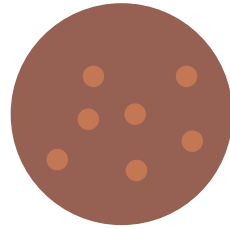
7.13.2.3.7 Reinstatement

No additional reinstatement is required.

7.13.2.3.8 Potential Route Deviation

Lateral route deviation could have a potential to impact on a greater or lesser number of mature trees on the alignment in area 13 than the existing proposed alignment. Longitudinal or vertical deviations of the alignment are unlikely to result in any additional impacts.

Soil



7.13.3.1 INTRODUCTION

This section addresses impacts arising out of the construction and operation of Luas Line B1 on soil, based on available information in Area 13. It includes an evaluation of potential for contamination arising from previous land uses. Soil dispersed as dust during construction is addressed in Section 7.13.6- Air Quality of this EIS.

7.13.3.2. RECEIVING ENVIRONMENT

Over the extent of Area 13, the general soil profile generally comprises a thin or absent made-ground layer over glacial till over a weathered granite profile. These are relatively impermeable soils. All these soils may be present near the existing ground surface.

The amount of development in the vicinity of the Sandyford Industrial Estate and Leopardstown Road area makes it likely that made-ground or reworked soils will lie immediately below ground level.

As the route passes behind the Central Park development, it is likely to cross reworked natural soils and then, as it crosses open land, natural glacial till and weathered granite. The sequence of soils on the slopes and in the valley of the Racecourse Stream are likely to include recent soliflucted deposits and alluvium, over glacial till and then granite. On the southern side of the valley, reworked soils and made-ground associated with Murphystown Castle and Clonlea House are likely to be present near the surface. It is also understood that a pit, which was filled with refuse etc existed within the perimeter of the former farm present at Clonlea House. Although it is understood that this has now been removed, there is a possibility of encountering residual contaminated materials. During the second site visit in January 2005, piles of made ground/reworked soils were also observed on the southern side of the valley, adjacent to the Murphystown Road.

No potential contaminative uses have been identified in Area 13 of the Luas Line B1 alignment. However, local contamination in near surface soils cannot be completely discounted.

7.13.3.3 POTENTIAL IMPACT OF THE PROPOSAL

Construction Phase

Ground disturbance will be required for the construction of the planned Luas substations, stops and other proposed works. To accommodate the required levels topsoil stripping followed by a cut and fill operation to varying depths is required. Overall, at-grade ground disturbance will principally be 800-1200mm. Deeper but more localised ground disturbance may be required for bridge foundations and utility works. The proposed construction compounds located within the Sandyford Industrial Estate, adjacent to the Stillorgan Reservoirs, and proposed compounds within Glencairn and the Murphystown area are likely to generate a limited amount of disturbance to the ground surface, resulting in the generation of dust.

Impacts can arise from disturbance, handling and transport of contaminative substances including made-ground, subsoil and construction wastes. No potentially contaminative uses have been identified in Area 13, but the possibility of contamination from residual materials in made-ground should not be excluded. In addition, the potential for the spillage of construction wastes and generation of dust still exists. However the boulder clay/granite soil structure provides a relatively impermeable barrier against leakage into the surrounding environment.

Operational Phase

In respect of the track alignment there will be no operational impacts other than the possible release of minor quantities of dust from the tram braking system and spillage of minor quantities of oil from the electrical substations. This is not considered to be likely or significant.

'Do-Nothing' Scenario

Under a 'Do-Nothing Scenario', no likely or significant implications arise in respect of soil.

7.13.3.4 REMEDIAL OR REDUCTIVE MEASURES

Construction Phase

Intrusive investigations will be carried out prior to excavation within the former Clonlea House farm area, particularly within the vicinity of the former pit to confirm where any contaminated materials are present in this area where disturbance of the ground is intended.

During the construction process, the contractor will be bound by the terms of the contract to exercise due care and attention in the handling and disposal of any potentially contaminated material in accordance with the Waste Management Acts 1996-2003 and subsequent legislation. Dust suppression measures, particularly for the construction compounds, shall also need to be incorporated into the terms of contract.

Operational Phase

Any spills of oil from the substations are considered unlikely and insignificant. No remedial or reductive measures are considered necessary.

7.13.3.5 PREDICTED IMPACT OF THE PROPOSAL

Construction Phase

Neutral impacts are predicted from the construction process if the remedial and reductive measures are adhered to.

Operational Phase

Neutral impacts are predicted from the operation of Luas Line B1.

7.13.3.6 MONITORING

Requirements to monitor for possible emissions to soil during the construction process will be laid down in the contract documents.

7.13.3.7 REINSTATEMENT

Construction Phase

There are no requirements for reinstatement in respect of soil.

7.13.3.8 POTENTIAL ROUTE DEVIATION

It is not considered that any of the potential deviations of the route alignment stated within the Railway order shall pose any additional significant impact upon the soil.



7.13.4.1 INTRODUCTION

This section addresses impacts arising out of the construction and operation of Luas Line B1 on the aquatic environment in Area 13. It does not include issues of surface water and foul drainage, which are addressed in Section 7.13.8.2 – Public Utilities of this EIS.

7.13.4.2 RECEIVING ENVIRONMENT

The Luas Line B1 commences at a point adjacent to the Stillorgan Reservoirs. The reservoir is part of the storage system for Dublin's potable mains water supply that is sourced from upland gathering grounds. The overall area contains both existing paved areas and open ground. Existing rainfall runs into the ground or into the local drainage network.

The area from the new Central Park development to Murphystown Road is in the catchment of the Racecourse Stream. Near Central Park, rainfall is likely to enter the established and new local drainage networks. Elsewhere, rainfall is likely to infiltrate into the ground or run-off into the Racecourse Stream.

The Racecourse Stream has been formed at one point into a series of ornamental ponds. Here, the stream is close to its head and flow rates are relatively low. At the time of the initial site survey in July 2001, surface flow rates were estimated to be about 0.001 cumecs.

There are no known abstractions within the vicinity of the route. The deposits crossed by the planned alignment include made-ground, reworked natural soils or fill, glacial till and granite. These are generally considered to be non-aquifers. However, fracture flow in the weathered granite may contribute to the base flow of the Racecourse Stream.

7.13.4.3 POTENTIAL IMPACT OF THE PROPOSAL

Construction Phase

Stream will be on a bridge that will also cross the SEM. This will be a significant structure and will involve disturbance to the ground during construction of the structure and foundations.

No evidence of any material potentially harmful to the aquatic environment has been identified on the Luas route and none of the information obtained suggests that sensitive ground water resources exist in the area. The relatively impermeable nature of the subsoils will help to reduce the passage of any contaminating spillages from entering underground or surface watercourses, or affecting the supplies of the Stillorgan reservoir.

At the Stillorgan reservoirs the disturbance arising from construction of the Luas, associated railway sidings and the presence of the construction compound within the vicinity has the potential to increase the level of dust that may be deposited in the reservoirs, and runoff that is loaded with sediment.

At the crossing of the Racecourse Stream, construction activities including activities within the proposed construction compound adjacent to the proposed Leopardstown Bridge have the potential to introduce construction waste materials and rubbish as well as sediment and dust to the stream. Flow rates of the stream are relatively low and therefore even small amounts of foreign materials will have a long residence time. This is a potential moderate impact of low severity.

Operational Phase

The track pavement in Area 13 comprises an embedded or raised track. All surface water will be collected and run off via a positive drainage network. Where the track runs on or adjacent to existing roads discharges of surface water from the trackbed of Luas Line B1 will be to the existing or upgraded highway drainage system. Where the alignment runs across open land a new drainage system will be built. Since the trams are powered by electricity, the potential for contaminating leakages or spillages is minimal.

Consequently no potential adverse impacts arise in this instance.

'Do- Nothing' Scenario

Under a 'Do-Nothing' Scenario, no implications arise in respect of water.

7.13.4.4 REMEDIAL OR REDUCTIVE MEASURES

Construction Phase

Careful design and control of the method of working during the construction will do much to alleviate any potential adverse effects. The contractor will be required to implement control procedures in order to maintain safe working practices and the protection of the Environment.

With reference to the Stillorgan reservoirs, protection measures to avoid pollution by seepage, vibration damage, or air borne pollutants such as dust will be strictly complied with. The permanent drainage network in this area will include a Class 1 interceptor to prevent the egress of oils into the environment.

At the Racecourse Stream construction management practices will be key to mitigating any adverse construction affects. Proper planning of construction activities and site management including dust suppression measures will minimise the potential for spillages, wastes, rubbish, dust or an increased sediment load reaching the stream. The risk of causing flooding at the Racecourse Stream crossing will be designed out during the planning stage.

Operational Phase

As there are no likely or significant adverse impacts arising in respect of water during the operational phase of Luas Line B1, no remedial or reductive measures are necessary.

7.13.4.5 PREDICTED IMPACT OF THE PROPOSAL

Construction Phase

The remedial or reductive measures detailed above will ensure that any adverse impact to water during the construction phase will be slight.

Operational Phase

No likely or significant impact to water is predicted during the operation of Luas Line B1.

7.13.4.6 MONITORING

Requirements to monitor for possible emissions to water during the construction process will be laid down in the contract documents.

7.13.4.7 REINSTATEMENT

No reinstatement measures are required in respect of water.

7.13.4.8 POTENTIAL ROUTE DEVIATION

It is not considered that any of the potential deviations of the route alignment stated within the Railway order shall pose any additional significant impact upon the water.



7.14.5.1 INTRODUCTION

This section of the Environmental Impact Statement considers the impact of the construction of the Luas Line B1 alignment in Area 13 on the Noise, Vibration, Lighting and Electromagnetic environments.

7.13.5.2 NOISE

7.13.5.2.1 Receiving Environment

The proposed route from Sandyford Stop to Murphystown Road is at grade up to the ramp at Burton Hall Road and over the Leopardstown Roundabout and is at high level past Block E at Central Park, where it returns to grade crossing the SEM by bridge. This Area ends at Murphystown on street. From Sandyford Depot to Leopardstown Roundabout there is existing heavy traffic flow. The noise environment along this portion of the route is dominated by road traffic. From Central Park, past Leopardstown Park Hospital the noise environment is mostly due to distant road traffic. At Murphystown Road there is moderate road traffic.

The existing noise environment was measured at four representative locations along the proposed route.

Four samples of fifteen minutes duration were taken at each location. Where practical the microphone was located one metre from the facades, otherwise in the near vicinity of the facades. The samples were analysed to yield the equivalent continuous noise level LAeq and the percentile levels LA10, and LA90, the noise levels in dBA equalled or exceeded for 10% and 90% of the sample time. The maximum noise level at LAmax was also measured for each sample.

Table 7.13.5.1.1 Summary of Noise Monitoring Results Taken at 1 metre from Facades of Building*

Location	L _{Aeq}	L _{A10}	L _{A90}	L _{AMAX}
26A Woodford	59	60	55	65
86 Woodford	50	51	48	60
Leopardstown PK (Outside Chapel)	47	49	46	54
90 Murphystown Road	64	67	51	70

*Mean value of four 15- minute samples.



The measurements at locations were carried out over two days, on the 7th and the 13th January 2005, between the hours of 08.00am and 20.00pm. The instrumentation consisted of a Bruel and Kjaer Precision Integrating Sound Level Meter Type 2236. This was calibrated using a Bruel and Kjaer Calibrator Type 4230.

7.13.5.2.2 Characteristics of the Proposal

Noise generated by the passage of trams will be pronounced at the facades of residences and other noise sensitive areas. The source of noise is deemed to be at the top of the rail head nearest to the facade.

7.13.5.2.3 Potential Impact of the Proposal

The noise from the passage of trams has the potential to cause disturbance to the occupiers of premises along the route.

7.13.5.2.4 Remedial or Reductive Measures

Construction Phase

All construction equipment will be required to comply with the EC Directives relating to noise emission from construction plant and equipment. These include compressors, welding generators; hand held concrete breakers and picks, excavators, dozers, loaders and excavator loaders. Construction work will be limited to hours agreed with the Local Authorities.

Operational Phase

To reduce the risk of additional noise from trams going around curves, anti-wear and anti-squeal measures will be applied to the rails. The anti-wear treatment is applied to the vertical surface of the railhead, and the anti-squeal treatment is applied to the running surface of the rail.

The existing trams running along the Green and Red Lines have incorporated noise control measures in their design, as will any additional trams running along the Luas B1.

7.13.5.2.5 Predicted Impact of the Proposal

Construction Phase

Comparatively high noise levels will temporarily arise during the construction phase, particularly from the use of pneumatic jackhammers and/or hydraulic rock breakers used for road breaking in the diversion of services and the preparation for laying of the track bed. Within 10 metres of this type of activity the noise levels are likely to be of the order of LAeq of 88dBA. Other types of construction noise are likely to be of the order of LAeq 75dB at a distance of 10 metres. This will be temporary and intermittent in nature and will be similar to that occurring in the laying and maintaining of public utility services. Its impact will be moderate to significant.

Operational Phase

The noise level expected from the operation of the Luas one metre outside the facades of the noise monitoring locations are shown in Table 7.13.5.1.2

Table 7.13.5.1.2 Predicted Noise Levels 1m outside facades due to operation of the Luas

Location	Distance from Track Reception	Mean By Pass Speed Km/hr	L _{Aeq, 18h}	L _{Amax}
26A Woodford	15	30	56	82
86 Woodford	40	30	53	81
Leopardstown park Hospital, outside	20	35	58	86
90 Murphystown Rd	30	15	48	71

It should be noted that the methodology set out in "Calculation of Railway Noise 1995", is valid for distances from 10 metres to 300 metres from the rail head to the nearest receptor point, which is taken as 1 metre outside the nearest effected window.

The projected noise levels, and their exceedance or otherwise over the existing ambient noise levels are shown in table 7.13.5.1.3

Table 7.13.5.1.3 Projected Noise Levels due to operation of the Luas line B1 and existing ambient levels*

Location	Projecte d Luas Noise	Existing Traffic Noise	Expected Traffic Noise	Resultant	Exceedance Over Existing dBA
26A Woodford	56	59	59	61	+2
86 Woodford	53	50	50	55	+5
Leopardstown park Hospital	58	47	60*	62	+15
90 Murphystown Rd	48	64	64	64	0

At locations A and B there will be an increase in the overall noise levels by 2dBA to 5 dBA. The impact will be slight. At locations C there will be an increase in the existing noise levels of 15 dBA, which will be due to the noise from the SEM. The impact will be significant.although once the SEM becomes operational, noise associated with Luas Line B1 will be largely insignificant and intermittent in nature. At location D there will be no change in the existing ambient noise level. The impact will be neutral.

7.13.5.2.6 Monitoring

Construction Phase

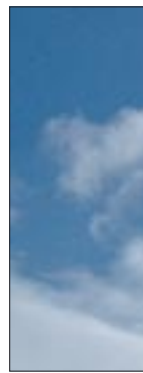
The noise levels due to construction will be monitored at selected noise sensitive locations.

Operational Phase

Noise levels will be monitored at selected locations to check for compliance with predicted levels.

7.13.5.2.7 Potential Route Deviation

It is considered that the potential route deviation as set out in the Railway Order application will have no material effect in terms of noise.



7.13.5.3 VIBRATION

7.13.5.3.1 Receiving Environment

A comparatively low level of vibration is generated by the passage of road vehicles along the existing roadways. This is due to all these vehicles having pneumatic tyres. Consequently vibration levels transmitted to the residences along the route is comparatively low.

7.13.5.3.2 Characteristics of the Proposal

During the construction phase vibrations will arise from machinery and plant involved, and during operational phase vibrations will arise from the dynamic interaction of the wheels of the trams on the rails themselves.

7.13.5.3.3 Potential Impact of the Proposal

Construction Phase

During the construction phase the proposed development has the potential to create an adverse impact on the adjoining residences due to vibration caused by the mechanical tools and equipment used during this process.

Operational Phase

During the operational phase Luas Line B1 has the potential due to the running of trams on the trackbed to create vibratory effects, which could have an adverse impact on properties adjoining the Luas alignment.

7.13.5.3.4 Remedial or Reductive Measures

Construction Phase

Remedial measures to be considered are the control of working hours and by agreement with local authority. A balance has to be achieved between hours which are too restrictive and which might further prolong the impact. During demolition and construction the best practical means will be utilised to minimise vibration transmitted to sensitive areas and buildings. A criterion for vibration will be set at a level of 5mm/sec when measured near the foundation of any building. For listed and vulnerable

buildings the criterion will be 3mm/sec.

This follows the German standard DIN 4150. This level is very conservative and is used to protect against the onset of superficial damage in listed buildings or ancient monuments.

Operational Phase

To reduce the vibration transmitted from the interaction of wheels on tracks to the ground and through to sensitive areas, vibration isolation techniques will be incorporated into the track and track-bed design. To take account of possible amplification of vibration, which may occur between the foundations and upper floors, an amplification factor of 3 will be allowed for in the design.

7.13.5.3.5 Predicted Impact of the Proposal

Construction Phase

Vibrations will arise and may be perceptible inside residential areas during the breaking out of the roadway with the use of pneumatically operated hammers or hydraulic rock breakers. Vibration levels of 1 to 2 mm/sec are clearly perceptible. Levels up to 3mm/sec do not pose any risk of structural or cosmetic damage to the most sensitive of buildings such as ancient monuments, etc.

Operational Phase

The level of vibration will meet the criterion for residential properties both by day and night set out in Annex A, Table 2 of International Standard 2631-2 "Evaluation of human exposure to whole-body vibration Part 2: Continuous and shock induced vibration in buildings (1 to 80Hz)." The impact will be negligible. This naturally concerns the human response to vibration. This criterion for human response is much more stringent than that for slight cosmetic damage to buildings therefore the possibility of slight cosmetic damage to any buildings will be negligible.

7.13.5.3.6 Monitoring

Construction Phase

Vibration levels will be monitored at sensitive buildings where the vibration level may exceed the criteria set.

Operational Phase

During commissioning of the system, which is likely to last for up to six months, vibration levels will be monitored at selected locations to check for compliance with the design criterion.

7.13.5.4 LIGHTING

7.13.5.4.1 Receiving Environment

Public lighting, as described later, is provided on Blackthorn Avenue, Burton Hall Road and at the roundabout between Burton Hall Road and Leopardstown Road. There is no public lighting on the remainder of the route in this section.

7.13.5.4.2 Characteristics of the Proposal

During the construction period the construction site may be lit at night-time for safety and security reasons. The stations and crossings associated with the operation of the Luas will require appropriate levels of lighting for reasons of safety also.

The Luas system will operate from overhead lines fed at 750 Volt D.C. Sparking and flashing from these overhead lines will occur in an unpredictable pattern as the collector on the trams make contact with them. This will not occur on a regular basis or frequency.

7.13.5.4.3 Potential Impact of the Proposal

Construction Phase

As the construction site may be lit at night-time during the construction period, this may give rise to some impacts on established residences where these adjoin the B1 alignment.

Operational Phase

The stops and crossings associated with Luas will require appropriate levels of artificial lighting for reasons of safety. This will introduce a new additional lighting source.

A proposal of this kind can be expected to have a neutral impact on existing natural lighting.

'Do-Nothing' Impact

Were the proposed development not to take place the 'do-nothing' impact the current levels of both natural and artificial lighting would remain unchanged.

7.13.5.4.4 Remedial or Reductive Measures

Construction Phase

The night-time lighting of the construction site, if required, will be facilitated through the use of low angle lighting with a minimum of 25 Lux which concentrates the light beams downwards thereby minimising the impact of night-time light disturbance to local residences.

Operational Phase

The operational phase may involve the following factors:-

- Provide lighting at stops and level crossings
- Proposed lighting at stops, car parks cycle ways shall be to a level recommended by C.I.B.S.E. in the interest of public safety.
- Lighting of alignment at isolated places.

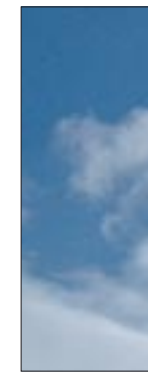
During the operation of the Luas a 'worst case' impact is unlikely as the mitigation measures concerning public lighting will be built into the lighting actually provided. These lights will be in accordance with B.S. 5489 which sets out the requirements for such lighting.

As the proposal is not expected to have any significant adverse impacts on artificial lighting no further remedial or reductive measures are necessary.

7.13.5.4.5 Predicted Impact of Proposal

Construction Phase

The night-time lighting of the construction site will have a temporary impact, which is not considered to be significant. Proposed night-time lighting at the construction site shall be to a level of not less than 25 Lux in the interest of public safety.



Operational Phase

The proposal will not have any significant adverse impact on the natural lighting along this route section.

It is anticipated that, as in other similar systems, residents along the route section will quickly become accustomed to infrequent sparking and flashing of the contact between the tram collector and the overhead lines and that its limited intrusion will not cause an impact of any significance.

Blackthorn Road

Public lighting is provided on the east side of Blackthorn Road, using 10m high columns at 30m spacing. These are fitted with high pressure sodium lamps and give an average illumination on the road of 5 lux. The existing public lighting will be disturbed by the installation of the Light Rail line and the new system of lighting will have to be relocated on the west side of Blackthorn Avenue.

Burton Hall Road

The existing lighting on Burton Hall Road comprises of 10m high columns at 30 m. centres, fitted with high pressure sodium lamps, giving an average illumination of 5 lux. This lighting system is located to the north side of the carriage way and will not be affected by the installation of the new Light Rail tracks.

Leopardstown Roundabout

Public lighting is provided at Leopardstown Roundabout, giving an average illumination of 7 lux. It will be necessary to provide lighting under the Light Rail ramp, so as to ensure that there is adequate public lighting for traffic using this roundabout.

Leopardstown Roundabout to Central Park

There is no public lighting on this section and it is not proposed to install any additional lighting, except at crossings and stations.

Central Park to Murphystown Road

There is no public lighting on this section of the proposed route.

Murphystown Road to Glencairn Heath

Public lighting is provided in Glencairn Heath using 5m high columns with sodium lamps, giving an average illumination of 2 lux. The existing lighting will not be affected by the installation of the new Light Rail system.

7.13.5.4.6 Monitoring

Construction Phase

Throughout the construction phase there will be an on-going consultation process between RPA and local residents and businesses. The night-time lighting shall be monitored to ensure that it does not exceed the acceptable limit of 25 Lux for such lighting, thereby negating the possibility of a 'worst case' scenario.

Operational Phase

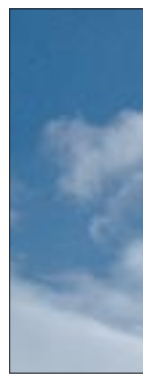
No monitoring of Lighting will be required during the operation phase of this proposal.

7.13.5.4.7 Reinstatement

The proposed development will involve alterations to part of the existing lighting system along the route section. The lighting system including the new elements of same, will be restored to the current standard by Dun Laoghaire Rathdown County Council, or by the contractor, whichever is considered the most appropriate.

7.13.5.4.8 Potential Route Deviation

Where the route may vary, deviate from the proposal laterally, consideration may be required with regard to impact on the existing public lighting system along part of the route.



7.13.5.5 ELECTROMAGNETIC ASPECTS

7.13.5.5.1 Receiving Environment

On the basis of available information, it is considered unlikely that there is any sensitive equipment along the Area 13 route which may be impacted upon by the operation of Luas Line B1.

7.13.5.5.2 Potential Impact of the Proposal

Construction Phase

No potentially adverse electromagnetic effects arising during the construction phase have been identified at this stage of the project.

Operational Phase

The trams will take their power source from 750 V-D.C. over head cables supported by headspans attached to poles. Further parallel Traction Power supply cables will run in ducts below ground at the edge of the trackbed. There will be three stops in Area 13 which will take power from ESB supplies. In addition there will be two sub-stations serving Luas Line B1 within Area 13, one previously permitted within the Sandyford Depot and the other adjacent to the Glencairn stop. These will also take power from ESB supplies and rectify AC current to DC.

In respect of the track alignment, there may be potential electro-magnetic impacts arising from the distribution of current to the trams. Experience with new and developing trams through out the E.U. suggests that adverse effects can be “designed out” prior to the selection of the vehicle. The contract will require the contractor to carry out rigorous analysis, testing and monitoring of the tramway equipment with regard to EMC. The Contractors will be required to comply with the relevant European and International Standards and Directives.

The alignment will be located a minimum of 30 metres from the facade of the existing building, of the FAAC Electronics Ltd operators. It is considered that the potential electromagnetic impact of Luas Line B1 on this operator will be slight.

'Do-Nothing' Scenario

Under a 'Do-Nothing' scenario no likely or significant implications arise in respect of electromagnetic aspects.

7.13.5.5.3 Remedial or Reductive Measures

Construction Phase

The Luas Line B1 alignment will be constructed to meet the requirements of the EU Directive on Electromagnetic Compatibility (89/336/EEC) and the emerging 'best engineering standards' from the European Committee for Electrotechnical Standardisation (CENELEC). Thus, further remedial and reductive measures are not expected to be called for. All components of Luas Line B1 will be designed for compliance with the current European Standard, EN 50121 (Electromagnetic compatibility for railways). The contractor shall ensure that sufficient procedures are in place to ensure compliance with the above legislation and standards.

Testing for electromagnetic interference will be undertaken during the testing and commissioning phase to confirm that the system is performing to the manufacturer's specifications.

With reference to stray current, suitable spacing and design measures will be provided. Where this cannot be achieved, appropriate remedial actions will be agreed to conform with the specification.

For telecommunication facilities, field measurements will be undertaken during the testing and commissioning stages to check that measures adopted are sufficient. Further remedial and reductive measures should not be required.

Operational Phase

If any adverse impacts are identified, then intensive consultation with owners/occupiers of sensitive premises or equipment will be undertaken to eliminate the adverse effects.

7.13.5.5.4 Predicted Impact of the Proposal

Construction Phase

No electromagnetic impacts are predicted from the construction process.

Operational Phase

If the remedial and reductive measures outlined above are adhered to, no likely or significant residual electromagnetic impacts are predicted on, or from the operation of Luas Line B1.

7.13.5.4.5 Monitoring

Construction Phase

There are no requirements to monitor for possible emissions during the construction phase.

Operational Phase

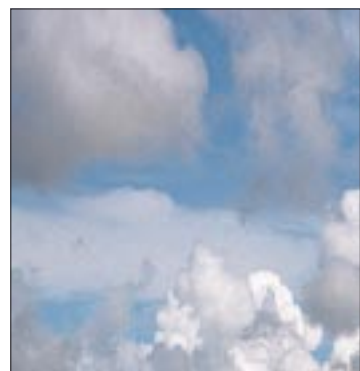
Requirements to monitor for possible electromagnetic emissions during the commissioning process will be laid down in the contract documents.

7.13.5.4.6 Reinstatement

No reinstatement measures are required during either the construction or operational phases of Luas Line B1.

7.13.5.4.7 Potential Route Deviation

It is not considered that any of the potential deviations of the route alignment stated within the Railway Order Application shall pose any additional significant electromagnetic impact.



7.13.6.1 INTRODUCTION

This section of the Environmental Impact Statement addresses the issue of Air Quality in terms of the impact of the construction and operation of Luas Line B1 on existing air quality levels.

7.13.6.2 AIR QUALITY

7.13.6.2.1 Receiving Environment

The air quality in Area 13 of the Luas Line B1 alignment is rated as satisfactory and reflects the combined impact of emissions from traffic and boiler emissions from commercial/warehousing and distribution units in Sandyford Industrial Estate and from the office park recently constructed along Leopardstown Road. Overall, levels of air pollution in the area have fallen dramatically since the end of the 1980's due to the major change in fuel usage patterns within the domestic sector following the ban on the sale of bituminous coal throughout Dublin in 1990. Natural gas is now the main fuel burnt in homes and commercial/industrial buildings within the area.

There are no significant industrial emission sources within Sandyford Industrial Estate, with many of the units housing high-technology office facilities, warehousing or light industrial activities. The Central Park development comprises telecommunications and technology businesses along with a hotel. The buildings are mainly heated with boilers fired on natural gas and so emissions from these premises will be low. The principal source of atmospheric emissions is from traffic, with a background contribution due to boiler emissions from the commercial/industrial premises as well as housing in the Leopardstown area. At the kerb-side to Leopardstown Road and alongside roads in Sandyford Industrial Estate elevated levels of nitrogen oxides, hydrocarbons, carbon monoxide and particulates from the exhaust-pipes of vehicles are observed. Ambient levels of sulphur dioxide are well below the National Air Quality Standards (NAQS) contained in the Air Quality Standards Regulations 2002 (SI No 271 of 2002) within Area 13. These Regulations give air quality limit values for hourly and daily sulphur dioxide levels. In the case of daily

concentrations the limit to be met is $125 \mu\text{g}/\text{m}^3$, expressed as a 99.2 percentile (3rd highest daily value of the year). Monitoring results obtained from the site operated by Dun-Laoghaire Rathdown County Council at Mount Annville (3.0 km to NW) for the period 1997/98-1999/00 (this site closed in 2000) give maximum daily concentrations of $44 \mu\text{g}/\text{m}^3$ for sulphur dioxide. The annual average levels during this period were 13-18 $\mu\text{g}/\text{m}^3$ for sulphur dioxide. This monitoring site is located in a more built-up part of the suburbs than is found in the Sandyford/Leopardstown area and so lower levels of these pollutants could be expected in the Area 13 portion of the Luas Line B1 alignment.

Nitrogen dioxide levels, which are due primarily to motor vehicle exhaust emissions are below the current NAQS limit value (SI No 244 of 1987) of $200 \mu\text{g}/\text{m}^3$ (expressed as a 98 percentile, or 175th highest hourly level recorded over the year) in the area. Results obtained from air quality monitoring locations in Dundrum and Foxrock operated by Dun-Laoghaire-Rathdown County Council in 2002/03 indicate annual nitrogen dioxide concentrations of 25 and $29 \mu\text{g}/\text{m}^3$ respectively (Dublin County Council Air Quality Report 2003). Similar concentrations of nitrogen dioxide would be found within Sandyford Industrial Estate and near Leopardstown Road, with levels also below the future annual limit of $40 \mu\text{g}/\text{m}^3$ contained in the 2002 Regulations, which is to be met by January 2010.

Annual levels of benzene are below $1 \mu\text{g}/\text{m}^3$ within Area 13 of the proposed Luas Line B1. The future annual limit value of $5 \mu\text{g}/\text{m}^3$, which is specified in the 2002 Regulations, comes into effect in 2010. With further reductions in the benzene content of petrol, the levels will continue to decline over the next few years. The 2002 Regulations also specify a NAQS limit value for carbon monoxide of $10 \text{mg}/\text{m}^3$ based on an 8-hour exposure. Vehicle exhausts are the main source of these air pollutants, with high levels commonly experienced in areas of traffic congestion and poor air movement such as within inner city streets. Results for 2003 from the continuous ambient monitoring station operated by Dublin City Council at Coleraine Street in the inner city give a maximum level of $5 \text{mg}/\text{m}^3$ (Dublin City Council, Air Quality Monitoring and Noise Control Unit, Annual Report 2003-04). Emissions of carbon monoxide decrease rapidly as the

vehicle speed increases. Given the relatively open nature of the Leopardstown Road, rapid dilution of emissions will be adequate to prevent significant concentrations of carbon monoxide being experienced in this area. Ambient levels in the locality will be substantially less than the NAQS hourly value, with maximum levels below $5 \text{mg}/\text{m}^3$.

Levels of particulates referred to as PM_{10} (particulate material with a mean aerodynamic diameter of less than $10 \mu\text{m}$) in the area would be generally below the NAQS specified in the 2002 Regulations. The annual limit value is $40 \mu\text{g}/\text{m}^3$ with a daily limit value of $50 \mu\text{g}/\text{m}^3$ (no more than 35 exceedances per year). The primary sources of PM_{10} along the Luas Line B1 alignment through Area 13 would be from traffic and from the construction programme taking place within the Central Park development area. However, beyond a few tens of metres from the kerb-side, ambient levels will be substantially below the NAQS daily limit value with average PM_{10} levels for the Sandyford/Leopardstown area likely to be in the order of $20\text{-}25 \mu\text{g}/\text{m}^3$.

7.13.6.2.2 Potential Impact of the Proposal

Construction Phase

Dust emissions will result from the laying of track and construction of the tram-stops and sub-stations along this section of the Luas Line B1. Movement of vehicles to and from the construction compounds and assembly areas and delivery to the temporary storage areas along this section also has the potential to generate dust and PM_{10} emissions from the road surface. Air emissions from the exhausts of construction equipment as well as trucks delivering materials can also result in short-term elevated concentrations of air pollutants near the construction activities.

Operational Phase

The operation of Luas Line B1 through Area 13 may affect current traffic volumes and hence exhaust-pipe emissions due to likely future residential development and increase in commuter traffic in the Leopardstown/Sandyford area of the SE suburbs.

7.13.6.2.3 Remedial or Reductive Measures

Construction Phase

Dust suppression measures, in accordance with effective site management, will be implemented to control dust emissions caused by the resuspension of material on roads and from construction areas within Area 13. These include:-

- A mobile vacuum sweeper will be used on a regular basis during the construction of the track-bed on the road surface along Blackthorn Avenue, Burton Hall Road and during the construction of the ramp to the Leopardstown Road overbridge.
- Temporary wheel-wash facilities will be available at the Depot site to prevent drag-out of silt and mud onto Blackthorn Avenue.
- Truck speeds shall be controlled along temporary haul routes to prevent high levels of dust and PM_{10} being re-suspended from the road surface.
- Loose fine building material that can be easily re-suspended by the wind should not be stored in uncovered stockpiles. No storage of aggregates should take place along the boundary of the construction compound at Sandyford Depot with Woodford housing development.
- Burning of construction waste material will be prohibited, with material recycled and re-used where practicable.
- Diesel engines of trucks and other plant machinery should be regularly maintained so that they do not emit excessive black smoke likely to cause a local nuisance at nearby private properties.

Operational Phase

No remedial measures are required in respect of air quality.



7.13.6.2.4 Predicted impact of the Proposal

Construction Phase

It is planned that the construction of the track-bed will be undertaken in sections, reinstating each section as it is completed. Materials to construct the track-bed will be stored along with plant machinery in the designated temporary construction compounds at the permitted Sandyford Depot, Burton Hall Road, Central Park near the SEM overbridge and Murphystown Road. There may be a short-term impact on air quality in terms of dust emissions in the vicinity of the ramps for the Leopardstown Road and SEM bridges. Some quantities of cut and fill will also be needed along the boundary of Central Park with Leopardstown Hospital. However, with the proposed dust control measures (Sect 7.13.6.2.3) the impact on air quality in terms of dust deposition rates and PM10 will be slight to moderate. Given, the planned approach to constructing the track-bed in sections along the Luas Line B1 alignment, this impact will be temporary at any private property along the route.

Operational Phase

Atmospheric emissions from a motor vehicle are dependent on the type of vehicle, age and speed along the section of a roadway. Exhaust-pipe emission rates for cars and commercial vehicles have declined significantly over the past decade with stricter controls on the quantity of pollutants permitted from petrol and diesel engines. Additional reductions were introduced in 2000 with the implementation of EU Council Directive 98/69/EC relating to measures to be taken against air pollution by emissions from motor vehicles. This E.U. Directive sets stringent limits on the emissions of nitrogen oxides, hydrocarbons (benzene), carbon monoxide and suspended particulates from post 2000 vehicles. As the age of the motor fleet changes with older models on the roads being replaced by newer vehicles, there will be an overall reduction in emissions per vehicle. Therefore, compared to present exhaust rates from vehicles, emissions will decline by 2016 with the improved engine and emission control technology. Estimates of traffic flows on the road network within Area 13 of the Luas Line B1 alignment are provided in the traffic impact analysis (Section 7.13.1.4) for the 2016 'With' and

'No Luas' scenarios. A minor change of less than 10% in traffic flows along parts is predicted on Burton Hall Road and Leopardstown Road with the operation of the Luas. In addition, the tramway crossing of Burton Hall Road is not predicted to result in increased congestion and significant delays in traffic flows. This will result in a minor or slight increase or reduction in exhaust-pipe emissions from vehicles traveling along these roads with the operation of the Luas, compared to the 'No Luas' scenario in 2016. The impact of these minor changes in the volume of exhaust-pipe emissions is predicted to be imperceptible near the kerb-side.

The planned Luas Line B1 runs predominantly off-road either along the existing roadside verge or on undeveloped ground through Area 13, with a ramp and bridge constructed to cross Leopardstown Road and the SEM. Therefore, the impact on air quality from the operation of the Luas is predicted to be neutral at the nearest properties to the track.

7.13.6.2.5 Monitoring

No air quality monitoring is proposed during the construction or operational phases in respect of Luas Line B1.

7.13.6.2.6 Reinstatement

Not applicable in relation to air quality

7.13.6.2.7 Potential Route Deviation

Minor deviations of the final Luas Line B1 alignment track from the original route may occur that are no more than 5m laterally, no more than 2m vertically and longitudinally by no more than 20m. These minor changes to the original planned alignment will not significantly change the magnitude of the predicted impacts on air quality described above.

Landscape & Visual Impact



7.13.7.1 INTRODUCTION

This section sets out to describe the visual environment of the area, to assess the Impacts of the Luas insertion on the existing suburban townscape and landscape including the existing trees in the area and also assesses the visual impact of the development. The section also sets out measures to eliminate, ameliorate and mitigate these impacts.

7.13.7.2 LANDSCAPE

7.13.7.2.1 Receiving Environment

The route commences at the existing Sandyford Luas stop at Blackthorn Road and runs in a south-easterly direction across an existing car park associated with the Sandyford stop. To the east of the alignment the Sandyford Luas Depot building and 'Tram Stabling Area' is located, while to the south west of the alignment is Blackthorn Road, where there is a narrow grass verge with 3/4m. high trees (*Malus* sp.) at 6m centres (for all references to trees, refer to section 7.13.7.3 Trees of this EIS) a 1.2m concrete footpath; a grass margin approximately 3m wide and with standard Rowan trees planted at 5m centres; and the business units- 2/3 storeys high with red brick and cream rendered finishes. A tarmac road and car parking adjoining the wide grass margins front the units.

Between Blackthorn Avenue and the junction with Burton Hall Road, there is a wide margin, of some 4m. planted with 3m. high feathered whips on the western side. A dark vertical metal palisade fence supported by heavy brick piers bounds the margin. To the rear of the fence there is dense screen planting which provides some visual enclosure to an office complex. On the eastern side of the road, there is a wide grass margin, a 3m high concrete block boundary wall and a dense barrier of trees on both sides of the wall, which enclose the Woodford Housing Estate.

Immediately north of Blackthorn Avenue / Burton Hall Road junction, a line of trees crosses on a north-east axis. They lie to the rear of an office building situated on the west edge

of the roundabout and continue along the south boundary of Woodford Estate. These trees are approximately 20m in height.

The wide grass margin continues on both sides of the Burton Hall Road and are planted with standard trees. On the southern side of this section of Burton Hall Road, the FAAC Electronics Ltd. complex is bounded by a steep bank supporting tall mixed shrubs and trees, which provides considerable visual enclosure.

The northern perimeter of the lands at Central Park is defined by a 3m high stone wall, with a small woodland at its north-eastern corner. A concrete boundary wall, some 4m high, separates the woodland from the adjoining multi-storey office park. To the east of the route, at Central Park, there are two office units-The Marketing Institute and Eurologic-two storey white 'systems' built' structures in landscaped car parks. The northern grounds of Leopardstown Park Hospital are currently being developed with new associated structures. Mature trees of Oak, Beech and Sycamore are located along the boundary wall. Additional woodland is located on the southwestern boundary of the Leopardstown Park Hospital lands. The planned route for the SEM, currently under construction, lies immediately north-east of the woodland.

From the southern end of the hospital grounds the alignment crosses a steeply wooded valley with a stream containing two weirs on the valley floor. The woodland is predominately mature Ash, Beech and Horse Chestnut, with an under-storey of regenerated Sycamore, and Hawthorn. The wood is bounded by a low stone wall on the Glencairn side. The route then crosses into an open field at Glencairn and proceeds to Murphystown Road. The fields are in rough grassland, with mounds of temporary spoil heaps deposited in the northwest sector. The ruins of the protected structure of Murphystown Castle are in the east sector of the field. The SEM alignment traverses this field and construction work is currently taking place in this area.

To the south east, the boundary of Glencairn is defined by tall and mature trees. The alignment at this point is located on a spur road immediately below the Murphystown Road

which provides access to two properties. The spur road is a 5m. wide carriageway with a low stone wall on its north edge, and a sloping grassed open space rising to the Murphystown Road. A row of 7m high Ash trees runs along the lower edge of the space. The houses on the west side of the road are part of Leopardstown Heights housing estate. These are two storey semi-detached houses in red brick with a white render on the first floor. They have shallow front gardens defined by a red brick stub wall. There are standard trees in a grass margin adjoining the footpath (*fastigiata* Lime). The adjacent road carries substantial traffic linking to Sandyford and to Ballyogan Road and beyond. The route continues along the spur road past the private grounds of Glencairn. The perimeter boundary of Glencairn is formed by a dressed stone wall and ornamental railings and a tall gate to the rear of which is a gate lodge. There is a row of trees -a mix of Ash, Beech and Pine c. 10/15m. high- along the boundary.

The route proceeds past another enclosed private property-Glencairn Stables also with a dressed stone wall and metal gates, and on to a large private house, where the grounds are enclosed by a 4m high wall - a stone wall with a rough plaster finish. The grounds of the property are well maintained and have mature trees over 20m high.

7.13.7.2.2 Potential Impact of the Proposal

Construction Phase

A visual impact is inevitable during construction. The construction of the track bed with its rails, kerbs, edges and paved surfaces could have a moderately negative impact on segments of the route alignment. Negative impacts could occur at the road crossing unless surfacing materials are carefully chosen.

Construction will be preceded by preliminary works, including as follows:

- Segregation of the contractor's compounds and sit assembly areas, to the west of the permitted Sandyford Depot on the northern side of Blackthorn Road, to the north of the Luas Line B1 alignment on the southern side of Burton Hall Road within the existing property of

FAAC electronics Ltd. and immediately to the north of the SEM in the vicinity of the planned Leopardstown Bridge.

- Modification of kerbs and carriageways to provide temporary road diversions, and final alignments where appropriate.
- Excavation of trenches and laying of service mains an diversions. These will be suitably secured and fenced-off to approximately 1.8m;
- Accessible parts of the alignment will also be fenced ansecured where appropriate while the trackbed is being excavated, formed and laid, and at other times when work which could be dangerous to the public is in progress;

The provision of Overhead Line Equipment (OHLE), with its power lines supports and masts, could have severe negative impact on the suburban townscape. This could be particularly so at all road crossings were the OHLE crosses the line of vision of road/footpath users.

The construction of a 30 metre high radio mast could also have a significant negative visual impact.

Luas stops could have local negative visual impact if poorly designed for their locations (refer also to section 7.13.7.4 Visual Impact of this EIS)

The construction phase will involve considerable movement of machinery and goods, and enclosure of temporary works. Site activities will include excavation, clearance, materials storage, concreting pouring, and fabrication, erection and fixing sequences.

Blackthorn Road and Barton Hall Road will have two open carriageway lanes at all times.

Access to the construction site will be provided from the existing road network where practicable. Access to the area of the SEM overbridge will be from a slip lane off either side of the Motorway alignment, and from the planned compound and assembly area on the northern



side of Murphystown Road. Where necessary, to ensure continuous public access to properties, temporary road, paths and footbridges will be provided. Construction will be planned to minimise disruption and dust from compounds and assembly areas, and particularly along the track bed. Damage to property, to grassland, planting and carriageways will be minimised. Where damaged cannot be avoided, it will be repaired.

Access to the construction site will be provided from the existing road network where practicable. Access to the area of the SEM overbridge will be from a slip lane off either side of the Motorway alignment, and from the planned compound and assembly area on the northern side of Murphystown Road. Where necessary, to ensure continuous public access to properties, temporary road, paths and footbridges will be provided. Construction will be planned to minimise disruption and dust from compounds and assembly areas, and particularly along the track bed. Damage to property, to grassland, planting and carriageways will be minimised. Where damaged cannot be avoided, it will be repaired.

The main construction work will include:

- Excavation, widening, formation and surfacing of the track bed, and the insertion of parallel service ducts.

Construction of ramped and elevated section of the trackbed from Burton Hall Road over the Leopardstown Road / Brewery Road roundabout to the elevated podium at Central Park lands.

- Construction of elevated sections of track bed on a bridge structure to the south of Central Park lands.

Installation of electrical equipment, support masts and OHLE, insertion of footpath connections, grading, top soiling, grassing and planting of landscaped areas.

Operational Phase

The area to the north of Murphystown Road is currently an open landscape, containing the alignment of the planned SEM, currently under construction, and adjoining the

woodlands of Leopardstown Valley. This character of this area would be significantly impacted upon in terms of landscape and visual impact, although some significant impact occurs in any case with the construction works of the Motorway. These developments will significantly alter existing landscape conditions.

The following areas could have locally significant negative impacts:

- South of the lands at Leopardstown Park Hospital grounds where Luas Line B1 crosses the Leopardstown Valley with consequent scarring of the woodland
- At Leopardstown Road / Brewery Road roundabout where the alignment will be elevated.

Moderately negative impacts could occur along the following sections:

- Along the Blackthorn Road/Burton Hall Road margin. The aspect is contained by a boundary wall and screen planting.
- Through the lands at Central park. The existing boundary wall and mature trees will experience a significant direct impact.

In operation Luas Line B1 could provide positive impacts by:

- Enlivening the suburban setting with trams travelling through well-designed reservations, notably where it adjoins built-up areas.

The long-term impact of improved transport in raising perception of environmental quality.

'Do Nothing' Impact

If Luas Line B1 is not constructed the existing backlands corridor will remain as a semi-derelict and visually poor landscape. The developed lands through which the corridor passes - Sandyford Industrial Estate, Murphystown Road and Ballyogan Road - will remain

heavily trafficked and consequently suffer further environmental deterioration.

7.13.7.2.3 Remedial or Reductive Measures

Potential impacts during the construction phase can be mitigated somewhat by appropriate management practices. Primary amelioration of the line will be achieved through the co-ordination of the design of the trackbed with the adjoining carriageways, boundaries and paths, and through careful design of raised embankments, bridges and stops. The visual integration of the OHLE with the landscape will be achieved by careful choice of the support systems, by the careful integration of masts with the vertical elements of the streetscape, and by their co-ordination with street furniture

The line insertion will be visually dominant from the permitted Sandyford Road Depot to the point where the line enters on the elevated ramp on Burton Hall Road, but can be remediated with appropriated actions. The ramped section of the Luas Line B1 alignment from Burton Hall Road to the podium at Central Park will be visually quite dominant and will require sensitive architectural detailing to effect integration.

Mitigation will be achieved by:

- Inserting the trackbed at grade in the existing grass margin.
- Selecting the visually appropriate method of support for the OHLE system -where possible one line of lateral poles with cantilevered arms.
- Retaining and supplementing as much of the existing tree and shrub planting along the corridor as possible
- Providing new planting, in groups and copses, rather than linearly which would emphasise the linear aspect of the corridor. Existing trees and shrubs should be protected or reinstated and particularly those at the Woodford Housing Estate boundary.
- Planting a new boundary line of trees and shrubs between the corridor and the FAAC office complex on the southern side of Burton Hall Road where the provision of Luas Line B1 requires the removal of the

existing row of vegetation

- Planting the new embankment along the Burton Hall Road boundary with trees and shrubs.

The ramp/bridge section of Luas Line B1 alignment along Burton Hall Road and crossing the Leopardstown Road / Brewery Road roundabout to Central Park has been designed with considerable sensitivity to its prominence in the townscape. The bridge is intended to register as a lightweight structure, which will be visually assimilated into the surroundings and at the same register as an elegant and distinguished landmark.

When the Luas Line B1 alignment returns to grade at the boundary between the lands at Leopardstown Park Hospital and Central Park, the existing stone boundary wall will need to be removed as well as the adjoining trees.

Visual mitigation will be achieved by:

- Reconstructing the wall to match the existing wall along its new boundary alignment. The workmanship will have to respond to the high level of craftsmanship evident in the condition of the existing wall
- Replacing the mature trees, which have to be removed, with semi mature deciduous trees. The species mix should correspond with the original trees.
- Planting trees locally to visually absorb the line, including the overhead elements, as it traverses open landscape.

When the Luas Line B1 alignment crosses the woodland on the southwest corner of Leopardstown Hospital Grounds amelioration will be achieved by:

- Maintaining the alignment above the woodland valley by means of a sensitively designed bridge proceeding from the edge of the woodland to the lands of Glencairn to the south.
- Damage to the existing trees and to the valley floor will be minimized
- Planting trees and shrubs to form a screen on both sides of the corridor across the lands of Glencairn.
- Re-grading and seeding the open space, where it will be disturbed by construction, between Murphystown Road adjoining Glencairn



- Planting the lower edge of the open space with additional trees
- Generally providing new tree planting locally

7.13.7.2.4 Predicted Impact of the Proposal

Construction Phase

The temporary and intermittent construction impacts- temporary enclosure of the compounds and assembly areas, creation of temporary carriageways, diversion of traffic, construction operations, moving vehicles, dust and vibration- fall into a number of categories:

- Segregation of construction compounds and assembly areas, and their use as temporary storage welfare facilities.
- The segregation of the various elements of the Luas Line B1 alignment while the main construction work - the building and surfacing of the trackbed- is carried out.
- The diversion of traffic onto temporary carriageways for approximately four months while the road crossings are excavated and constructed
- The intermittent work involved in equipping the line and erecting the OHLE.
- The final grading, finishing and landscaping of the work area, the compounds and assembly areas, following completion of construction.

All of these impacts are temporary, some are intermittent, and dust and dirt will be strongly controlled. They are all impacts that are normal in the urban / suburban scene. In the context of this project these are not regarded as being visually significant.

Following amelioration and mitigation, the trackbed will have a moderate, positive visual impact on the corridor in general, as the consistent treatment of the median with paving and planting will environmentally improve the roadway. This impact will be strengthened by the consistent design and treatment of the grass verges with new planting.

Following amelioration and mitigation, the trackbed will have a moderate, positive impact on the Luas Line B1

alignment in general, as the consistent treatment of the area of the alignment with paving and planting will comprise an environmental improvement to the adjoining roadway. This impact will be strengthened by the consistent design and treatment of the grass verges with new planting.

Following amelioration and mitigation, the OHLE and the supports will have moderate, negative visual impact in area 13. The impact from the housing areas will be slight given the capacity for tree planting. The elevated section of the Luas Line B1 alignment over the Leopardstown Road / Brewery Road roundabout cannot be screened, and requires careful architectural treatment to minimize its impact.

Operational Phase

The increase in the use of Luas Line B1 as a safe and environmentally attractive movement corridor will have a positive impact on the area. Overall the provision of Luas Line B1 from Sandyford Industrial Estate to Cherrywood via Ballyogan, Carrickmines, and Laughanstown will have a continuing positive effect on the development of these areas and will underpin their gradual environmental improvement.

The impact of the OHLE and its supports, and the residual overlooking from trams into adjoining properties will reduce as the landscaping matures.

The 30 metre high radio mast to be located adjacent to the Sandyford Luas stop will have a significant and negative visual impact.

The Luas Line B1 will have a significant and positive visual impact on the landscape and townscape of the area. The residual negative impact of the OHLE and its supports will be greatly outweighed by the positive impacts of the other parts of the system and by the anticipated long term benefits that will accrue to the visual environment. Overall moderate positive visual impact will result from the operation of Luas Line B1.

7.13.7.2.5 Monitoring

During the construction phase it will be necessary to monitor the method statements of contractors to ensure that the work conforms to good engineering and landscape conservation practice. It will be particularly important to limit the work areas, to minimise topsoil loss. The control of dust and dirt, and the protection of existing trees and shrubs, will be important throughout the period of the works, particularly at points of access to the line.

During the operation phase of the Luas the landscape elements, including grassing, trees and shrub planting, will require planned maintenance and replacement, to ensure their health and long term growth.

7.13.7.2.6 Reinstatement

During the construction phase all disturbed fencing, garden walls, and flanking soft areas along the Luas Line B1 alignment will be reinstated to provide a consistent landscaped edge to the corridor.

Operational Phase

Reinstatement will not be necessary following the commissioning of the system.

7.13.7.2.7 Potential Route Deviation

The proposed possible route deviation will not, in most cases, significantly alter the assessment of visual impacts outlined above, due to the large scale and open nature of the landscape compartments it passes.

7.13.7.3 TREES

7.13.7.3.1 Receiving Environment

At the corner of the Sandyford Depot, is the property no. 27 Woodford. Within the garden behind the boundary wall is a mature, well-managed cypress hedge in good condition. To

the north of this property is a new plantation of young rowan, holly and Portuguese laurel.

Along Blackthorn Avenue is a well-established roadside planting scheme in good condition. The standard trees and whips are closest to the road, with a border of shrubs behind that is interspersed with trees. Some of the smaller trees have not established very well. This plantation extends as far as the junction with Burton Hall Road.

On the south side of Burton Hall there is a mature shrubbery growing on a mound and forming a dense hedge. It is mature and in good condition. Mid way along this section is a stand of mature tree, they include a mature Scots pine in good condition, two early mature ash in fair condition, a mature Oak and Scots pine both with leaning stems and in fair condition, as well as a dead tree. Along the north of the mound in the grass verge is a row of young hornbeam in good condition. They are part of a street tree-planting scheme.

Outside the wall of the South County Business Park is a group of seven early mature hornbeam, which are in good condition. Inside this wall is a pocket of mixed species, multiple aged woodland that is predominantly in fair condition, though there are a number of trees in good condition. Species include lime, elm, ash, sycamore horse chestnut, cherry plum, sycamore and willow.

In Central Park there is a row of fourteen mature trees comprising oak, beech and horse chestnut and sycamore that are growing along the boundary wall with the South County Business Park. Some of these trees have sustained significant root damage during construction that took place in 2001, and one tree has blown over. As a result of construction works half these trees are in poor condition. The remaining trees are in fair condition. The trees are mature and are of significant value to the landscape.

Inside the boundary wall of the Irish Marketing Institute (within the lands of the IDA South County Business Park) is a group of early mature to mature trees of which most are in fair condition and only one is in poor condition. There are six sycamore trees, some of which are multiple-



stemmed, combined with an oak and a beech. There is no physical boundary between this property and that of Eurologic and so the trees in Eurologic are a continuation of the same group. They comprise multiple-stemmed sycamore with self-seeded ash and sycamore, all in fair condition. There are further sycamore, beech and ash in fair to poor condition.

In the grounds of Leopardstown Park Hospital are a row of twenty-seven mature trees; sycamore, oak, holly, lime, field maple, horse chestnut, ash, beech and cherry, with six early mature trees of ash, sycamore and horse chestnut. They occur along the south-east side of the boundary wall. They are in various stages of health, from good, through fair to poor. There are also early mature sycamore, ash and horse chestnut, all of which are in fair to poor condition. Many of these trees are very old, and are of significant value to the landscape.

In 'Glencairn' residence there is a wooded valley divided into two by a stream. The trees are significant element in the landscape and the area is generally well managed.

Outside the boundary fence to the north is an old remnant hawthorn hedge with isolated specimens of holly, ash and cherry.

On the north side of the stream the woodland, which is on steep ground, contains early mature and mature trees in varying degrees of health from predominantly good, through fair to a few poor trees. There are fourteen early mature trees comprised of sycamore, beech, ash and willow, and nine mature trees made up of beech, holly, elm and oak.

On the south side of the stream the woodland contains eighteen mature trees with four early mature trees that are mainly in fair and good condition with a few in poor condition. The early mature trees are ash and sycamore and the mature trees comprise beech, sycamore, lime, horse chestnut and ash.

Adjacent to the gate lodge of the property 'Glencairn' is a group of six early mature trees and four mature trees of

ash, pine, sycamore and beech that are mainly in fair condition. One tree is in good condition and three are in poor condition. Outside the property is an early mature ash in fair condition.

In the property 'Clonlea House', on Murphystown Road, there is a group of eight mature trees in good to fair condition. They comprise beech, sycamore, yew, Monterey cypress and cherry with one early mature Monterey cypress in good condition.

7.13.7.3.2 Potential Impact of the Proposal

The insertion of the Luas Line B1 alignment from the Sandyford stop at the Stillorgan Reservoirs to the junction of Blackthorn Avenue and Burton Hall Road will result in the removal a mature hedge and a number of recently planted young trees at the western boundary of no. 27 Woodford, as well as most of the roadside planting scheme, on the eastern side of Blackthorn Avenue. This will have a moderate impact.

The insertion of the Luas Line B1 alignment along the southern side of Burton Hall Road will result in the removal of part of the planted berm and the group of mature trees. This will have a moderate impact.

The bridge over the Leopardstown Road/ Brewery Road roundabout into Central Park, will result in the removal of an area of the woodland, with mature trees inside the entrance to the IDA South County Business Park and may also require the removal of the young trees outside the entrance, this will have a moderate impact.

Due to the fact that an insufficient Luas reservation was retained within the lands of Central Park, under the terms of the permitted extension to Central Park, the insertion of the Luas Line B1 alignment along the south eastern boundary of Central Park will necessitate the removal of all trees in the grounds of the Marketing Institute and Eurologic properties. It will also result in the removal of the line of fourteen mature trees on the western side of the boundary wall within the lands of Central Park side, and a further eighteen trees on the south-eastern side within the lands of Leopardstown Park Hospital. This will have a

significant impact although the condition of these trees is variable.

The bridge across the Southeastern Motorway and across the Valley at the 'Glencairn' property will result in the removal of a number of mature and early mature trees. The will have a potential long term impact on the remaining trees either side of the bridge, as the will have lost mutual shelter and may be come prone to wind damage. This will have a significant impact.

Where the Luas Line B1 alignment links to Murphystown Road, it will result in the removal of a group of eleven trees mostly in fair condition. This will have a moderate to slight impact. The proposals will also result in the removal of a number of trees within Clonlea House. This will have a significant impact.

7.13.7.3.3 Remedial or Educative Measures

The section has a significant impact on mature trees; where possible the relocation of any young trees would reduce the impact. New planting of trees will also serve to reduce the significant impact.

7.13.7.3.4 Predicted Impact of the Proposal

The insertion of the proposals in this section will have a significant impact of the receiving environment due to the removal of a large number of mature trees and recently planted trees. The re-location of any young trees could reduce the extent of this impact.

7.13.7.3.5 Monitoring

Any trees to be retained should be protected from construction damage by suitable fencing in accordance with the current best practices. for the protection of trees on construction sites (BS 5837 Trees in Relation to Construction; Protection of Trees on Development Sites Part 1 & 2, Arboricultural Association; The National Joint Utilities Group 10, Guidelines for Planning, Installation & Maintenance of Utility Services in Proximity to Trees) All excavations near trees should also be in accordance with the current best practices. Monitoring of fences and the

effects on construction will be required for the duration of the construction phase.

7.13.7.3.6 Reinstatement

Where trees are being removed an extensive replanting programme should be undertaken. Trees planted close to the overhead cables should be selected so as to be compatible with the operations of the system. Typically trees should have an upright growth habit and should not have large leaves.

7.13.7.3.7 Potential Route Deviation

Lateral route deviation could have the potential to impact on a greater or lesser number of mature trees along the alignment in Area 13.



7.13.7.4 THE BUILT ENVIRONMENT AND VISUAL IMPACT

7.13.7.4.1 Receiving Environment

The Luas Line B1 begins at the Sandyford Stop, turning south east from the alignment of the former Harcourt Street Railway, and passing through a landscaped area to Blackthorn Avenue. A section of the carparking associated with the Luas Sandyford Stop will be removed in order to facilitate the new alignment. The construction of Luas Line B1 will result in some loss of land at No. 27 Woodford and the demolition of an existing garage at the west side of that property. Blackthorn Avenue, from the permitted Luas Sandyford Depot to the junction with Burton Hall Road, is the peripheral road of the Sandyford Industrial Estate. It is lined on its eastern side by planting and the boundary wall of the housing estate at Woodford, and on its western side by walls enclosing industrial premises which do not face out onto Blackthorn Avenue. Woodford is a self contained estate of just over 100 detached and semi-detached two storey houses. The recent intensification of development in and around the Sandyford Industrial Estate has impacted on the skyline as seen from within Woodford. 'The Atrium' within the Industrial Estate is visible in views to the west, and Central Park dominates views to the south east. There are also a number of proposed or approved developments in the Sandyford and Leopardstown area which, when constructed, will also be visible from within Woodford. There is a recent apartment development, Carmanhall Court, on the corner of Blackthorn Avenue and Burton Hall Road. The proposed Luas Line B1 passes along the western boundary of this development.

Between the Blackthorn Avenue/Burton Hall Road junction, and the Leopardstown Road/Brewery Road roundabout, Burton Hall Road is landscaped on both sides with shrubs and trees. Apart from Carmanhall Court, no properties open onto it. The rear of numbers 87 to 94 Woodford back onto Burton Hall Road, and are partly screened from it by

planting. The Leopardstown Road/Brewery Road roundabout is bounded by two storey housing at Woodford and the Chase to the north, and by commercial buildings to the west south and east, the largest of these being Central Park. The IDA South County Business Park, with groups of mature trees within it, opens off the east side of the roundabout. The development at Central Park runs south from the Leopardstown Road/Brewery Road roundabout as far as the Legionaries of Christ and to the soon to be completed M50. It is bounded on the west by the realigned Leopardstown Road, and on the east by the lands of Leopardstown Park Hospital. There is a stone wall some 2 to 2.5 metres high separating Central Park and Leopardstown Park, with fine mature trees along the boundary on the Leopardstown Park side. The permitted phased redevelopment of Leopardstown Park Hospital is well under way. The development ultimately entails the demolition of existing hospital buildings now attached to the original Leopardstown Park house, and the construction of new hospital buildings on part of the grounds near the boundary with Central Park. After crossing the M50, Luas Line B1 runs through open land and then across the gates of Glencairn to the Glencairn Stop. This Stop is to be located in what are now the grounds of Clonlea House.

7.13.7.4.2 Potential Impact of the Proposal

Construction Phase

Along the Luas Line B1 alignment, institutions and institutional lands as well as new and established housing areas are potentially sensitive to change and to new development. However, given the very extensive new development planned or approved near the alignment, sensitivity to the development of the Luas alignment itself will be secondary to sensitivity to these larger developments. Residents at Woodford and The Chase are likely to be sensitive to the construction of Luas Line B1.

The proposal by Dun Laoghaire-Rathdown County Council to construct a new Murphystown Road is contained in the County Development Plan and in the Stepside Action Plan 2000. These proposals and their resultant impacts are independent of the planned Luas Line B1. However, the impacts arising out of the demolition of Clonlea House are

addressed in this EIS. At the Sandyford Stop the construction of Luas Line B1 is likely to result in slight to significant impacts, neutral in character. At Woodford the construction of the Luas Line B1 alignment has the potential to result in a significant negative impact at No 27 Woodford. The impacts on Blackthorn Avenue are likely to be slight to significant, but regarded as neutral in character, because the industrial character of the area has the capacity to absorb substantial further development. At Burton Hall Road, the Leopardstown Road/Brewery Road roundabout and at Central Park, the construction of the rising ramp carrying the alignment and the bridge over the roundabout are likely to bring about a significant change in the character of the built environment of the area, resulting in significant impacts, likely to be regarded as negative during the construction phase.

Along the boundary between Central Park and Leopardstown Park Hospital the impact of the construction of Luas Line B1 is likely to be much less than that of the construction of Central Park itself and the M50, but is nevertheless likely to be perceived as significant and negative in character, due principally to the loss of trees. The impact on the Motorway itself of the construction of the bridge carrying Luas Line B1 will be significant but is likely to be regarded as neutral in character. The construction of the Motorway has brought about major changes in the character of the area, and the Motorway construction work is very extensive. This fact will reduce the perceived impact of work to construct Luas Line B1, even if work on the alignment is not commenced until after the Motorway is fully complete and operational. The demolition of Clonlea House is likely to result in a significant negative impact on the character of the area. The subsequent construction of the Glencairn Stop is likely to bring about a significant impact on the character of the area, likely to be regarded as neutral in character during the construction phase.

Operational Phase

At the Sandyford Stop the existence of Luas Line B1 is likely to result in a slight impact, neutral in character. The character of the Stop is likely to benefit from the presence of the landscaped area through which the new alignment is proposed to run. At Woodford, the loss of amenity at No.

27 Woodford has the potential to result in a significant negative impact on that property. The impacts on Blackthorn Avenue of the existence of Luas Line B1 are likely to be slight to significant. Because the industrial character of the area is capable of absorbing further development, the impacts might for that reason be regarded as neutral in character. The impacts on the western end of Carmanhall Court are likely to be moderate to significant, and negative in character. At Burton Hall Road, the Leopardstown Road/Brewery Road roundabout and at Central Park, the existence of the rising ramp carrying the alignment and the bridge over the roundabout has the potential to result in a significant and permanent change in the character of the built environment of the area, resulting in significant impacts, likely to be regarded as negative, at least initially. Residents at Carmanhall Court, Woodford and The Chase are likely to be sensitive to Luas Line B1 because of intrusion at Woodford, and perceived overlooking from the Luas. Along the boundary between Central Park and Leopardstown Park Hospital, the impact of the existence of Luas Line B1 has the potential to be perceived as significant though neutral in character. The impact, on the South Eastern Motorway itself, of the existence of the bridge carrying Luas Line B1 will be significant but is likely to be regarded as positive in character. The sight, from the Motorway, of trams passing over the bridge is likely to provide visual interest. The loss of Clonlea House is likely to result in a significant negative impact on the character of the area. The existence of the Glencairn Stop has the potential to bring about a significant impact on the character of the area, likely to be regarded as positive in character, by way of mitigation.

7.13.7.4.3 Remedial and Reductive Measures

Construction Phase

No remedial or reductive measures are proposed in respect of the built environment and visual impact.



It is proposed to renew any planting lost at Blackthorn Avenue. Landscaping is proposed to mitigate the impacts of the existence of the ramp and bridge at Leopardstown/Brewery Road roundabout. It is proposed to plant trees where trees are lost along the boundary between Leopardstown Park Hospital and Central Park. There are also landscape proposals at Glencairn Stop.

7.13.7.4.4 Predicted Impact of the Proposal

Construction Phase

At the Sandyford Stop the construction of Luas Line B1 is predicted to result in slight to significant impacts, neutral in character. At Woodford the construction of the Luas Line B1 alignment will result in a significant negative impact at No 27 Woodford. The impacts on Blackthorn Avenue will be slight to significant and neutral in character. At Burton Hall Road, the Leopardstown Road/Brewery Road roundabout and at Central Park, the construction of the rising ramp carrying the alignment and the bridge over the roundabout will result in significant negative impacts. Along the boundary between Central Park and Leopardstown Park Hospital the impact of the construction of Luas Line B1 will be significant and negative in character. The impact, on the South Eastern Motorway itself, of the construction of the bridge carrying Luas Line B1 will be significant and neutral in character. The demolition of Clonlea House will result in a significant negative impact on the character of the area. The subsequent construction of the Glencairn Stop is predicted to bring about a significant impact on the character of the area, regarded as neutral to positive in character.

Operational Phase

At the Sandyford Stop the existence of Luas Line B1 is predicted to result in slight impacts, neutral in character. The loss of amenity at No 27 Woodford will result in a significant negative impact on that property. The impacts on Blackthorn Avenue of the existence of Luas Line B1 will be slight, mitigated by landscaping. At Burton Hall Road, the Leopardstown Road/Brewery Road roundabout and at Central Park, the existence of the rising ramp carrying the

Leopardstown Road/Brewery Road roundabout and at Central Park, the existence of the rising ramp carrying the alignment and the bridge over the roundabout is predicted to result in significant negative impacts at first, becoming neutral in time. Landscaping will somewhat mitigate these impacts. For some residents at Carmanhall Court, Woodford and The Chase, the impacts of the existence of Luas Line B1 will be perceived as negative because some overlooking is likely. Along the boundary between Central Park and Leopardstown Park Hospital the impact of the existence of Luas Line B1 is predicted to be perceived as significant and neutral in character. The severity of this impact is likely to reduce over time as proposed landscaping matures. The impact, on the Motorway itself, of the existence of the bridge carrying Luas Line B1 will be significant but positive in character. The loss of Clonlea House will result in a significant negative impact on the character of the area. The existence of the Glencairn Stop will bring about a significant positive impact on the character of the area.

7.13.7.4.5 Monitoring

No monitoring of the impacts of the existence of Luas Line B1 on the character of the built environment is proposed

7.13.7.4.6 Reinstatement

Not applicable in respect of the built environment and visual impact.

Material Assets



7.13.8.1 INTRODUCTION

This section addresses impacts on Material Assets. It includes an evaluation of the diversion and/or relocation of statutory undertakers equipment and all pipes and cables laid under the wayleave for the Luas Line B1 alignment. It is a key objective of this project that there should be no interruption to the operation of Luas Line B1 for repairs or alterations to public utilities. The issue of Property is also addressed under the main heading of Material Assets.

7.13.8.2 PUBLIC UTILITIES

7.13.8.2.1 Receiving Environment

The various utilities set out below are known to exist within the vicinity of the Luas Line B1 alignment in Area 13. This area of Central Park is still undergoing major development, and will require study at a later date to determine the extent of services within this area. The extent of services throughout the receiving area, which has been determined from records, will require extensive surveying and mapping at a later date to determine the final diversionary requirements. In particular an area of Central Park is still undergoing major development

Gas

There is a 250mm transmission main on Blackthorn Avenue. This main has been diverted. There is also a 180mm distribution main on Murphystown Road. Following a more detailed study, this may require diverting and/or lowering/protection to facilitate the alignment.

Drainage

Surface water drainage pipes ranging in size from 225mm to 450mm, run along Blackthorn Avenue. These may require diverting or side entry manhole construction. There are a number of 225mm surface water drainage pipes at *Glencairn Health* which will need diverting or side entry manhole construction.

ESB

Local low voltage supplies at Central Park in the vicinity of the Leopardstown Road/Brewery Road roundabout, and at Glencairn will need lowering below the depth of the trackbed.

Telecommunications

There are two Eircom networks in the area, one along Blackthorn Avenue and the other along Murphystown Road, which will need diverting and/or lowering and new chambers constructed.

7.13.8.2.2 Potential Impacts of the Proposal

Construction Phase

Existing services with the exception of any major sewers will be diverted out of the path of the trackbed into the footway or into other parts of the carriageway. Service ducts under the Luas Line B1 alignment may be provided if required e.g. to support redevelopment. Manholes will be required to provide access to sewers located outside the alignment. Impacts can arise from the disturbance of the existing roadway such as delays to traffic and access limitations to residential and commercial property. It should be noted that other than the cumulative effect of diverting all services out of the B1 alignment, the works are no different to those carried out on a day to day basis by the statutory undertakers. This work will occur in the initial phase of construction.

Diversion of utilities will be carried out prior to construction of the trackbed. It is not anticipated that there will be any significant effects since the size of the services is such as not to require exceptional plant or equipment. While trenching is undertaken, there will be short periods when access to individual premises may be limited.

Operational Phase

In respect of public utilities there will be no potential impact during the operation of Luas Line B1. Consequently, no potential likely or significant effects are identified.

'Do-Nothing' Scenario

Under a 'Do-Nothing Scenario' there are no implications in respect of public utilities other than to note that ongoing maintenance and repair work would continue to be done.

7.13.8.2.3 Remedial or Reductive Measures

Construction Phase

In respect of the construction of Luas Line B1, no specific remedial or reductive measures are required during the construction process.

Operational Phase

No remedial or reductive measures are required in the operational phase of Luas Line B1.

7.13.8.2.4 Predicted Impact of the Proposal

Construction Phase

Overall, a neutral impact is predicted.

Operational Phase

Overall, a neutral impact is predicted.

7.13.8.2.5 Monitoring

Any requirements to monitor for possible effects during the construction process will be laid down in the contract documents.

7.13.8.2.6 Reinstatement

Upon completion of the diversionary work, public utilities will be restored and full services access will be provided outside the Luas Line B1 alignment.

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7.13.8.3 PROPERTY

7.13.8.3.1 Receiving Environment

To the east of the Blackthorn Avenue alignment is the Woodford Estate, an established development primarily of semi-detached residences. A development of apartments, Carmanhall Court, is located at the southern end of Blackthorn Avenue on its eastern side, at its junction with Burton Hall Road.

Properties within the existing Sandyford Industrial Estate and IDA South County Business Park primarily accommodate employment-related and associated commercial uses. Retail uses are few with commercial/office uses predominating. A significant amount of land within Central Park are currently being developed for significant new employment-related and commercial uses. Adjoining the south-eastern boundary of Central Park is the property of Leopardstown Park Hospital, which has undergone significant development of the existing institutional use in recent years.

To the south of the SEM reservation, properties are predominantly residential, comprising both estate schemes and individual dwellings. In particular, the protected structures *Glencairn and Clonlea House*, are located on the eastern side of Murphystown Road. The Leopardstown Heights (Mount Eagle) scheme is located on the western side of this road.

7.13.8.3.2 Potential Impact of the Proposal

Construction Phase

Acquisition of land will be necessary in a number of places in Area 13 in order to accommodate the Luas Line B1 alignment. Significant property acquisition is shown on Map 3. A reservation has been retained within the Central Park scheme as a condition of permission for that scheme. However, due to the restrictive nature of this reservation, additional lands principally adjoining the boundary of the Leopardstown Park Hospital will also be required. Overall, the potential impact of the loss of such lands is not anticipated to be significant in terms of property.



Demolition of property at two locations will be required, comprising the boundary wall and garage structure of 27 Woodford, and the dwelling *Clonlea House*, an existing Protected Structure. Where demolition is required, the potential impact will be significant or profound. However, it should be noted that in the case of *Clonlea House*, demolition of that property would be required to facilitate construction by Dun Laoghaire-Rathdown County Council of the planned alignment of the Murphystown Parallel Access Road.

Construction works could give rise to adverse effects by restricting access to properties. This would particularly affect commercial and employment-related properties in the Sandyford industrial Estate and the IDA South County Business Park. This is also addressed in Sections 7.13.1.4 *Traffic* and 7.13.1.5 *Community Severance*.

Operational Phase

Overall, the operation of Luas Line B1, ultimately linking the Stepside and Sandyford areas to Cherrywood and St. Stephen's Green will increase the attractiveness of these residential and employment areas, and will strengthen the property market in the vicinity. While the property market in this area is at present very strong, the demand for property and values could potentially increase due to the construction of Luas Line B1.

In operation, Luas Line B1 could potentially significantly adversely impact upon the amenity of the residential property No. 27 Woodford, Sandyford.

'Do Nothing' Scenario

Under the 'Do-Nothing Scenario', the property market in this section of the Luas Line B1 alignment would remain strong due to the high demand for employment-related and residential properties in the Sandyford and Stepside areas, particularly due to the planned construction of the SEM, including a major intersection serving Sandyford.

7.13.8.3.3 Remedial or Reductive Measures

Construction Phase

Where applicable, compensation will be payable to the owners of acquired property, in accordance with the general Compulsory Purchase Code.

Landscaping, noise abatement, and other remedial measures will be put in place to protect the amenities of the existing residential properties in closest proximity to the alignment and where necessary to meet the noise and vibration criteria. These are addressed in the relevant sections of this EIS. In particular, a new boundary treatment will be provided along the revised western boundary of No. 27 Woodford, and at the boundary between Central Park and the Leopardstown Park Hospital.

During construction, access to properties in the vicinity of the Luas Line B1 alignment will be maintained.

Operational Phase

No remedial or reductive measures are required in respect of property.

7.13.8.3.4 Predicted Impact of the Proposal

Construction Phase

Should the remedial measures set out above be implemented, the impact on property resulting from the required acquisition of strips of land is not expected to be significant.

The impact of the demolition of the garage and wall of No. 27 Woodford is predicted to be moderate to significant, even with the incorporation of remedial measures.

The impact of the demolition of the period dwelling *Clonlea House* is predicted to be profound, although it should be noted that such impact will occur in any case in order to enable the construction of the planned Murphystown Parallel Access Road, which is a Local Roads Objective of the Dun Laoghaire-Rathdown County Development Plan 2004-2010.

Operational Phase

The provision of Luas Line B1 will strengthen the property market in this area and will increase property values. This is a significant positive impact.

7.13.8.3.5 Monitoring

A Construction Team representative will be available during construction for consultation and liaison with members of the public.

7.13.8.3.6 Reinstatement

Reinstatement of all property boundaries affected by acquisition of land will be carried out during the construction phase.

7.13.8.3.7 Potential Route Deviation

The purpose of the powers of deviation is to facilitate on-site construction and to further mitigate rather than contribute to an increased impact on any given aspect of the environment considered. It is not envisaged that any increased impact on property will result from the potential employment of these powers.

Cultural Heritage



7.13.9.1 INTRODUCTION

This section of the EIS considers the impact of the proposed development on Cultural Heritage in Area 13 which is examined in terms of local history, buildings of artistic, historic and architectural merit, and archaeology.

7.13.9.2 LOCAL HISTORY

7.13.9.2.1 Receiving Environment

Leopardstown

The name of this townland originates in the medieval period. In 1230 the leper hospital associated with the church of St Stephen at Mercer Street, Dublin was granted land in *Leperstown (Baile na Lobhar)* by Geoffrey and Sara Tyrel (Gwynn and Hadcock 1988,350,353).

In 1888 the Leopardstown Racecourse site was acquired by Captain George Quinn from Benedictine Monks who had run a model farm on the lands. He built a mile-and-three-quarters racecourse (Pearson, 1998).

Leopardstown Park House, now the administrative offices of the Leopardstown Park Hospital, comprises a two-storey-over-basement, five bay Victorian dwelling. An earlier house is believed to have been built on the land by Charles Henry Coote who leased the lands in Leopardstown in 1796. On his death the house was sold to Fenton Hort who was listed as a resident here in the 1830's. The house was home to James Talbot Power, who purchased Leopardstown in 1877, at which stage it was probably remodelled (Pearson, 1998). Power was the grandson of the founder of the very successful Power's Distillery in Dublin. The year after his death in 1916, his widow presented Leopardstown Park to the ministry of pensions as a hospital for disabled soldiers and sailors and other victims of World War 1.

Murphystown/Glencairn

The townland of Murphystown originally formed part of the widely extended lands of Ballyogan, which were in the possession of the Priory of the Holy Trinity shortly after the English Conquest. Subsequently the lands were

transferred to the Cathedral of St. Patrick and the remainder retained by the Priory was divided into two sections, now comprising the townlands of Murphystown and Ballyogan.

The castle at Murphystown is a former Pale Castle (SMR Ref: DU023:025), which survives now in ruins in the grounds of the property of *Glencairn*. The vaulted ruins of the castle are said to have given the townland of Murphystown its name (Pearson 1998). It is not uncharacteristic for later eighteenth or nineteenth century manor houses such as *Glencairn* to have chosen locations that enabled the incorporation of pre-existing medieval castle sites within the estate.

Pearson (1998) recounts that the big house at *Glencairn* appears to have first been built in about 1860, and was either completely absorbed or demolished by a number of subsequent editions and modifications. Cartographic sources would seem to indicate, however, that some form of structure existed at Murphystown in the grounds of Glencairn since at least the early eighteenth century. The present house dates from 1904 when Richard Welstead (Boss) Croker lavishly rebuilt the house in a mixture of Baronial and American Colonial style, complete with an encircling veranda of granite columns and a battlemented tower. Here he housed a famous stud, which included a double Derby winner in 1907. The estate was offered for sale following Croker's death in 1939, at the time comprising 375 acres, four secondary houses and private gallops.

The townland of Murphystown is not shown on Rocque's 1756 map of south County Dublin. However, Rocque does record the presence of a number of structures in the general vicinity of the interpreted Murphystown area, at the junction of Ballyogan Road and Stillorgan Road. These building structures have confined themselves to the higher ground in Murphystown, where the local topography slopes down toward the east and south. 'LeopardsTown,' as shown on the lower side of Ballyogan Road on Rocque's map, may illustrate Rocque's tendency to incorrectly site or name large houses. Alternatively, it may indicate that the line of the original Ballyogan Road has altered since Rocque's initial survey in the mid-eighteenth century.

Taylor's early nineteenth-century map (1816) shows in greater detail the location of the townland of Murphystown and its existing buildings. Once again, the land is recorded as sloping downward from the north-east to east to south-east. A concentration of building structures is represented on what has been interpreted as the site of the present day Glencairn estate, labelled Belmont. An avenue appears to lead to these structures from a curve in Stillorgan Road. Two singular additional structures are shown to the north of this avenue, again to the east of Stillorgan Road, one of which undoubtedly relates to the castle at Murphystown. The second, more northern, structure may represent a building formerly located within the study area. Rockland House and Leopardstown House are depicted by Taylor to the north-east of Murphystown.

The first edition Ordnance Survey map, published in 1843, clearly outlines Murphystown townland. The castle at Murphystown is also clearly labelled '*Murphystown Castle*,' immediately south and south-east of which is a large house and garden named Murphystown and a lodge named 'Belmont Lodge.'

The 1866 Ordnance Survey map was published at a scale of twenty-five inches to one mile, thereby showing the castle at Murphystown in greater detail than the first edition (1843). The castle itself is now recorded as 'Murphystown Castle (Remains of).' The house labelled Murphystown on the 1843 Ordnance Survey edition is now named *Glencairn*, Belmont Lodge is now Murphystown Lodge and a second smaller unnamed lodge is sited between the latter and the castle.

Tipperstown

The townland name Tipperstown is an Anglicisation of the Irish words *Baile an Tobair* meaning the Town of the Well. The townland is shown on the 1657 Down Survey map as *Tiberstown*, it formed a portion of the property of the Priory of the Holy Trinity. Tenants who provided services and provisions to the Priory occupied the land. In 1561, after the dissolution of the Priory the land was leased to Bassenet, Brady, and Hore. In 1623 they were held by William Wolverton the owner of Stillorgan and in 1645 by Richard Swinfield of Murphystown. The Priory recovered the land after the Restoration, where they were once more to be leased (Ball 1902).

The Stillorgan Reservoirs and Vartry river scheme were completed in 1869, in order to improve the supply of water to the city's 300,000 population.

7.13.9.2.2 Potential Impact of the Proposal

Construction Phase

No likely or significant potential impacts on local history during the construction phase are anticipated.

Operational Phase

The operation of Luas Line B1 between Sandyford and Murphystown, could potentially have an indirect positive impact on local history, as it will improve accessibility to the historical attractions, both of this area, and within Dublin City Centre.

'Do-Nothing' Scenario

Under a do-nothing scenario, no implications arise in respect of local history.

7.13.9.2.3 Remedial or Reductive Measures

No remedial or reductive measures are necessary.

Operational Phase

No remedial or reductive measures are necessary.

7.13.9.2.4 Predicted Impact of the Proposal

Construction Phase

No likely or significant impacts on local history during the construction phase are predicted.

Operational Phase

The Luas Line B1 will have an indirect positive impact on the appreciation of local history, as it will improve accessibility to historical attractions both in this area and in the city centre.

Worst Case Scenario

A worst case scenario is not applicable to local history in this instance.



7.13.9.2.5 Monitoring

No monitoring measures are necessary in respect of Local History.

7.13.9.2.6 Reinstatement

No reinstatement measures are necessary in respect of Local History.

7.13.9.3 ARCHITECTURAL HERITAGE

7.13.9.3.1 Receiving Environment

The Waterworks Complex on Brewery Road and the former Stillorgan Station House are both listed as protected structures under the Dun Laoghaire Rathdown County Development Plan 2004 - 2010. Both adjoin the existing Luas facilities at Sandyford Industrial Estate. Burton Hall at the southern end of the Burton Hall cul-de-sac, is a protected structure, but is some distance away from the Luas Line B1 alignment. There is a small housing development called 'The Chase' immediately north of the Leopardstown Road/Brewery Road roundabout, and Nos 1 to 29 Arkle Square, The Chase are protected structures, as is the former Shiel's Almshouse, St Joseph's House. Both it and the Chase are overlooked by Central Park, immediately to the south across the roundabout. Leopardstown Park, a large and very fine Victorian house, is the nucleus of Leopardstown Park Hospital. The house and its Edwardian stables are protected structures.

Glencairn, a protected structure, is accessed from Murphystown Road through very fine gates with granite castellated flanking walls. The house has a conservatory and substantial out offices, including a gatehouse. All these features, and the entrance gates, railings, archway and piers, are separately listed as protected structures. Glencairn was greatly remodelled by Boss Croker who bought the house at the beginning of the 20th century. He also laid out the grounds. He was a horse racing enthusiast and had private gallops for training his horses laid out on part of the grounds of the house. This was presumably where the nearby 'Gallops' housing estate gets its name.

Murphystown Castle stand in the grounds, near the gates.

Clonlea House, a substantial late Victorian/Edwardian house, immediately south of Glencairn, is a protected structure. It is not as notable or extensive as Glencairn nor has it such well-known associations. Lisieux Hall, also known as Park Cottage, is a protected structure a little to the south of the proposed Luas Line B1.

7.13.9.3.2 Potential Impact of the Proposal

Construction Phase

The proposed Luas Line B1 moves away from the Waterworks Complex and the former Stillorgan Station House, and, in light of the extensive Luas activity already in the area, neither the construction of Line B1 nor its subsequent operation are likely to have any affect on these structures. Construction equipment engaged in erecting the ramp approaching the proposed bridge over the Leopardstown Road Roundabout, and the construction of the bridge itself, may just be visible from Arkle Square and from Burton Hall, and so may have a slight to imperceptible impact on these structures. Impacts on the former Shiel's Almshouse, St Joseph's House, are unlikely because of distance and intervening trees and buildings. The western boundary of Leopardstown Park Hospital is a stone wall, generally some 2.5 metres high. There are mature trees along the inside of the boundary. Under the provisions of the Planning and Development Act, 2000, these trees and the boundary fall within the definition of 'protected structure'. The removal of these elements has the potential to result in profound and negative impacts in the immediate vicinity, and significant negative impacts on the heritage context of Leopardstown Park. The works at the gates of Glencairn have potentially significant and negative impacts on architectural heritage, but the design of the Luas stop, extending the wall southwards in a manner that matches existing construction is likely to result in a positive impact. There are not expected to be any impacts on Glencairn House itself. The demolition of Clonlea House will result in a profound negative impact on the building itself, and slight to significant impact on the architectural heritage of the area. Impacts on Lisieux Hall are likely to will result in a profound negative impact on the building itself, and a slight

to significant impact on the architectural heritage of the area. Impacts on Lisieux Hall are likely to be imperceptible, particularly in the context of proposed roadworks between Lisieux Hall and Luas Line B1.

Operational Phase

Where Luas Line B1 runs along the alignment of the former Harcourt Street Railway line, bringing a former railway line back into use, it has the potential to give rise to significant permanent and positive impacts on architectural heritage. The Luas Line B1 departs from the old line between Sandyford and Carrickmines. There is potential for moderate impacts on Arkle Square to result from the presence of the bridge over the Leopardstown Road Roundabout and of trams travelling on that bridge. The impact of the existence of Luas Line B1 on the setting of Leopardstown Park Hospital has the potential to be significant and initially negative. The existence of the Glencairn Stop is likely to result in a significant but neutral impact on architectural heritage. The loss of Clonlea House is likely to result in a slight to significant permanent impact on the architectural heritage of the area. There are unlikely to be any impacts on Lisieux Hall.

7.13.9.3.3 Remedial and Reductive Measures

Construction Phase

The significant development works, both recently completed and proposed, at the Leopardstown Park Hospital, are, in themselves, a reductive measure in terms of reducing the potential impact of the construction of Luas Line B1 on the architectural heritage of the Hospital. It is proposed to plant trees to replace those lost along the western boundary of Leopardstown Park Hospital. It is also proposed to erect a new stone boundary wall of similar construction to the existing.

Operational Phase

No remedial or reductive measures are proposed.

7.13.9.3.4 Predicted Impact of the Proposal

Construction Phase

The removal of the boundary wall and trees along the

western boundary of Leopardstown Park Hospital will result in significant negative impacts on the architectural heritage of the area. These impacts will be mitigated by the erection of a new stone boundary wall of similar construction to the existing, and by the planting of new trees. The works at Glencairn will have, on balance, a neutral impact. The demolition of Clonlea House will result in a slight to significant impact on the architectural heritage of the area.

Operational Phase

The impact on Leopardstown Park Hospital will be significant and negative at first, reducing as new planting matures. The existence of the Glencairn Stop will result in a neutral impact on architectural heritage. The loss of Clonlea House will result in a slight to significant impact on the architectural heritage of the area.

7.13.9.3.5 Monitoring

No monitoring of the impacts of the existence of Luas Line B1 on architectural heritage is proposed

7.13.9.3.6 Reinstatement

Not applicable in respect of architectural heritage.

7.13.9.3.7 Potential Route Deviation

It is understood that the potential to vary the alignment, if invoked, will be in order to avoid and/or minimise impact in terms of the built and architectural heritage along the route and therefore should not result in an increased impact.



7.13.9.4 ARCHAEOLOGY

7.13.9.4.1 Receiving Environment

The following archaeological appraisal of Area 13 (Sandyford Industrial Estate -Glencairn Stop) is based on a field inspection, targeted archaeological testing and a desk study drawn from several published sources; the Record of Monuments and Places (RMP) of the Department of the Environment, Heritage and Local Government and the topographical files of the National Museum of Ireland (information on stray finds).

The main purpose of this section of the EIS is to assess the importance of the receiving archaeological environment and the impact of the proposed route on this environment. Ameliorative measures are also proposed to safeguard any monuments, features or finds of antiquity.

Archaeological sites are broadly classified for the purposes of impact assessment in such a way that their importance in the archaeological record is suggested. A zone of archaeological potential (ZAP) is the area around the extant remains where related archaeological features are likely to occur. The numbers used to identify the sites are those of the RMP; all sites listed in the RMP are given full protection under national monuments legislation.

Archaeological sites that occur within approximately 100m of the Luas route corridor are described below, sites which are relevant to the general archaeological landscape of the area are indicated in (figure 1).

The Luas route corridor runs through the townlands of Tipperstown, Carmanhall and Murphystown. The only recorded monument in the area is located in Murphystown townland. However, during the construction of the South Eastern motorway (SEM) to the north of the site a number of prehistoric sites were encountered in the area suggesting an even greater density of archaeological activity than standing monuments alone would indicate

The proposed Luas line B1 runs approximately 28m west of the ruins of Murphystown Castle (DU023:025) and through its zone of archaeological potential (ZAP). During the field inspection, it was noticed that the castle site lies on the highest point of an overgrown grass-covered field and that the ground slopes irregularly around the ruined remains of the castle. This gives rise to the possibility that the castle was built on an earlier moated site; however, the irregular and damp nature of the ground may also be the result of natural rock out-cropping. This site was subject to archaeological investigation by opening a series of test trenches by Abigail Cryerhall of MGL on the 31st of January 2005.

A further site inspection was carried out on the 16th of March 2005. A section of wall was noted under a thick covering of briars. The wall appears to consist of a tumbledown section of a granite dry-stone field boundary wall with a ditch on its western side. The ditch measures circa 1.80m to 2m in width. There is some evidence of stone and earth revetting on the eastern side of the ditch, with stone at the base and earth on top. The ditch is possibly cut into the bedrock. The southern section of the wall abutting Glencairn has been partially demolished to make way for a wire fence.

A study of the historical maps has demonstrated that this wall is the old boundary of the Murphystown Road as shown on the first edition Ordnance Survey map of 1843. This wall once continued further southeast to the castle. The southern section of the wall abutting Glencairn is a later field division.

Archaeological Background

Area 13 is located within a landscape that has produced evidence for a rich and varied archaeological heritage dating back to earliest times.

Mesolithic (9000-5000 BC)

Current archaeological evidence suggests that south county Dublin was first inhabited at the end of the Mesolithic period. Excavations on Dalkey Island have revealed deposits dating to this period that include shell middens, animal bones and razor-sharp flint tools called Bann flakes. Radiocarbon results on this site show an early

Bann flakes. Radiocarbon results on this site show an early date of 3340 BC. A small number of Bann flakes have also been recovered in Dún Laoghaire, Rathfarnham and Loughlinstown, indicating early settlement along rivers, streams and the coast (Corlett 1999).

Neolithic (4000-2400 BC)

The evidence for settlement of the area during the Neolithic period occurs in the form of megalithic tombs and a distribution of dateable stray artefacts. In south county Dublin, settlement appears to have been located at the foot of the Dublin/Wicklow Mountains, and there is a striking east-west band of surviving tombs in this area. The relatively few finds dating to the Neolithic in the area include a polished stone axe (NMI Ref. 1979:73), which was recovered in Murphystown. This axe, made from a local andesite, is typical of the Neolithic period, when such tools were used for cutting wood.

Bronze Age (2000-500 BC)

A flat bronze axe head, uncovered in sandy soil (NMI Ref. IA/67/83) at Carmanhall (Leopardstown), indicates the possibility of Neolithic and Bronze Age activity in the area.

Recent excavations: A number of Bronze Age sites were identified during the monitoring of topsoil stripping for the SEM in the Carmanhall area (figure 1).

Site 54, a Bronze Age burial site was located north of Glencairn house in Carmanhall townland west of the proposed Luas M50 overbridge (figure 1). This site was excavated by Fiona Reilly under licence number 01E0076. 'This area measured 40m on its SW and NE sides by 15m on its SE side and 10m on its NW side. It is likely that more burials are situated beyond the CPO line of the SEM to the SW' (Reilly 2004, 129). The burials were accompanied by vase urns and have been dated to c. 2000-1850 BC (Cotter 2005, 9).

A number of further sites were identified during monitoring to the southeast of the proposed Luas route in Murphystown/Carmanhall and Leopardstown townlands along the valley of a stream. Fourteen potential features were identified and excavated by Thaddeus Breen under licence number 02E0153. This included an inhumation cemetery, firepits/hearths, a possible *fulacht fiadh* and

stone drain (Breen 2004).

Site 65M, was identified during the monitoring of topsoil stripping for the south-eastern motorway in Carmanhall and Leopardstown townland to the east of the proposed Luas route. The site consisted of a *fulacht fiadh* and was excavated by Thaddeus Breen under licence number 02E0330 (Breen 2004).

Site 73M, a *further fulacht fiadh* was excavated by Thaddeus Breen under licence number 02E0699 in Murphystown townland as part of the south-eastern motorway (Breen 2004).

Brian Ó Donnchadha also excavated a smelting site to the northwest of the proposed Luas overbridge in Murphystown townland (pers. comm. Gary Conboy & Bennett 2003, xl). This consisted of a single keyhole pit with a bowl furnace containing high quantities of slag (pers. comm. Brian Ó Donnchadha).

Early historical (Christian) period (AD 400-1200)

In the early historical era, the area of south county Dublin in which the proposed development is situated was part of the territory of the Dál Messin Corb, the first of the Leinster dynasties (MacShamhráin 1996, 47). The Dál Messin Corb were eventually displaced from the Liffey plain and gradually pushed further into Wicklow under pressure from other dynasties that were themselves being displaced by Scandinavian settlements being established from the ninth century onwards. It is possible that the area later became part of the domain of the Ui Briúin Chualann, who dominated the southern parts of county Dublin and the coastal strip towards Wicklow.

A number of pre-Norman early historical ecclesiastical settlements occur in the area. Churches and crosses like those in Kilgobbin (DU025:016; DU025:017; DU026:121) point to a considerable local population living in well-defined villages and hamlets, rather than being scattered across the landscape. Such settlement reflects a relatively stable early medieval population.

Finds from the period include a range of Belarmine ware, typically dating to the 1600s (NMI Refs. 1971:1126;



1972:16) found in the area around the castle at Kilgobbin and some stoneware sherds (NMI Ref. 1972:17).

Medieval period (AD 1200-1600)

The medieval period is represented by a wide range of monuments, and south Dublin's status as the frontier of the Pale is mirrored by the tower houses in the locality, such as those at Carrickmines (DU026:005), Kilgobbin (DU025:017/01), and Murphystown.

Recent Excavations: A possible medieval site was identified during monitoring of topsoil stripping for the SEM in Carmanhall townland. Site 55, boundary pits and ditch were located to the west of the proposed Luas route. This site was also excavated by Fiona Reilly under licence number 01E0074. The site 'consisted of a ditch with evidence of a collapsed wall or stone bank, several fire pits and post-holes' (Reilly 2004). As the ditch was not marked on the first edition, it is thought that it is earlier and may represent a medieval field boundary. One of the areas of scorching is believed to be contemporary with the silting up of the ditch.

Murphystown Castle

The castle at Murphystown is a former Pale castle (DU023:025) and survives in ruins in the grounds of Glencairn. The vaulted ruins of the castle are said to have given the townland its name (Pearson 1998). The RMP details of the castle are as follows:

RMP No.	DU023:025
NGR:	31956,22556
Townland:	Murphystown
Site Type:	Tower house
Distance:	The Luas Line B1 runs 28m west of the monument.

Description:

The remains consist of two-mortared granite walls, with traces of a vaulted ceiling, covered with ivy. There are corbels in the interior, possibly indicating the former presence of wooden upper floors. The remains of the castle are situated in the grounds of Glencairn. Marked 'Murphystown Castle (in Ruins)' on the 1936-37 edition OS six-inch map.

A section of wall was noted under a thick covering of briars situated approximately 15m to the west of Murphystown Castle. The wall appears to consist of a tumbledown section of a granite dry-stone field boundary wall with a ditch on its western side. This wall is shown on the first edition Ordnance Survey map of 1843. This wall once continued further southeast to the castle.

The first edition map shows a further wall, angular in plan to the north and northeast of the castle. This wall is no longer in situ. The western edge of this wall is located adjacent to the proposed Luas line. This wall may also represent the line of an old field boundary or an enclosing element to Murphystown Castle.

7.13.9.4.2 Archaeological Testing

The route of the proposed Luas was tested on the 31st of January 2005 by Abi Cryerhall (licence no: 05E0011). The area tested was along the part of the preferred Luas route that passes through the zone of archaeological potential associated with Murphystown Castle (DU023:025).

The testing programme was undertaken to establish whether any archaeology associated with the castle was present along this section of the route.

A total of five trenches were mechanically excavated by JCB along the route. Two were specifically excavated across the sunken waterlogged areas.

No archaeological features or finds were encountered in trench 1. Further quarrying evidence in the form of a large pit was revealed in trench 4. Datable material recovered from this trench consisted of 19th and 20th century pottery, glass and other waste. Although trench 5 was not fully excavated due to boggy ground, similar material was recovered from the trench. This material would strongly suggest that these pits relate to the 19th century quarrying activity as depicted in the northwestern area of the site on the Ordnance Survey 1866 map.

A large pit was identified in trenches 2 and 3 and was interpreted as a quarry pit. The fill of the pit encountered in trench 2 and 3 consisted of a silty gritty subsoil-type clay. No datable material was recovered from the quarry pits,

which may suggest that some of the pits are earlier and could relate to the castle construction

Nothing of archaeological significance was revealed during the testing. No subsurface remains of the wall shown on the first edition map to the north of the castle were revealed. Though it is possible that quarrying may have removed subsurface remains associated with the wall.

The area to the west of the castle (approximately 28m to the west) which lies within the route of the Luas Line was not tested as it was inaccessible due to soft ground and the presence of a thick overgrowth of briars.

7.13.9.4.3 Potential Impact of the Proposal

The construction of the Luas track involves the excavation of a trench 6-7m wide and 0.8-1.2m deep. A working width generally of 10m-15m in extent will be observed by the contractor along the route of the Luas. As with each of the Luas alignment sections, and in all areas where ground disturbance is proposed, there exists the potential for disturbing previously unrecorded archaeological soils, features or deposits. It is advised that all archaeological recommendations are implemented during the pre-construction/site preparation phase of the development.

The proposed Luas line B1 runs approximately 28m west of the ruins of Murphystown Castle and through its area of archaeological potential. The testing results revealed possible late medieval quarrying activity. The construction groundworks are likely to impact on as yet unidentified archaeological remains. The section of wall identified in the line of the Luas route appears to be an old field boundary. However, a proper study of the wall was impeded by briars. North of the castle adjacent to the present field boundary the castle passes close to the location of an angular wall shown on the first edition map (1843). This wall may also represent the line of an old field boundary. However, the location of both these walls close to Murphystown castle could also suggest the surviving line of an enclosing element to the castle.

The Luas route crosses the Racecourse Stream via a bridge. There is always a potential to find evidence for

archaeological activity close to rivers. Mesolithic and Neolithic settlement evidence in this part of south county Dublin has been associated with riverine margins.

Furthermore it is in this area that a number of archaeological sites were recorded during the construction of the south-eastern motorway. This included a Fulacht Fiadh, Bronze Age burials and a possible medieval boundary with associated pits. The Bronze Age burials were located west of the location of the proposed M50 over-bridge for the Luas. According to Fiona Reilly who excavated the Bronze Age burials it is considered very likely that further burials are located to the southwest (further away from the Luas overbridge) beyond the line of the CPO of the South-Eastern Motorway.

Given the sensitive archaeological landscape it is likely that subsurface archaeological material will be uncovered during the construction phase of the bridge.

'Do Nothing' Scenario

If Luas Line B1 was not to proceed, there would be no potential impact upon the archaeological heritage of the area.

7.13.9.4.4 Remedial or Reductive Measures

The Luas Line B1 runs east of a Bronze Age burial site (see figure 2 for location). Excavations during the SEM have demonstrated this area to be a sensitive archaeological landscape. It is possible that further archaeological features survive to the north and south of the SEM along the proposed route of the Luas/Luas overbridge. Therefore it is recommended that this section be monitored with approval from and under licence to the Department of Environment, Heritage and Local Government. The nature of the mitigation will be determined by the extent to which the archaeological features survive and will have a bearing on the subsequent requirements of DoEHLG.

The Luas route clearly passes through the area of archaeological potential around the castle (DU023:025). Though no further archaeological activity such as external ditches or banks relating to the castle was identified during the testing. It is possible that the quarrying activity has



removed or obscured such remains.

The nineteenth century quarrying activity does appear to be quite extensive to the west and northwest of the castle remains. It is along this side that the route of Luas Line B1 will be passing. No date was clearly established for the quarry pit in Trenches 2 and 3 although they may be late medieval in date.

However the present upstanding section of wall to the northwest of the castle and the wall identified on the first edition Ordnance Survey map could represent an enclosing element to the castle.

Given the proximity of the proposed Luas route to Murphystown Castle/Tower House (DU023:025), it is recommended that further testing should take place to the north and west of the castle to determine the nature of the walls (see figure 2 & 5 for location), where vegetation and soft ground hampered the initial investigation. This section of the Luas should also be monitored with approval from and under license to the Department of Environment, Heritage and Local Government (see Monitoring section for further details).

It is also recommended that adequate measures be taken to secure the upstanding remains of Murphystown Castle (DU023:025) during the construction and operational phase of the development programme. A detailed archaeological/structural engineering survey of the ruins should be carried out in advance of construction to determine its stability. If it is at risk, supports should be used to reinforce the monument. The castle remains should be cordoned off to prevent the site from being damaged by construction traffic or temporary works, such as compounds and haul roads etc. Machinery traffic should be limited to the route-take and not encroach further east into the area of archaeological potential around the castle (DU023:025).

The close proximity of the Luas Line to Murphystown Castle presents an opportunity to display illustrative/descriptive plaques at the Luas stops either side of the monument to inform commuters of the cultural heritage of the area through which they are travelling.

7.13.9.4.5 Predicted Impact of the Proposal

Construction Phase

Luas construction through this area will involve considerable groundworks and the construction of a bridge crossing the valley and stream to the north. Along with topsoil removal, these groundworks will involve the stabilising and levelling of the sloping and uneven ground. This would involve the removal of the quarry pits and landscaping to create an even and stable platform for the track line. Given that the route passes through the western part of the area of archaeological potential associated with Murphystown Castle DU023:025, the construction groundworks are likely to impact on as yet unidentified archaeological remains.

If any archaeological sites are identified during the construction process, all construction work in that area will have to cease and the area be fenced off. All archaeological issues will have to be resolved to the satisfaction of the Department of Environment, Heritage and Local Government and the National Museum of Ireland.

Operational Phase

No impact on archaeology is predicted during the operation of the Luas.

7.13.9.4.6 Monitoring

The area around Murphystown Castle has been identified as a one of archaeological potential and as such should be treated as an archaeologically sensitive area. Consequently, it is recommended that construction groundworks for Luas Line B1 be archaeologically monitored. The programme of monitoring should specifically address whether any of the quarry pits are earlier than the nineteenth century and relate to castle construction. Monitoring should also ensure that any other archaeological activity present and not found during the testing will be identified.

It is also recommended that an adequate amount of time is reserved in the groundworks phase of the construction programme for the recording of the quarry pits and the

resolution of any further archaeological remains that may be uncovered during the works.

The archaeological monitoring must be carried out by a suitably qualified archaeologist under licence to the Department of Environment, Heritage and Local Government and the National Museum of Ireland.

All groundbreaking works in undisturbed areas along the length of the proposed Luas route will be subject to full monitoring to ensure that any soils, features or deposits of an archaeological nature encountered during the pre-construction phase are fully recorded, thus preserving the archaeological material by record. The developer should make provision to allow for and fund the archaeological works required to resolve any remains that are noted during the construction phase of development. The attention of the developer is drawn to the relevant sections of the National Monuments Acts (1930-2004), which describe the responsibility of the site owners to report the finding of archaeological items if any should be discovered during construction works.

Please note that all recommendations are subject to approval by the National Monuments Section, Department of Environment, Heritage and Local Government and the National Museum of Ireland.

7.13.9.4.7 Reinstatement

In an archaeological context, no reinstatement measures are necessary.

7.13.9.4.8 Potential Route Deviation

The deviation of the Luas line in the area of Murphystown Castle (DU023:025) could impact previously unknown subsurface archaeological remains. It is recommended that the Luas line does not deviate east of the present alignment as this would bring it closer to the castle (DU023:025). Any suggested deviation in this area would have to be agreed with the Department of Environment, Heritage and Local Government. At a minimum the deviation would be subject to archaeological testing along the route of the deviation.

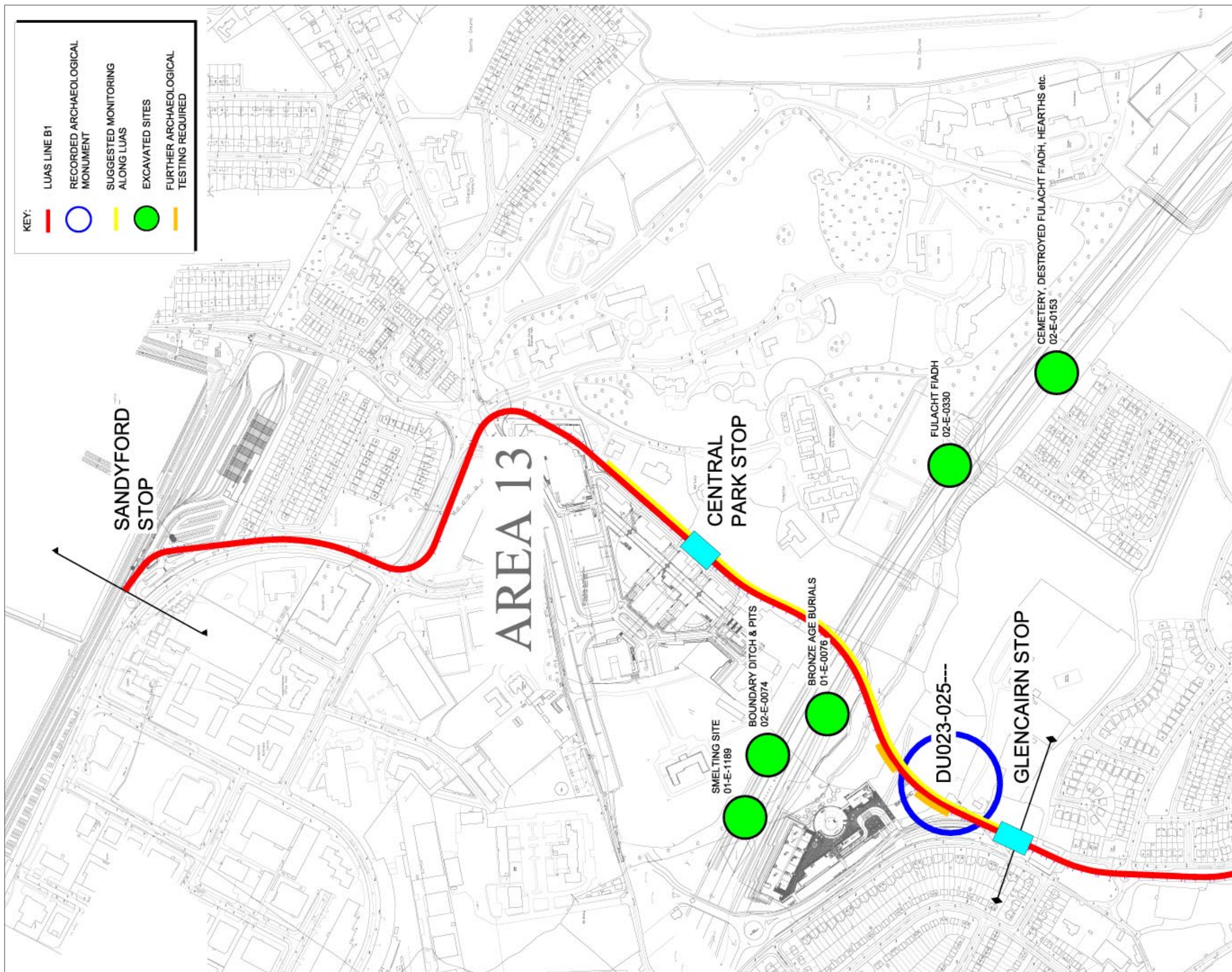


Figure 1 Area 13 Showing RMP Sites & Locations of Recent Excavations

Area 13 Construction Scenario



7.13.10.1 URBAN FUNCTION

The Luas Line B1 in Area 13 runs from the proposed Sandyford Stop at the Stillorgan Reservoirs, following the alignment of Blackthorn Avenue at the eastern edge of the Sandyford Industrial Estate. It crosses the junction of this road with Burton Hall Road at grade, and follows that road in an easterly direction, rising on an embankment to a bridge over the Leopardstown Road/Brewery Road roundabout, which comprises the main eastern entrance into the Industrial Estate. The Luas Line B1 runs along the south-eastern boundary of the Central Park development. It then rises on an embankment and crosses the line of the SEM by means of a bridge.

Area 13 of the Luas Line B1 alignment terminates within the property of *Clonlea House* on the eastern side of Murphystown Road, which is required to be demolished. Such demolition would be required in any case to facilitate the planned route of the Murphystown Parallel Access Road.

There will be two stops provided, in addition to the existing Sandyford stop, along Area 13 of the Luas Line B1 alignment. The first, Central Park stop, is to be provided opposite the planned plaza area of the Central Park scheme, and will include pedestrian access to Leopardstown Park Hospital, the IDA South County Business Park, and Leopardstown Road. Glencairn stop will be located within the property of *Clonlea House* at the northern end of Murphystown Road.

Construction compounds and assembly areas will be located to the west of the existing Sandyford Luas Depot on the northern side of Blackthorn Avenue; to the north of the Luas Line B1 alignment on the southern side of Burton Hall Road, within the existing property of FAAC Electronics Ltd.; immediately north of the SEM in the vicinity of the planned Luas Leopardstown Bridge; on lands to the north of Murphystown Road, immediately to the west of the Luas Line B1 alignment in the vicinity of the property 'Glencairn' and, finally; to the east of Murphystown Road, south of Glencairn. A sub-station serving the scheme will be constructed immediately to the east of the Glencairn stop.

7.13.10.2 ORGANISATION OF THE WORK

As Luas Line B1 is predominantly segregated along its entire length, it is unlikely to have any major impact on the public road infrastructure. The work sites for utilities diversion will be undertaken within an area as restricted as possible and will be planned in considerable detail. It may be noted that this phase does not require any substantial changes to the existing traffic system.

The provision of Luas Line B1 in the vicinity of the Blackthorn Avenue/Burton Hall Road junction will benefit from the previous alteration of the roundabout junction system, and the revised circulation plan as part of overall traffic management measures, implemented by Dun Laoghaire Rathdown County Council for the Sandyford Industrial Estate. These implemented traffic management measures comprise a one-way system with a signalised junction at Blackthorn Avenue/Burton Hall Road.

The construction works for the bridge crossing at the Leopardstown Road/Brewery Road roundabout will be fully controlled in order to ensure minimal disturbance of traffic using this roundabout. Finishing and resurfacing works within all roadways will be undertaken as soon as practicable in order to return the adjacent carriageway areas to vehicular circulation at the earliest possible opportunity.

The construction of the Luas Line B1 alignment in Area 13 also requires the provision of a bridge over the SEM at a location to the south of the lands of Central Park.

Until a contractor has been formally appointed to undertake the construction of Luas Line B1, no precise programme can be established. For the purposes of this EIS the following assumptions can reasonably be made based on the required end date for completion of the works and the commissioning of the system, and on the basis of experience gained on similar projects elsewhere.

- Work will start simultaneously at a number of locations.
- Duration - overall approximately 38 months
- A period for testing and commissioning the system is included.

- Trams will be supplied during the construction period.

7.13.10.3 SITE ACCESS

The site is proposed to be accessed primarily from four points,

- Blackthorn Avenue and Burton Hall Road will be used as a primary construction access route from the existing Luas Sandyford Depot for that portion of the alignment from the proposed Sandyford stop to the Leopardstown Road/Brewery Road roundabout. Access will also be taken onto this route from the planned construction compound and assembly area on the southern side of Burton Hall Road.
- Access will be provided by means of defined routes within the lands of Central Park.
- Access is also proposed by means of slip roads off both sides of the SEM, in order to facilitate the construction of the SEM bridge crossing.
- Access will be taken off Murphystown Road, in the vicinity of the planned construction compound and assembly area.

The stocks of materials to be used, and passing through these access points will be relatively large and will be managed with considerable care.

7.13.10.4 CONTRACTORS' COMPOUNDS AND ASSEMBLY AREAS

An area at the western end of the permitted Sandyford Depot will also serve as a temporary construction and storage compound and assembly area during the construction of Luas Line B1.

A contractors compound and assembly area will be created on the southern side of Burton Hall Road, to the north of the Luas Line B1 alignment. This will be approximately 3,450m² in area. At present, this area comprises the lands of the FAAC Electronics Ltd. property. Following

construction, the contractors' compound and assembly area will be landscaped and incorporated into the existing streetscape.

A smaller compound and assembly area, of approx. 1,000m² will be located on the northern side of the SEM in the vicinity of the planned Luas Leopardstown Bridge, and will be used primarily in association with the construction of this structure.

A contractors compound and assembly area will be created on the southern side of Burton Hall Road, to the north of the Luas Line B1 alignment. This will be approximately 2,000m² in area. At present, this area comprises the lands of the FAAC Electronics Ltd. property. Following construction, the contractors' compound and assembly area will be landscaped and incorporated into the existing streetscape.

Another compound and assembly area, of approx. 2,000m² will be located on the northern side of the SEM in the vicinity of the planned Luas Leopardstown Bridge, and will be used primarily in association with the construction of this structure.

Another construction compound and assembly area will be located to the west of the Luas Line B1 alignment, to the north of Murphystown Road. Access to the Luas Line B1 alignment from the compound will be taken via the public road southwards to the area of the property *Clonlea House*, and northwards across currently undeveloped lands in the vicinity of the existing property *Glencairn*. Another smaller compound will be provided to the east of Murphystown Road, south of 'Glencairn'. Combined these two construction compounds comprise approximately 4,000m²



7.13.10.5 WASTE MANAGEMENT

A Waste Management Plan will be prepared by the appointed contractor prior to the commencement of development. It will be implemented by the appointed contractor on site. This will involve identification of all likely waste materials prior to construction work commencing and a review and selection of the most appropriate means of waste disposal in accordance with best practice and the provisions of the Waste Management Acts.

All excavated inert material will be reused, where possible, to create embankments and bunding elsewhere along the alignment. Any remaining material will be reused and/or disposed of by licensed operator/carrier within the Dublin area, the location to be determined at the time of development.

7.13.10.6 SPECIAL MATTERS

Critical Crossroads

The only at-grade crossing point in Area 13 is located at the junction of Blackthorn Avenue and Burton Hall Road. This is currently the main eastern entrance to Sandyford Industrial Estate, and carries a considerable amount of daily traffic. As stated above, the Local Authority has recently undertaken a major traffic management programme in this area, including the signalling of this junction. Provision will also be made to maintain vehicular and pedestrian movement in this area during construction to the greatest extent possible.

Local Residents

The works site along Blackthorn Avenue is immediately adjacent to the westernmost dwellings of the Woodford Estate. In this regard, the Luas Line B1 alignment requires the acquisition of the western portion of the property of No. 27 Woodford. There are also a considerable number of residences in the vicinity of the Glencairn stop, primarily comprising the houses of the Leopardstown Heights and Gallops estates, but critically, including the property of Clonlea House, which is required to be demolished.

Leopardstown Valley

The Leopardstown Valley, an existing natural heritage amenity area is located immediately to the south of the SEM alignment, and will be crossed by Luas Line B1, by means of a bridge structure. In order to undertake essential and temporary construction works to the bridge, vehicular access will be required through the valley from the southern side of the Motorway, requiring the removal of vegetation. The construction route will be clearly designated in order to ensure a minimal intrusion into the valley. In addition, reinstatement measures, including replacement planting if necessary, will ensure that the overall predicted impact of this temporary route is minimised.

Mature Boundary Trees

The insertion of the Luas Line B1 alignment along the southeast boundary of Central Park will necessitate the loss of mature trees. An insufficient corridor was retained under the permitted extension to Central Park. Replacement planting and landscaping will ensure that the predicted impact of the B1 alignment in this location will be minimised.

7.13.11 DIRECT AND INDIRECT EFFECTS RESULTING FROM USE OF NATURAL RESOURCES

Area 13 of the Luas Line B1 alignment will run from the existing Sandyford stop on Blackthorn Avenue, and run to the Glencairn stop on Murphystown Road, via Burton Hall Road, Central Park and by means of a bridge over the SEM and the Leopardstown Valley. The likely significant direct and indirect effects on the environment of the proposed development which may result from the use of natural resources in this case natural resources being the land encompassed within the alignment, have been comprehensively assessed in this Environmental Impact Statement in keeping with Paragraph 3 (e) (i) of S.I. No. 349 of 1989 as amended. It is expected that the building materials required for the construction of Luas Line B1 will be sourced from Ireland and elsewhere within the E.U.

7.13.12 DIRECT AND INDIRECT EFFECTS RESULTING FROM EMISSION OF POLLUTANTS, CREATION OF NUISANCES AND ELIMINATION OF WASTE

Details of emissions arising from the development were outlined in the relevant sections of this Chapter, which dealt with the aspects of the environment considered in relation to Area 13. There will be no significant direct or indirect effects arising from emissions. Waste Management is addressed under Section 7.13.10.5.



7.13.13 FORECASTING METHODS USED FOR 7.13.10 AND 7.13.11

The methods employed to forecast the effects on the various aspects of the environment are standard techniques used in the particular professional disciplines. The general procedure employed was to address the receiving environment in a dynamic fashion, to add to that a projection of the "loading" placed on aspects of the environment by the development in it, mitigated by appropriate measures and thereby arrive at a net or predicted impact. The methodology employed by each of the specialist consultants is outlined in the relevant sections of Chapter 5 of the Environmental Impact Statement.

7.13.14 INTERACTIONS

Material Assets/Human Beings

The operation of Luas Line B1 will provide a new permanent public transport service linking the significant employment area of Sandyford Industrial Estate with the evolving residential area of Glencairn and Murphystown. Significant new employment-related development at Central Park, the IDA South County Business Park and at Murphystown will also be served by this efficient public transportation mode. This will lead to a significant positive interaction between Material Assets and Human Beings, and will also achieve planning policy and objectives relating to achieving a closer correlation between development and the provision of public transport.

The construction of the Luas Line B1 alignment will result in a significant local adverse impact on the properties of No. 27 Woodford, and *Clonlea House*, (a Protected Structure) which is to be demolished. However, it should be noted that *Clonlea House* will require to be demolished in any case in order to accommodate the planned alignment of the Murphystown Parallel Road, which is a short-term Local Roads Objective of the Statutory Development Plan.

The operation of Luas Line B1 in Area 13, including remedial planting and other landscaping measures will ensure a positive interaction between Townscape and Human Beings. It is likely that Human Beings will quickly become accustomed to the new built form elements in the townscape, including new bridge structures in the area.

Climate/Human Beings

The operation of Luas Line B1 will provide for positive interaction between human beings and Climate (Air Quality) by means of providing a clean and efficient alternative to the use of the private car. However, it is noted that the provision of the facility may act as a catalyst for higher density development in the catchment area. Without effective controls by the Planning Authority, this could result in higher levels of traffic flow in the area.

Material Assets/Flora/Fauna

The main interaction between Flora and Fauna is that the loss of vegetation necessary for the proposal will result in a loss of cover and habitat for insects, birds and mammals, and disturbance along the route, which will reduce its use as a corridor for animal movement. This will particularly occur along the south-eastern boundary of the lands of Central Park, and in the vicinity of the reservation of the SEM. However significant new planting of semi-mature trees at this location should mitigate this impact.

Human Beings/Material Assets/Landscape

The construction of the Luas Line B1 alignment will run along a corridor, virtually all of which is segregated from existing road infrastructure, whether by bridge or by reservation. This will ensure a minimum of conflict with existing and planned future vehicular or pedestrian traffic movement in the area.

Appendix 13A

List of Plant Species in Area 13

Common name	Scientific name
Rushes	
Toad rush	Juncus bufonius
Grasses	
Annual meadow-grass	Poa annua
Cock's-foot	Dactylis glomerata
Creeping bent-grass	Agrostis stolonifera
False brome	Brachypodium sylvaticum
Meadow foxtail	Alopecurus pratensis
Red fescue	Festuca rubra
Ryegrass	Lolium perenne
Yorkshire fog	Holcus lanatus
Sedges	
Remote sedge	Carex remota
Other herbs	
Alexanders	Smyrniolum olusatrum
Blubell	Hyacinthoides non-scripta
Broad-leaved pondweed	Potamogeton natans
Brooklime	Veronica beccabunga
Bush vetch	Vicia sepium
Celandine	Ranunculus ficaria
Cleavers	Galium aparine
Common duckweed	Lemna minor
Common fumitory	Fumaria officinalis
Common mouse-ear	Cerastium fontanum
Cow parsley	Anthriscus sylvestris
Creeping buttercup	Ranunculus repens
Creeping thistle	Cirsium arvense
Daisy	Bellis perennis
Dandelion	Taraxacum agg.
Groundsel	Senecio vulgaris
Herb robert	Geranium robertianum
Hogweed	Heracleum sphondylium
Japanese knotweed	Reynoutria japonica
Lords and ladies	Arum maculatum
Meadow buttercup	Ranunculus acris
Narrow-leaved vetch	Vicia sativa nigra

Nettle	Urtica dioica
Opposite leaved golden saxifrage	Chrysosplenium oppositifolium
Poppy	Papaver rhoeas
Primrose	Primula vulgaris
Red dead-nettle	Lamium purpureum
Ribwort plantain	Plantago lanceolata
Shepherd's purse	Capsella bursa-pastoris
Sow thistle	Sonchus spp.
Speedwell	Veronica spp.
Sun spurge	Euphorbia helioscopia
Sweet woodruff	Galium odoratum
White clover	Trifolium repens
Wild turnip	Brassica rapa
Willowherb	Epilobium spp.
Winter heliotrope	Petasites fragrans
Wood anemone	Anemone nemorosa
Wood avens	Geum urbanum
Yellow clover	Trifolium dubium
Trees and shrubs	
Ash	Fraxinus excelsior
Beech	Fagus sylvatica
Birch	Betula spp.
Horse chestnut	Aesculus hippocastanum
Ivy	Hedera helix
Oak	Quercus spp.
Holly	Ilex aquifolium
Sycamore	Acer pseudoplatanus
Privet	Ligustrum vulgare
Snowberry	Symphoricarpos albus
Scot's pine	Pinus sylvestris
Hawthorn	Crataegus monogyna
Bramble	Rubus fruticosus agg.
Lime	Tilia spp.
Elder	Sambucus nigra
Elm	Ulmus spp.

List of Tree Species in Area

Location	Ref. No.	Species	Age	Condition	Ref. Code	Comments
27 Woodford	Hedge 001	Cypress	M	Good	B	This hedge, is growing behind the boundary wall of this property. It is a mature, well managed hedge. To the north of this property is a new plantation which includes rowan, holly and Portuguese Laurel.
Blackthorn Avenue	Plantation 002	Shrubs - laurel, hebe, escalonia, viburnum, griselinia, cotoneaster.	Y	Good	A	A roadside planting scheme which has established well. The standard trees and whips are closest to the road, with a border of shrubs interspersed with trees. Some of the smaller trees have not established very well.
		Trees - horse chestnut, hazel, lime, ash, pine, beech, birch, field maple, oak, sycamore, eucalyptus, larch	Y	Good	A	
South side of Burton Hall Road	Shrubbery 003	Shrubs - viburnum, berberis, cornus, hebe, pitosporum, Rosa, Amelanchier, Portuguese Laurel, elder, Eleagnus, griselinia, Cherry laurel	M	Good	A	Mature shrubbery growing on a mound and forming a dense screen. There is one mature Scots pine in good condition. There are also two early mature multiple stemmed ash in fair condition which has been previously tagged 705. There is a mature oak with a leaning stem and one-sided crown in fair condition, a Scots pine with a pronounced lean in fair condition. Along the north side of the mound are a row of young hornbeam
		Trees - cherry, aycamore, rowan, alder and hornbeam	EM/Y	Good	A	
Entrance to South County Business Park,	Area 004	7 Hornbeam	EM	Good	A	A group of young trees in good condition and free from defects.
Inside the Wall Area 005	Area 005	Plum Cherry	M	Fair	B	An area of woodland comprising a mixture species. There are self seeded sycamore and elm with mature beech, two of which have been topped, oak one of which has been topped, a sycamore with a misshapen crown which has been pruned in the past, cherry-plum, lime, holly and cherry-laurel.
		Lime	Y	Good	A	
		Elm	Y	Fair	B	
		Ash	Y-M	Fair	B	
		Sycamore	Y-M	Fair	B	
		Horse Chestnut	Y/EM	Fair	B	
		Willow	EM	Good	A/B	
		Beech - Tagged 3684	M	Fair	B	This tree has a bifurcated stem. It has scattered major deadwood.
		Sycamore - Tagged 3685	EM	Fair	B	Is self-seeded and suppressed by adjacent trees
		Lime - Tagged 3686	M	Fair	B	Has been topped in past and has dense epicormic growth.
Central Park	Tree No. 3503	Beech	M	Poor	C	This tree had suffered root damage during recent construction works in this area. It was infected with the decay fungus Ustulina deusta and has recently blown over.
	Tree No. 3504	Beech	M	Poor	C	This tree has suffered root damage during recent construction works in this area. 4m up on the main stem there is a cavity. There is major deadwood in the crown and the trees is in major decline.
	Tree No. 3505	Oak	M	Poor	B	This tree has suffered root damage during recent construction works in this area. It has major deadwood in its crown and extensive crown die back.
	Tree No. 3506	Oak	M	Fair	B	A very large, old oak carrying major deadwood. It has stubs and truncated branches. It also appears to have suffered root damage during recent construction works in this area.
	Tree No. 3507	Oak	M	Poor	B	A large old tree it has suffered root damage during recent construction works in this area. It has major deadwood and significant crown die back.
	Tree No. 3508	Oak	M	Poor	C	A dead tree.
	Tree No. 3509	Horse Chestnut	M	Fair	B	Has truncated branches and storm damaged branches.
	Tree No. 3510	Oak	M	Poor	B	This tree has suffered root damage during recent construction works in this area. It has major deadwood, basal abrasions and significant crown die back .
	Tree No. 3511	Horse Chestnut	M	Poor	B	Has major deadwood and heavy lower lateral limbs, one of which has a cavity. Requires the removal of deadwood.
	Tree No. 3512	Horse Chestnut	M	Fair	B	Has been suppressed by 3513 but has no obvious defects. 3514 previously felled.
	Tree No. 3513	Horse Chestnut	M	Fair	B	Is bifurcated with truncated branches but has no obvious defects.

Appendix 13B

List of Tree Species in Area 13

Location	Ref. No.	Species	Age	Condition	Ref. Code	Comments
	Tree No. 3516	Oak	M	Fair	B	This tree has scattered major deadwood.
	Tree No. 3517	Sycamore	M	Fair	B	Has scattered minor deadwood and a large area of bark damage at the base of the trunk with some necrosis.
Irish Marketing Institute	Area 006	6 Sycamore	EM/M	Fair	B	Group of trees inside boundary wall of Irish Marketing Institute. Two of these trees are multiple stemmed
	1130	Oak	M	Fair	B	Has a one-sided crown and scattered major deadwood.
	1131	Beech	M	Poor	C	This tree has large laterals extending over boundary wall. Some laterals have broken off in past. Has signs of infection by <i>Ustulina deusta</i> and has a flux coming from a small cavity.
Eurologic	3670	Sycamore	EM	Fair	B	Small group of multiple stemmed sycamore on the boundary between Eurologic and the Irish Marketing Institute.
	706	Ash and sycamore	EM/M	Fair	B	Group of self-seeded trees along the boundary wall with heavy ivy growth and some minor deadwood.
	707	Sycamore	M	Good/Fair	A/B	Has minor scattered deadwood basal suckers, but no obvious defects.
	708	Sycamore	M	Fair	B	Has minor scattered deadwood and dense ivy growth.
	709	Beech	M	Poor	C	Has a significant basal pathogen
	710	2 ash and 1 sycamore	EM	Poor	C	Most of the tree is almost dead and those dead parts are infected with <i>Trametes versicolor</i> . One branch has snapped over the wall.
Hospital grounds	3624	Sycamore	M	Poor	C	This tree's stem is bifurcated at 1.5m with an included union. It has a cavity at the base and deadwood in the crown. The roots are lifting at the wall.
	3625	Ash	EM	Fair	B	It has a one-sided crown and is leaning away from the wall.
	3626	Sycamore	EM	Fair	B	Is a self-seeded, suppressed tree whose roots are wrapped around 3627.
	3627	Oak	M	Fair	B	This tree has major deadwood in crown and a history of branch shed.
	3628	Sycamore	EM	Poor	C	This tree is very suppressed by 3627, it is dying back and has minor deadwood.
	3629	Oak	M	Good	B	This tree overhangs the wall and is carrying scattered deadwood.
	3630	Holly	M	Good	A/B	A multiple stemmed with some truncated branches in its lower crown.
			M		C	
	3633	Horse Chestnut	M	Fair	B	It has a suppressed one-sided crown. Its branches overhang the wall
	3634	Sycamore	M	Fair	B	A very large tree whose crown is formed by multiple scaffolds, one of which has a cavity and rubbing branch. Has minor scattered dead wood and a basal wound.
	3635	Horse Chestnut	EM	Fair	B	This tree has been suppressed by 3634 and has a one-sided, unbalanced crown
	3636	Horse Chestnut	M	Good	A	This tree has a well formed, balanced crown with no apparent defects.
	3637	Ash	EM	Poor	B/C	This tree has a leaning stem from ground level, has a one-sided crown and is being suppressed by 3636. It has scattered minor dead wood
	3638	Sycamore	M	Fair	B	This tree has a significant distortion at the base, a one-sided crown and a large limb, which leans over the wall. It has scattered major dead wood.
	3639	Cherry	M	Fair	B/C	This tree has a twin stem with a tight union and branches overhang the wall. It has minor scattered dead wood.
	3640	Cherry	M	Fair/Poor	B/C	A tall, drawn up tree with major scattered dead wood. Appears to have bacterial canker.

List of Tree Species in Area 13

Location	Ref. No.	Species	Age	Condition	Ref. Code	Comments
	3643	Cherry	M	Fair/Poor	B/C	Has branches overhanging the wall and minor scattered dead wood.
	3646	Sycamore	M	Good	A	This trees stem bifurcates at approximately 5m. It has many heavy, large branches overhang wall and has isolated major dead wood.
	3647	Sycamore	M	Good	B	This tree has been slightly suppressed by 3648. It has a full crown which overhangs wall. It has two large, heavy laterals at approximately 2m and has scattered major dead wood.
	3649	Sycamore	M	Poor	C	This tree has a suppressed crown carrying major dead wood and overhangs the wall. It is infected with the decay fungus Ustulina deusta.
	3650	Oak	M	Fair/Poor	B/C	A tall, drawn up tree which would be exposed after the removal of trees 3648 and 3649. Has a small crown carrying isolated major dead wood.
	3651	Beech	M	Poor	C	A large, mature beech with well balanced crown. It has significant dead wood in the crown and areas of bark necrosis. It has an infected with the decay fungus Ustulina deusta.
	3652	Oak	M	Fair	B	A large tree, which overhangs the wall carrying, major dead wood and has major storm damage.
	3653	Oak	M	Fair	B	A large tree, which overhangs the wall carrying, major dead wood and has some storm damage.
	3654	Lime	M	Good	A	A multiple stemmed tree with prolific epicormic growth and scattered minor dead wood.
	3655	Beech	M	Poor	C	This tree's branches are overhanging the boundary wall. It has major dead wood and some cavities in the upper crown. It is infected with the decay fungus Ustulina deusta.
	3656	Ash	EM	Fair	B	A twin stemmed tree. One of these main stems has broken off at approximately 5m and the other is tall with minor scattered dead wood.
	3657	Ash	M	Fair	B	A multiple stemmed tree carrying scattered minor dead wood throughout. Has suppressed growth on two of the four main stems.
	3658	Beech	M	Good	A	Apparently healthy tree carrying isolated major dead wood.
	3659	Sycamore	M	Poor	C	This tree has multiple scaffolds, one of which overhangs the wall and is beginning to subside.
Glencairn Residence, north of stream	131	Sycamore	EM	Fair	A	A tall, drawn up tree with a high crown apparently free from any defects.
	132	Sycamore	EM	Fair	A	It has a tall drawn up canopy with scattered deadwood
	133	Sycamore	EM	Fair	B	This tree has a bifurcated stem at approximately 4m and has minor scattered dead wood.
	140	Beech	M	Poor	B/C	Is a large specimen with a basal infection of Ganoderma sp. it also has isolated major dead wood.
	141	Holly	M	Good	A/B	A pair of trees, one is multiple stemmed and the other a distorted stem., they appear to be free from defects.
	130	Beech	M	Fair	B	This tree has a slight lean, slight ivy cover and scattered deadwood.
	134	Beech	EM	Fair	B/C	A twin stemmed tree whose stems are rubbing. No signs of any defects.
	135	Ash	EM	Good	A	It has a one-sided crown being suppressed by the adjacent beech.
	136	Ash	EM	Fair	B/C	A tall, drawn up tree with a distorted stem and a high crown.
	137	Willow	EM	Fair	A	This tree has a one-sided crown being suppressed by the adjacent trees. It appears free from defects.
	138	Ash	EM	Fair	B	This tree has a distorted stem with a one-sided crown and scattered deadwood.
	139	Sycamore	EM	Poor	C	This tree has major decay on its stem that extends to 3-4m. Also has decay on its roots.
	145	Beech	EM	Poor	C	This tree has major decay on its lower stem and has lost its upper crown.

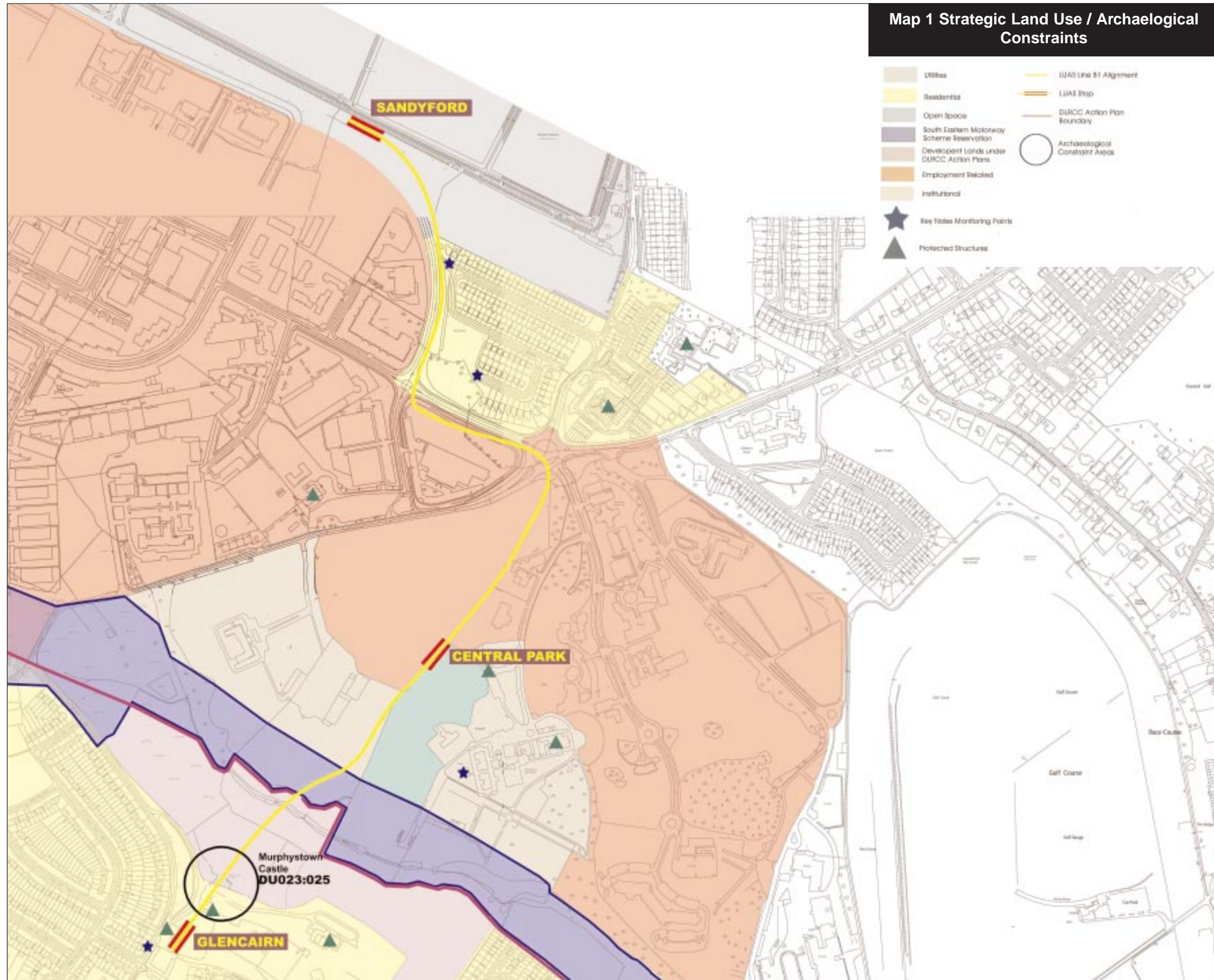
Appendix 13B

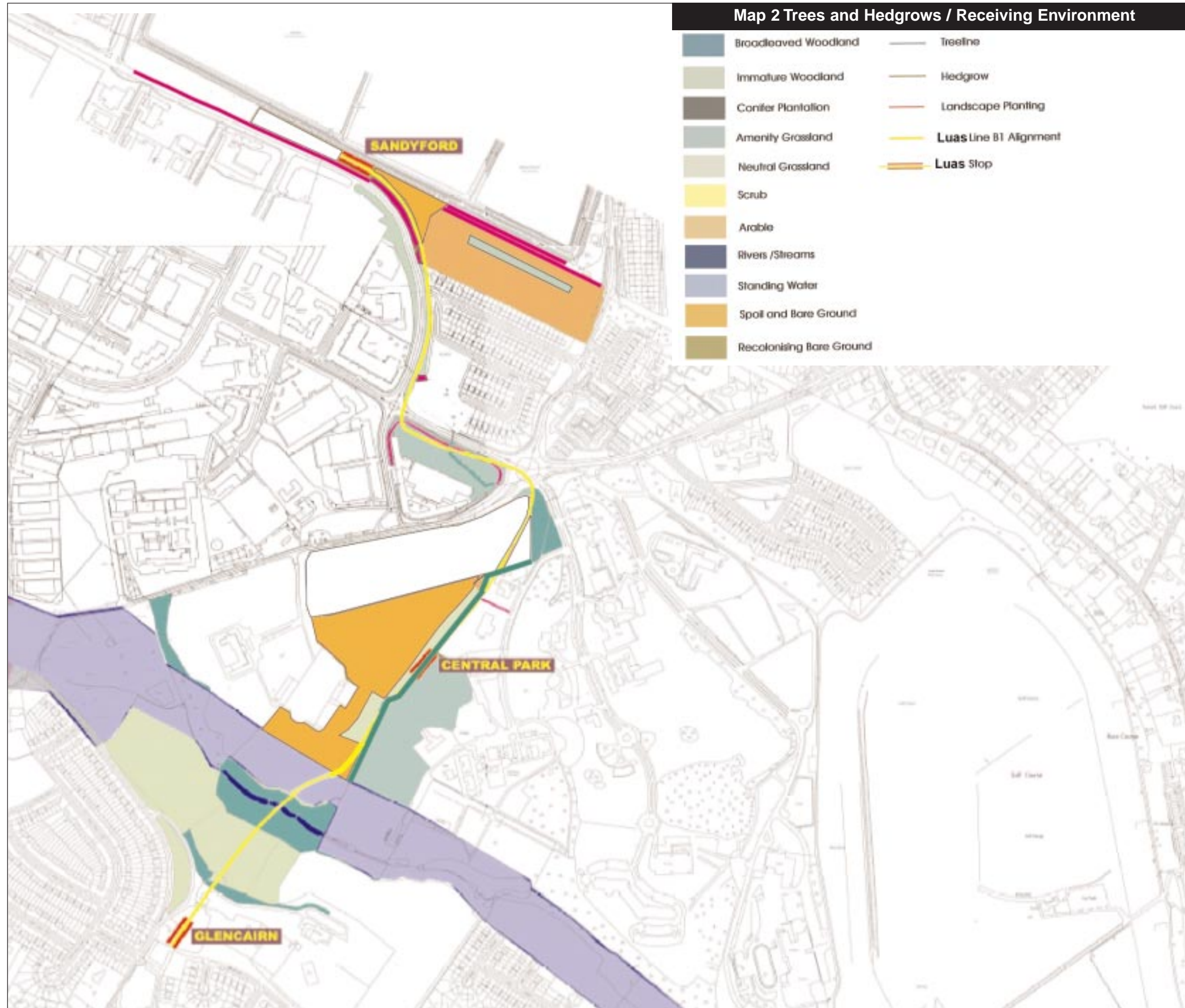
List of Tree Species in Area 13

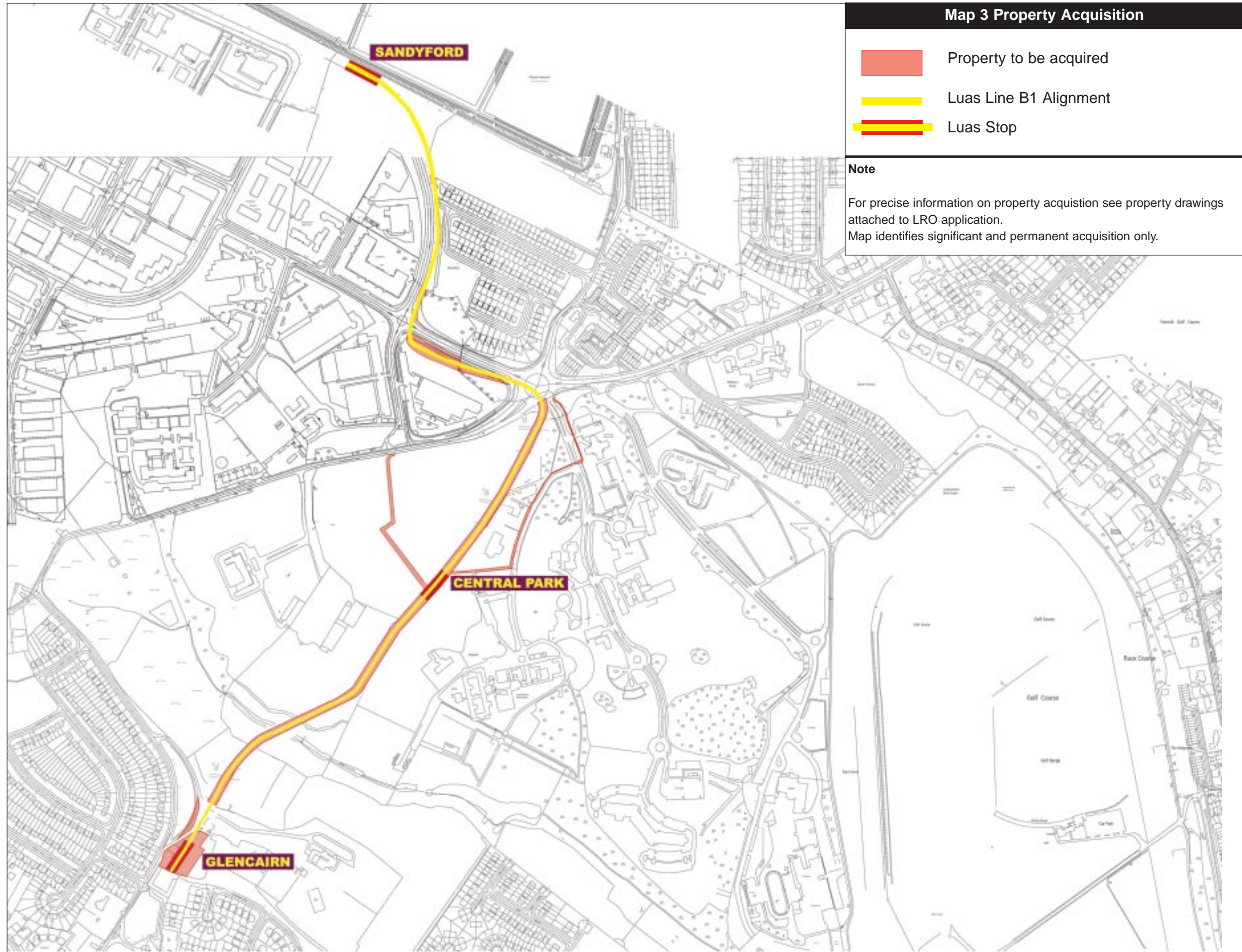
Location	Ref. No.	Species	Age	Condition	Ref. Code	Comments
	145	Beech	EM	Poor	C	This tree has major decay on its lower stem and has lost its upper crown.
	143	Holly	M	Poor	C	This tree has significant crown die-back and is being suppressed by the adjacent beech.
	142	Elm	M	Poor	C	Is a squat, distorted specimen with scattered tip die-back.
	144	Beech	M	Good	A	Is a large specimen with a full crown and appears to be free from any significant defects.
	146	Beech	M	Fair	B/C	This tree has basal decay, possibly infected with Armillaria sp. Has a large crown, a bifurcated union and scattered minor dead wood.
	147	Beech	EM	Good	A	A group of trees, one with a twin stem, one single stem beside the stream with a slightly leaning stem and a one-sided stem being suppressed by 146. No obvious signs of defects.
	148	Beech	EM	Good	A	
	149	Beech	EM	Good	A	
	151	Sycamore	EM	Good	A	This tree's stem bifurcates at approximately 7m and has a full healthy canopy and has slight ivy cover.
	150	Holly	M	Good	A	This tree has a well formed canopy and no obvious defects.
	152	Oak	M	Fair	B	A squat specimen with some minor scattered dead wood.
	125	Oak	M	Good	A	Is a large specimen with a decurrent crown carrying isolated major dead wood.
NOTE : Outside the site is an old hawthorn hedge, holly, a mature ash in decline beside oak 125, an early mature to mature ash and some over mature cherry. Outside the study area is a mature beech infected with Ganoderma sp. that is well within falling distance of the proposed track.						
Glencairn Residence, south of stream		33	Beech	M	Fair	
	27	Sycamore	M	Fair	B	This tree has a bifurcated stem with an uneven crown. Is carrying isolated major dead wood and has ivy on the lower stem.
	28	Beech	M	Poor	C	This tree has a bifurcated stem and a one-sided crown with die-back and isolated major dead wood. One stem has a cavity.
	23	Lime	M	Fair	B	Has a leaning stem with a small basal wound and associated depressions in the trunk. Two major limbs have been removed and decay can be seen from the wound.
	29	Horse Chestnut	M	Good	A	Has a full, balanced crown with truncated, storm damaged branches.
	32	Beech	M	Good/Fair	B	This tree has an abrasions on the lower stem and minor scattered dead wood.
	31	Beech	M	Good/Fair	B	Has bifurcated stems forming the crown, isolated major dead wood and minor tip die-back.
	30	Horse Chestnut	M	Good	A	Growing at the edge of a rock outcrop. It has a bifurcated stem with a tight union. It has a full crown which has some isolated storm damaged branches and cavities.
	34	Lime	M	Good	A	A large specimen that has a bifurcated stem at approximately 2m. It has some die-back, isolated major dead wood and basal suckers.
	35	Horse Chestnut	M	Good	A	Has a full crown with some isolated storm damaged branches. Has no signs of obvious defects.
	36	Sycamore	M	Poor	C	Has a wound and cavity at approximately 3m with a tarry flux exuding. Has extensive crown die-back and cavities on both stems.
	37	Horse Chestnut	M	Good	A	Has a decurrent crown with some storm damaged branches. No obvious signs of defects.
	38	Beech	M	Poor	C	This tree has shed half of its crown at an included union. The wound is decayed and it has a high chance of future failure.
	45	Horse Chestnut	M	Good	A	This tree has a full, well-balanced healthy crown that appears to be free from defects.
	44	Beech	M	Poor	C	This tree has been pruned in past and as a result has major necrosis. Tree is now 80% dead. Close by is a partially up-rooted mature lime.#1228
	46	Sycamore	M	Poor	C	This tree has an unbalanced crown, it has a decayed stump near its base and has significant deadwood in its upper crown.
	48	Horse chestnut	M	Poor	C	This tree has a large cavity on an old pruning wound at its base.
	49	Sorbus	M	Poor	C	A distorted tree with basal decay.

List of Tree Species in Area 13

Location	Ref. No.	Species	Age	Condition	Ref. Code	Comments
	40	Beech	M	Good	A	This tree has multiple scaffolds in its crown, it has an infestation of Felted coccus and has slight ivy cover. It appears sound and free from significant defects.
	39	Lime	M	Fair	B	This tree has a distorted stem with a high crown. One stem has lost its upper half. There is also one young ash and one young sycamore on a slope with two planted Horse chestnut.
	41	Ash	EM	Fair	B	On the edge of the rock outcrop, it is regenerated from an old stump. Has dense ivy on the lower stem, a leaning stem and the crown appears to be sound.
	82	Sycamore	EM/M	Good	A	Beside the weir. Has a full, well balanced crown that appears to be free from any significant defects.
	83	Ash	EM/M	Fair	B	A tall, drawn-up tree with a high crown that appears to be sound.
	84	Sycamore	EM	Fair	B	A self-seeded tree growing out of the side of the weir. It has a distorted stem and isolated dead wood.
	85	Ash	M	Fair/Poor	B/C	This tree has three stems all with small amounts of decay. All stems have high crowns and have been crown lifted in the past. It has slight ivy cover.
Glencairn Residence	Beech	M	Good	A	Has a full, well-balanced crown that appears sound.	
		Ash	EM	Poor	C	A twin stemmed tree with a one-sided crown, which overhangs the wall.
	1215	Pine	EM	Fair	B	A tall, drawn up tree with a high crown that appears sound.
		Sycamore	EM	Fair	B	A self-seeded tree with a leaning stem and a one-sided crown.
	1213	Sycamore	M	Fair/Poor	B	This tree has a small amount of basal decay and a distorted, one-sided crown that leans over the wall.
	1214	Beech	M	Poor	C	This tree has basal decay, necrosis on the stem and is infected with the pathogen Ustulina deusta.
		Sycamore	EM	Fair	B	A self-seeded tree with a distorted stem. It appears to be sound.
		Ash	EM	Fair	B	A pair of trees. One has a small basal wound with no decay. They have poorly formed crowns with scattered minor dead wood.
		Ash	EM	Fair	B	The upper crown of this tree is distorted, it appears to be free from any significant defects.
		Ash	M	Fair	B	Beside the gates (inside). It appears to be free from any significant defects.
		Sycamore	EM	Fair	B	Located outside the property, on the road side, it appears sound
Clonea House						
Murphystown Road	Beech	M	Good	A/B	A mature tree located inside the gate. Appears to be free from any significant defects.	
		Sycamore	M	Fair	B	A large, specimen tree with a bifurcated stem and scattered minor dead wood in its crown
		Yew	M	Good	A	This tree appears sound and free from significant defects.
		Monterey Cypress	M	Fair	B	A large specimen tree with a full crown and appears to be free from any significant defects.
		Cherry	M	Fair	B	A mature ornamental tree located outside the potential construction zone. However, due to the wide spreading roots of cherry, it could be damaged during development.
		Monterey Cypress	M	Fair	B	Two large specimen trees with full crowns. They appear to be free from significant defects.
		Yew	M	Good	A	This tree appears sound and free from significant defects. It has has a full healthy crown.
		Sycamore	M	Good	A/B	This tree appears sound and free from significant defects. Its crown is suppressed by adjoining Cypress.
		Monterey Cypress	EM	Good	A	Situated beside the garden shed, this tree has a full, healthy canopy that appears to be free from defects.

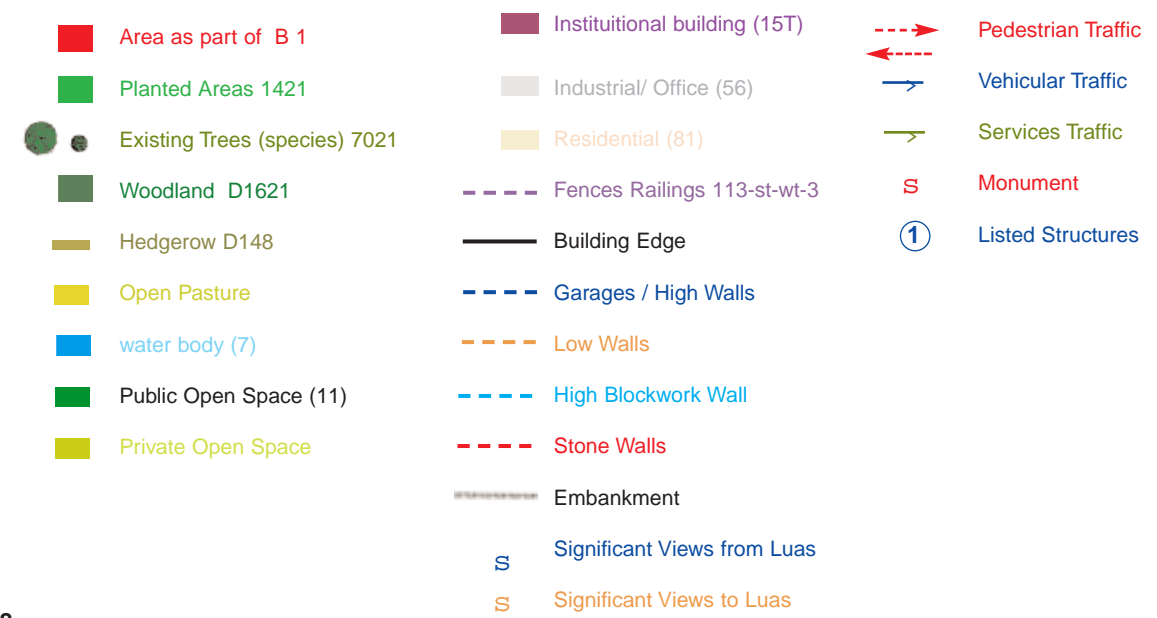






urban analysis

Sandyford Stop to Burton Hall Road



Appendix 13C

Specialist Maps

urban analysis

Burton Hall Road to Central Park



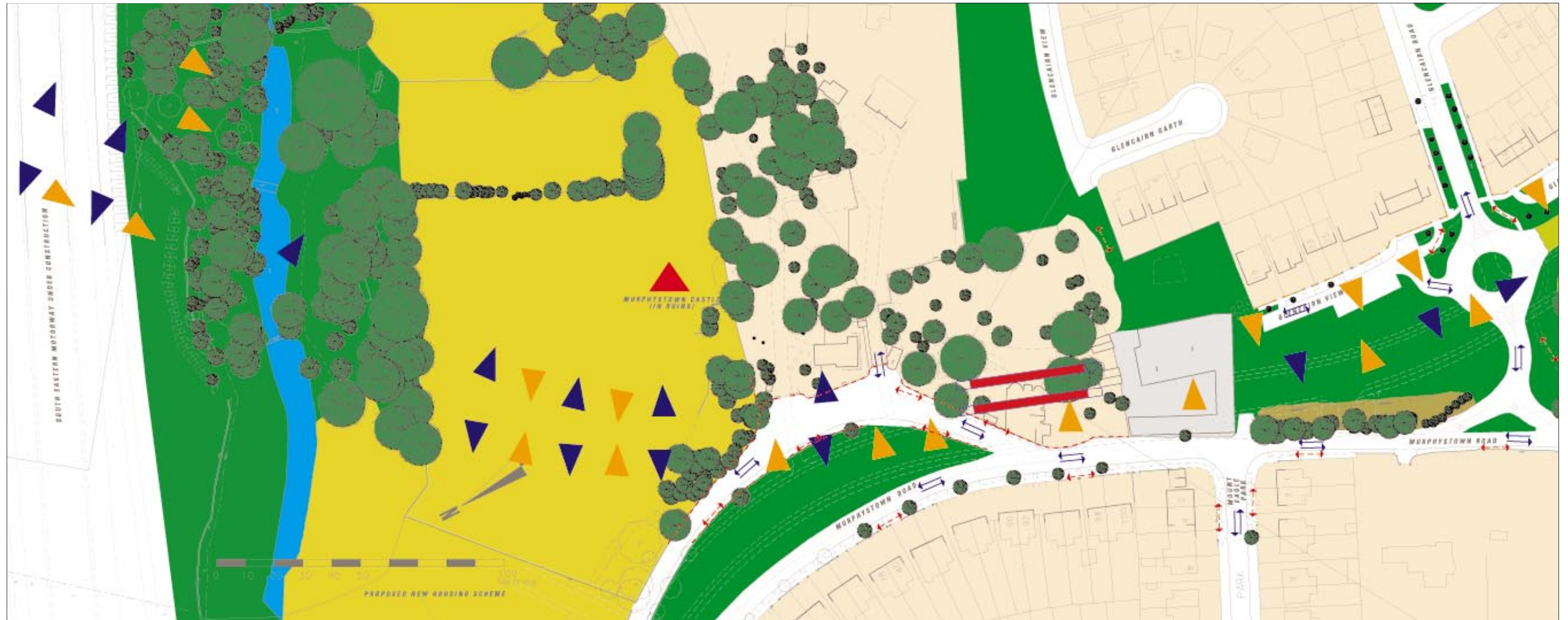
urban analysis
Central Park



Appendix 13C

Specialist Maps

urban analysis Central Park to Glencairn



Appendix 13D

Archaeological Assessment Luas Line B1-Murphystown Castle (DUO23:25)

1 INTRODUCTION

This report describes the results of an archaeological assessment carried out on the section of the preferred route of the Luas Line B1 that passes through the area of archaeological potential associated with Murphystown Castle DU025:023. The route is within 28m of the castle remains.

The assessment was undertaken to provide additional information for the archaeological impact statement of the EIS for the scheme.

A total of five trenches were excavated to establish whether medieval remains associated with the castle (DU023:025) were present along the Luas route. Large cut features were present in four of the five trenches. These appear to be associated with quarrying activity.

The assessment was carried out on behalf of the Railway Procurement Agency and the test trenching took place on the 31st January 2005.

2 Archaeological and Historical Background

This section is based on the research work undertaken by Marion Sutton and Siobhan Deery (Sutton, 2000 and Deery, 2001). The recent archaeological information has been provided by Sarah Halpin (Deery and Halpin, forthcoming).

2.1 General

Murphystown townland is situated at the foot of Three Rock Mountain, in the heart of one of the richest archaeological landscapes in Leinster. Evidence for activity in the foothills of the Dublin Mountains extends back to the Neolithic period, through the Bronze Age, the Early Christian and the medieval periods. Both monuments and artefacts in the area attest to the ritual, social and settlement activity of over several thousand years.

In the early historic era, the area of south County Dublin, in which the preferred route is located, was part of the territory of the Dál Messin Corb, the first of the Leinster

dynasties (MacShamhráin 1996). The Dál Messin Corb were eventually displaced from the Liffey plain and gradually pushed further into Wicklow under pressure from other dynasties that were themselves being displaced by Scandinavian settlements being established from the ninth century onwards. It is possible that the area later became part of the domain of the Ui Briúin Chualann, who dominated the southern parts of County Dublin and the coastal strip towards Wicklow.

During the late thirteenth and fourteenth centuries, the Irish living in the Wicklow and Dublin Mountains began to launch raids on the Anglo-Irish settlements of south County Dublin. This activity, combined with the devastation of the Bruce invasion, reduced the territory controlled by the administration of Dublin to the area of the Pale, which developed in the fifteenth century. The Pale was to be defended by an earthen bank and a ditch. Although this earthwork was never completed, there are some upstanding portions of the Pale boundary at Balally, Kilcross, Kilgobbin and Ballyogan.

The Pale boundary earthwork defined an area measuring thirty miles long and twenty miles wide that included parts of Counties Dublin, Louth, Meath and Kildare (O'Keefe 1992). The lands within the Pale were under English control but under constant attack from the native Irish. Ball and Hamilton (1895) state: '*The Pale*' began at Dalkey, and followed a southwesterly direction towards Kilterian; then turning northwards passed Kilgobbin, where a castle still stands, and crossed the parish of Taney to the south of that part of the lands of Balally now called Moreen, and thence in a westerly direction to Tallaght, and on to Naas in the County of Kildare. In the wall bounding Moreen is still to be seen a small watch-tower and the remains of a guard-house adjoining it. From this point a beacon-fire would raise the alarm as far as Tallaght, where an important castle stood.'

The Pale boundary has changed in form and line over time, and in 1492 was fortified after an Act of Parliament ordered that the line of defence consist of '*a double ditch of six feet high above ground on one side*' (the side closest to the Irish).

2.2 Neolithic (c. 4000-2400 BC)

Evidence for Neolithic activity in the south County Dublin hinterland occurs in the form of a number of megalithic tombs, in which the cremated remains of the communities' dead were buried. These Neolithic burial places include the portal tombs at Kiltiernan and Brennanstown, which are large dramatic structures commonly known as dolmens. There are also several cairns in the area, such as that at the Fairy Castle on top of Two and Three Rock Mountains, which may cover passage tombs. Wedge tombs, as at Kilmashoge and Ballyedmonduff, near Glencullen, represent the final megalithic phase, and date up to the beginning of the Bronze Age.

Of the relatively few finds dating to the Neolithic in the area a polished stone axe (NMI Ref. 1979:73) has been recovered at Murphystown, apparently made from a local andesite or dolomite. A second was found in Kiltiernan (NMI Ref. 1984:19). These artefacts of highly finished, fine-grained stone are typical of the Neolithic period, when they were used for cutting wood. Two objects from Kingston, near Ballyogan, described in the NMI files only as 'stone artefacts' (NMI Refs. 1935:398, 399) may also be polished stone axes.

2.3 Bronze Age (c. 2000-500 BC)

The Bronze Age is represented by several burials, one of which comes from Kilgobbin, south of Murphystown. After the decline of the megalithic tombs, the tradition of communal burial largely disappeared. Instead, individual burials were set in pits or cists (stone-lined pits or boxes), often accompanied by pottery vessels (known as food vessels) or other small grave goods, or contained within large pottery urns. These sites could be under tumuli or cairns, set into natural sand hills, or have no permanent above-ground markers at all. One such burial was found at Jamestown, southeast of Kilgobbin, where cremated bones were discovered in an encrusted urn, accompanied by a food vessel. References to other human bones and pottery sherds (NMI Refs. 1957:126-9, 1929:1290) in the area suggest that there may have been a sizeable Bronze Age cemetery in the sand hills of Jamestown.

Finds from the area dated to the Bronze Age include a

bronze flat axe from Murphystown. This is a very Early Bronze Age axe, cast in a one-piece mould, representing the earliest type of prehistoric metal casting. A bronze palstave (NMI Ref. 1974:89), a slightly later type of flanged axe, was found in Glenamuck. Palstaves were made in two-piece moulds and represent an improvement in technology from Early Bronze Age open moulds. They have raised sides, making hafting more secure. A small cast bronze ring (NMI Ref. 1971:1050) from Kilgobbin may also date from this period.

Recent excavations associated with the construction of the South Eastern Motorway have uncovered two Bronze Age sites closer to the development site in the Carmanhall, Murphystown and Leopardstown areas. Site 54 was a Bronze Age burial site located to the north of Glencairn house in Carmanhall townland near the proposed Luas route. This site was excavated by Fiona Reilly under licence number 01E0076. These were pit and cremation burials with associated urns. It is likely that more burials are situated beyond the CPO line of the motorway to the southwest (Reilly 2004, 129). The burials were accompanied by vase urns and have been dated to c. 2000-1850 BC (Cotter 2005, 9).

A number of further sites were identified during monitoring for the motorway construction to the east of the proposed Luas route in Murphystown/Carmanhall and Leopardstown townlands along the valley of the stream. Fourteen potential features were identified and excavated by Thaddeus Breen under licence number 02E0153. This included an inhumation cemetery, firepits/hearths, a possible fulacht fiadh and stone drain (Breen 2004, 177).

Site 65M was in Carmanhall and Leopardstown townland to the east of the proposed Luas route. The site consisted of a fulacht fiadh and was excavated by Thaddeus Breen under licence number 02E0330 (Breen 2004, 130). Site 73M was also a fulacht fiadh. This was excavated by Thaddeus Breen under licence number 02E0699 in Murphystown townland (Breen 2004, 177). Brian O Donnchadha excavated a smelting site to the northwest of the proposed Luas overbridge in Murphystown townland (Gary Conboy pers. comm. & Bennett 2003, xl).

2.4 Iron Age (c. 500 BC - 400 AD)

There are no definite finds or monuments known from the Iron Age, the last phase of the prehistoric period, although a small iron tube (NMI Ref. 1972:18) found in Kilgobbin may be part of an iron tool of this date.

2.5 Early Medieval (c. 400-1200 AD)

The Early Medieval period in the surrounding area is represented by a ringfort in Woodside (DU022:069), and possibly by a destroyed enclosure in Kilgobbin, which may also have been a ringfort. Ringforts are the classic Early Christian settlement type, and are among the commonest archaeological monuments in the country. They consist of circular areas, defined by banks and external ditches, and excavation often reveals the remains of dwelling houses and outbuildings for extended families. In areas where there is little field stone, the banks are generally of earth, while in stony areas, the banks may be of stone, with either stone-cut ditches or no ditch at all. Those with earthen banks are referred to as raths, while those with stone banks are known as cashels. Ringforts are usually situated on gentle slopes in open grassland, with good views of the surrounding area. They are very rare in Dublin, where intensive agriculture and the expanding city have removed much of their landscape.

2.6 Late Medieval (c. 1200-1600 AD)

The later medieval period is represented by a wide range of monuments. Along with the tower house at Murphystown (DU023:025), there are other tower houses and castles at Kilgobbin (DU025:017(01)) Balally (DU022:024) and at Carrickmines (DU026:005). These are indicative of the frontier nature of these areas as outposts of the Pale. The churches, holy wells, and crosses in the area also point to a considerable local population, living in well-defined villages and hamlets, rather than scattered across the landscape. They also appear to reflect a relatively stable medieval population, as the church in Kilgobbin appears to have been rebuilt with stones from an older church (DU026:004), rather than being deserted. Finds from the period include a range of Belarmine ware, typically dated to

the 1600s (NMI Ref. 1971:1126, 1972:16) found in the area around the castle at Kilgobbin and some stoneware sherds (NMI Ref. 1972:17).

The townland of Murphystown, now included in Tully parish, was shown on the Down Survey of 1657 in the parish of Taney, under the name of Moltanstowne. The modern townland originally formed part of the widely extending lands of Ballyogan, which were in the possession of the Priory of the Holy Trinity, as was the case with a number of neighbouring townlands in the south County Dublin region, shortly after the English Conquest.

Ball discusses the history of the townland Ballyogan, and that of the remarkably similar townland of Balyofryn in his 'History of the County Dublin' (1902 and 1905). It may be that Ball is attributing separate histories to the same townland, recorded under different names in historical documents. Alternatively it is possible that the original area was separated into a number of different parcels. Among the possessions of the Priory of the Holy Trinity shortly after the English Conquest, Ball records that part of the lands called 'Ballyogan' were subsequently transferred to the Cathedral of St Patrick. The remainder, retained by the Priory, was divided into two portions, representing the townlands of Murphystown and Ballyogan. These lands were leased at different times to neighbouring landowners from the first half of the thirteenth century. Towards the end of the fourteenth century the lands were leased under the names of Ballymorthan (Murphystown) and Farnecost (Ballyogan) to Sir John Cruise, the owner of Stillorgan.

In the sixteenth century the Harolds held Murphystown and Ballyogan. In the early part of the seventeenth century the Wolverstons, of Stillorgan, were in possession of the lands, and, under the Commonwealth, John Davies and seventeen other persons were resident in Murphystown. After the Restoration, Murphystown and Ballyogan were recovered with other adjacent property, for St Patrick's Cathedral (Ball 1902).

The Harold family occupied a great tract of land around the Dublin Mountains, and the family name is commemorated in the name Harold's Cross (Ball 1905). The Harold family, up until the Anglo-Norman invasion, controlled the area

around Balally. They first owned the land of Kilgobbin after the Anglo-Norman invasion, at a time when the adjacent land, known as 'Balyofryn', was given to All Saint's Priory by one Claricia, wife of a descendant of the chiefs called Mac Gillamochoilmog (O'Brien, unpublished MA thesis). It is unclear if this is part of the same lands known as 'Ballyogan' in historical references (see above). When ownership of Kilgobbin subsequently passed from the Harolds to the Hacketts, the Derpatricks of Stillorgan held the lands of Balyofryn. On the dissolution of the religious houses, the lands of 'Balyofryn' came into the possession of the Corporation of Dublin, and in the reign of Queen Elizabeth I, Jacques Wingfield, the tenant of Stillorgan, held them and covenanted to build a castle upon them (Ball 1905). Certainly there are no ruins or sites of castles on the lands known today as Ballyogan.

Similarly, Ball (1902) records that during the seventeenth century occupation by George Wolverston, a castle, a church and two substantial houses stood on the land at Leopardstown. However, no traces of these were to be found at the time of Ball's writing. The Wolverston family, the owners of Stillorgan, occupied the lands at Leopardstown from at least the late sixteenth century. Up until the eighteenth century the lands of Leopardstown had been known as Leperstown, this name deriving from their owner in medieval times, the Leper Hospital of St Stephen. The hospital is first mentioned in connection with the lands in 1230, and a church known as the Church of St Stephen was established at Leperstown during the next century.

A possible medieval site was identified during monitoring of topsoil removal for the South Eastern Motorway in Carmanhall townland. Site 55 consisted of boundary pits and ditch. This was located to the west of the proposed Luas route and northwest of the tested area. This site was also excavated by Fiona Reilly under licence number 01E0076. The site consisted of a ditch with evidence of a collapsed wall or stone bank, several fire pits and post-holes (Reilly 2004, 130). As the ditch was not marked on the first edition, it is thought that it is earlier and may represent a medieval field boundary. One of the areas of scorching is believed to be contemporary with the silting up of the ditch.

2.7 Murphystown Castle

The castle at Murphystown is a former Pale castle (DU023:025) and survives in ruins in the grounds of Glencairn. The vaulted ruins of the castle are said to have given the townland its name (Pearson 1998). The RMP details of the castle are as follows:

RMP No. DU023:025

NGR: 31956,22556

Townland: Murphystown

Site Type: Tower house

Distance: Within the area of interest of the site

Description: The remains consist of two-mortared granite walls, with traces of a vaulted ceiling, covered with ivy. There are corbels in the interior, possibly indicating the former presence of wooden upper floors. The remains of the castle are situated in the grounds of Glencairn. Marked 'Murphystown Castle (in Ruins)' on the 1936-37 edition OS six-inch map.

2.8 Glencairn

It is not uncharacteristic for later eighteenth or nineteenth century manor houses to have chosen locations for their estates that enabled them to incorporate pre-existing medieval castle sites, and at Glencairn the estate developed so as to accommodate the ruins of Murphystown castle. Pearson (1998) recounts that the big house at Glencairn appears to have first been built in about 1860, and was either completely absorbed or demolished by a number of subsequent editions and modifications. Cartographic sources would seem to indicate, however, that some form of structure existed at Murphystown in the grounds of Glencairn since at least the early eighteenth century. The present house dates from 1904 when Richard Welstead (Boss) Croker, in a mixture of Baronial and American Colonial style, lavishly rebuilt the house complete with an encircling veranda of granite columns and a battlemented tower. Here he housed a famous stud, which included a double Derby winner in 1907. The estate was offered for sale following Croker's death in 1939, at the time comprising 375 acres, four secondary houses and private gallops. It subsequently became the British Embassy until the site was resold relatively recently.

2.9 Cartographic Sources

2.9.1 Rocque 1756 (Fig. 3)

The townland of Murphystown is not shown on Rocque's 1756 map of south County Dublin. However, Rocque does record the presence of a number of structures in the general vicinity of the interpreted Murphystown area, at the junction of the Ballyogan and Stillorgan roads. The castle itself isn't named. These building structures one of which may be the castle have confined themselves to the higher ground in Murphystown, where the local topography slopes down toward the east and the south. 'LeopardsTown', shown on the lower side of the Ballyogan road on Rocque's map, may illustrate Rocque's tendency to incorrectly site or name large houses. Alternatively, it may indicate that the line of the original Ballyogan road has altered since Rocque's initial survey in the mid-eighteenth century.

2.9.2 Taylor 1816 (Fig 4)

Taylor's early nineteenth-century map shows in greater detail the location of the townland of Murphystown and its existing buildings. Once again the land is recorded as sloping downward from the northeast to east to southeast. A concentration of building structures is represented on what has been interpreted as the site of the present day Glencairn estate, labelled Belmont. An avenue appears to lead to these structures from a curve in the Stillorgan road. Two singular additional structures are shown to the north of this avenue, again to the east of the Stillorgan road, one of which undoubtedly relates to the castle at Murphystown. Rockland and Leopardstown House are shown by Taylor located to the northeast of Murphystown.

2.9.3 Ordnance Survey 1843 (Fig 5)

The first edition Ordnance Survey map was published in 1843. The castle at Murphystown is clearly labelled, 'Murphystown Castle', immediately south and southeast of which is a large house and garden named Murphystown, and a lodge named 'Belmont Lodge'.

2.9.4 Ordnance Survey 1866 (Fig 6)

The 1866 Ordnance Survey map was published at a scale of twenty-five inches to one mile, thereby showing the development site and castle at Murphystown in greater detail than the first edition (1843). A stream to the

northeast forms a natural townland boundary between Murphystown and Carmanshall. Murphystown Road is now named. A quarry is located in the northwestern area of the site. The castle itself is now recorded as '*Murphystown Castle (Remains of)*'. The house labelled Murphystown on the 1843 Ordnance Survey edition is now named Glencairn, Belmont Lodge is now Murphystown Lodge, and a second smaller unnamed lodge is sited between the latter and the castle.

3 Archaeological Testing Programme

3.1 General

The area tested was along the part of the preferred Luas route that passes through the zone of archaeological potential associated with Murphystown Castle (DU023:025). The route at its closest is 28m to the west of the tower house remains which are located on the highest point of an overgrown grass-covered field. The land slopes irregularly to the west and northwest. The ground is uneven and hilly as a result of rock out-crops. There are also pockets and larger areas of lower lying ground or depressions. These may be naturally occurring or as a result of quarrying activity, as evident in some of the trenches below.

A total of five trenches were mechanically excavated by JCB along the route (Fig.7). Two were specifically excavated across the sunken waterlogged areas. These trenches revealed extensive quarrying activity.

3.2 Trench 1

0.00m-0.40m Brown topsoil with root action from long grass above. Contains very infrequent charcoal flecks.

0.40m-0.50m Mottled brown and orange sandy and gritty clay subsoil. There were also some high spots of the granite natural below.

0.50m Compact silver, grey and yellow coarse granite sand and grit over granite stones/bedrock (Natural).

Trench 1 was 10m in length and 1.6m in width. The trench was orientated north-south down the naturally sloping ground. This meant that the depth of the trench and deposits varied from 0.2m to the east and 0.5m to the west. The land at the northern end of the trench flattened and levelled off. To the south it was more rocky and uneven as it became hillier. No archaeological features or finds were located within the trench.

3.3 Trench 2

0.00m-0.15m Light brown dry topsoil containing very infrequent flecks of charcoal.

0.15m-0.25m Light yellow brown gritty sandy clay subsoil. It contains very infrequent flecks of charcoal. It exists in the northern half of the trench only. One sherd of late medieval coarseware was noted in this layer.

0.25m-1.15m Large cut feature with unknown dimensions. This feature is probably a quarry pit. It contained two fills.

0.25m-0.75m Upper backfill of cut that consists of mixed grey and brown sandy gritty clay that is very similar to the subsoil layer. This fill also contains infrequent angular stones and charcoal. It is also relatively compact.

0.75m-1.15m Lower fill of cut feature that consists of waterlogged stony, gritty sand with some silt. The deposit is loose and also contained lenses of black organic material. The stones were angular and may be chippings or waste from quarrying activity.

0.25m Orangy white grey granite stones and sand loose deposit over larger compact granite stones/bedrock (Natural).

Trench 2 was 12m in length and 1.6m in width. It was excavated along sloping ground northeast of the castle. A section of a large cut feature was located within the trench. This cut feature caused a large depression in the land at it is possible to estimate its extent; 8 to 10m (east-west) by 4 to 6m. No datable finds were recovered from the fill of the cut feature. It is likely that it is a quarry pit.

3.4 Trench 3

0.00m-0.15m Light brown dry topsoil containing very infrequent flecks of charcoal.

0.15m-0.25m Light yellow brown gritty sandy clay subsoil. It contains very infrequent flecks of charcoal.

0.25m Large cut feature that extends for 5m eastwards in this trench. The eastern limit of the cut feature was established.

0.25m Granite stones and bedrock (Natural).

Trench 3 was excavated as an extension to Trench 2 to establish the limit of the large cut feature that was identified. It was excavated in an easterly direction for 6m. It was 1.6m in width and was a maximum of 0.4m in depth. The feature extended for 5m where the eastern side was located. The depression in the land around the trench corresponded to the cut edges identified in Trench 2 and 3. The extent of the feature is estimated as a maximum 10m (east-west) by 6m. The cut feature was not excavated in this trench.

3.5 Trench 4

0.00m-0.15m Brown topsoil containing charcoal flecks and some modern pottery sherds.

0.15m-0.25m Compact, dry light brown gritty clay subsoil with inclusions of granite sand and stones. There was a slight orange mottle caused by decayed granite. This subsoil was patchy, as there were high spots of the natural granite stone/bedrock.

0.15m-1.40m Large cut feature. Contained three fills. The lower fill is a waterlogged deposit of mixed grey silt with sandy grit with occasional large granite stones. This was 0.4m in depth. Over this was modern loose dump material containing nineteenth and twentieth century pottery, glass and iron. This was up to 1m in depth. The final fill of the cut was a soddy topsoil layer. This material was soft and had sunk into the depression rather than being a deliberate fill.

0.25m Slightly undulating orange, white and grey granite gritty sand over granite boulders/stones/bedrock (Natural). This trench was 20m in length and 1.6m in width. It was north-south in orientation and was located across hilly and uneven ground. The large cut feature is probably the remains of a quarry pit. The land around the trench contained irregular shaped depressions thought to be more quarrying evidence. The upper fills of this pit differed greatly from the fills of the quarry pit identified in Trench 2 and 3, as the Trench 4 fills contained nineteenth and twentieth century dump material.

3.6 Trench 5

0.00m-0.20m Dark brown undulating and sometimes wet/waterlogged topsoil layer.

0.20m-0.35m Grey and mottled orange subsoil. Mottling caused by decaying granite. There was very infrequent inclusions of charcoal. This deposit was patchy due to the undulating natural below.

0.20m-1.10m Evidence of large cut. The section exposed contained three fills. The lower fill was comprised with large granite boulders and was waterlogged. Around these was a silvery grey granite sand and grit. Above this was dark brown wet, sticky peat-like material. This was possibly an old topsoil layer sealed by the modern dump and levelling material above. Over the dump material was mixed grey sandy grit mixed with modern dump material.

0.20m-0.35m Undulating orange, white and grey granite sandy grit with patches of bedrock and stones. The natural varied in this trench. (Natural).

This trench was 15m in length and 1.6m in width. The trench was orientated east-west and was located over very uneven and boggy ground. This trench was the closest to the castle remains. Initially it was thought that the visible depressions and boggy areas may have been the remains of ditch features associated with the castle. However the large cut feature located in the eastern part of the trench was filled with large stones at the base and modern dump material. This may have been the remains of a drain or an in-filled quarry pit. The excavation of the trench at this end had to be abandoned due to the soft boggy ground being unsafe.

4 Archaeological Summary

The Luas line passes through the area of archaeological potential associated with Murphystown Castle, DU023:025. Little is known about the tower house or how extensive the sub-surface remains are. It was hoped that the testing programme would establish whether any archaeology associated with the castle was present along this section of the route close to the remains.

The ground to the west and northwest of the castle, and along the route contains sunken and uneven areas. These do not form any coherent plan, and certainly do not appear linear. Trench 2, 3 and 5 were excavated in an attempt to establish what in fact these depressed areas were.

Cartographic evidence from the Ordnance Survey 1866 (Fig 6) locates a quarry in the area, though it is marked further to the northwest than where the trenches picked up the large quarry pits.

In Trench 2 and 3 the northern and western limits of a large feature were identified, and interpreted as a quarry pit. While the excavation of Trench 5 was abandoned, a similar interpretation was reached for the cut feature present to the west of castle remains. In fact further quarrying evidence was revealed in Trench 4.

Datable evidence for the upper backfills of the pits in Trench 4 and 5 consisted of nineteenth and twentieth century type pottery, glass and other waste. This material would strongly suggest that these pits relate to the nineteenth century quarry as depicted on the 1866 OS.

The large quarry pit located in Trench 2 and 3 had a very different upper fill. No modern dump material was present, instead a compressed silty gritty subsoil-type clay over the granite stones and chippings at the base of the pit (Plate 5). This pit was located the furthest away from the castle remains and was somewhat isolated in comparison to the apparent extensive quarrying remains such as the two in Trench 4 and 5 further to the southwest.

Granite is the sole stone type used in the upstanding remains of Murphystown. The facing dressed stones are almost completely absent from the remains, though a small number are still in situ. These, along with the rubble core that remains are all granite. The testing revealed the natural hilly ground to the west of the castle and along the route is comprised of granite stones, boulders and bedrock.

The quarrying evidence starts approximately 40m from the castle remains. It is reasonable to suggest that along with nineteenth century activity some of this quarrying may be related to the castle construction, as it would have been the closest source.

Apart from two sherds of medieval coarseware found in the subsoil in Trench 2, no archaeological features or deposits of a medieval or earlier date was clearly established. The testing did not reveal any settlement or earthworks such as

outer ditches or banks relating to the castle along the Luas Line B1 route. However, the extensive nineteenth century quarrying activity may be obscuring such remains.

It must be noted that Bronze Age archaeological remains in the form of urn and cremation burials were uncovered in Carmanhall (O'Reilly 2002) across the stream/artificial lake, just to the north of the tested site. These were found during the archaeological monitoring of groundworks for the South Eastern Motorway.

5 Impact Statement

The ground along the Luas Line B1 route is sloping, uneven and contains areas of depressed or sunken water-retaining ground. Three of these areas were identified as probable quarry pits. Two of these contained nineteenth century upper backfills and therefore are likely to correspond to the quarry identified on the Ordnance Survey 1866. No datable material was recovered from the third quarry pit in Trench 2 and 3. It may be possible that some of the quarry pits are earlier, and could relate to the castle's construction.

Luas construction through this area will involve considerable groundworks and the construction of a bridge crossing the valley and stream to the north. Along with topsoil removal, these groundworks will likely involve the stabilising and levelling of the sloping and uneven ground. This would involve the removal of these quarry pits and landscaping to create an even and stable platform for the track line. Given that the route passes through the western part of the area of archaeological potential associated with Murphystown Castle DU023:025, the construction groundworks are likely to impact on as yet unidentified archaeological remains.

6 Conclusions and Recommendations

The nineteenth century quarrying activity does appear to be quite extensive to the west and northwest of the castle remains. It is along this side that the route of the Luas Line B1 will be passing. No date was clearly established for the quarry pit in Trenches 2 and 3, it may be late medieval in date.

The route clearly passes through the area of

archaeological potential around the castle (DU023:025). Though no further archaeological activity such as external ditches or banks relating to the castle was identified during the testing. It is possible however that the quarrying activity has removed or obscured such remains.

It is recommended that construction groundworks for the Luas Line B1 be archaeologically monitored. The programme of monitoring should specifically address whether any of the quarry pits are earlier than the nineteenth century and relate to castle construction. Monitoring should also ensure that any other archaeological activity present and not found during the testing will be identified.

It is also recommended that an adequate amount of time is reserved in the groundworks phase of the construction programme for the recording of the quarry pits and the resolution of any further archaeological remains that may be uncovered during the works.

It is also recommended that adequate measures be taken to secure the upstanding remains of the castle during the construction programme. These remains should be cordoned off to prevent the site from being damaged by construction traffic or temporary works, such as compounds and haul roads etc. Machinery traffic should be limited to the route-take and not encroach further east into the area of archaeological potential around the castle (DU023:025).

The archaeological monitoring must be carried out by a suitably qualified archaeologist under licence to the Department of Environment, Heritage and Local Government and the National Museum of Ireland.

Please note that all recommendations are subject to approval by the National Monuments Section, Department of Environment, Heritage and Local Government and the National Museum of Ireland.

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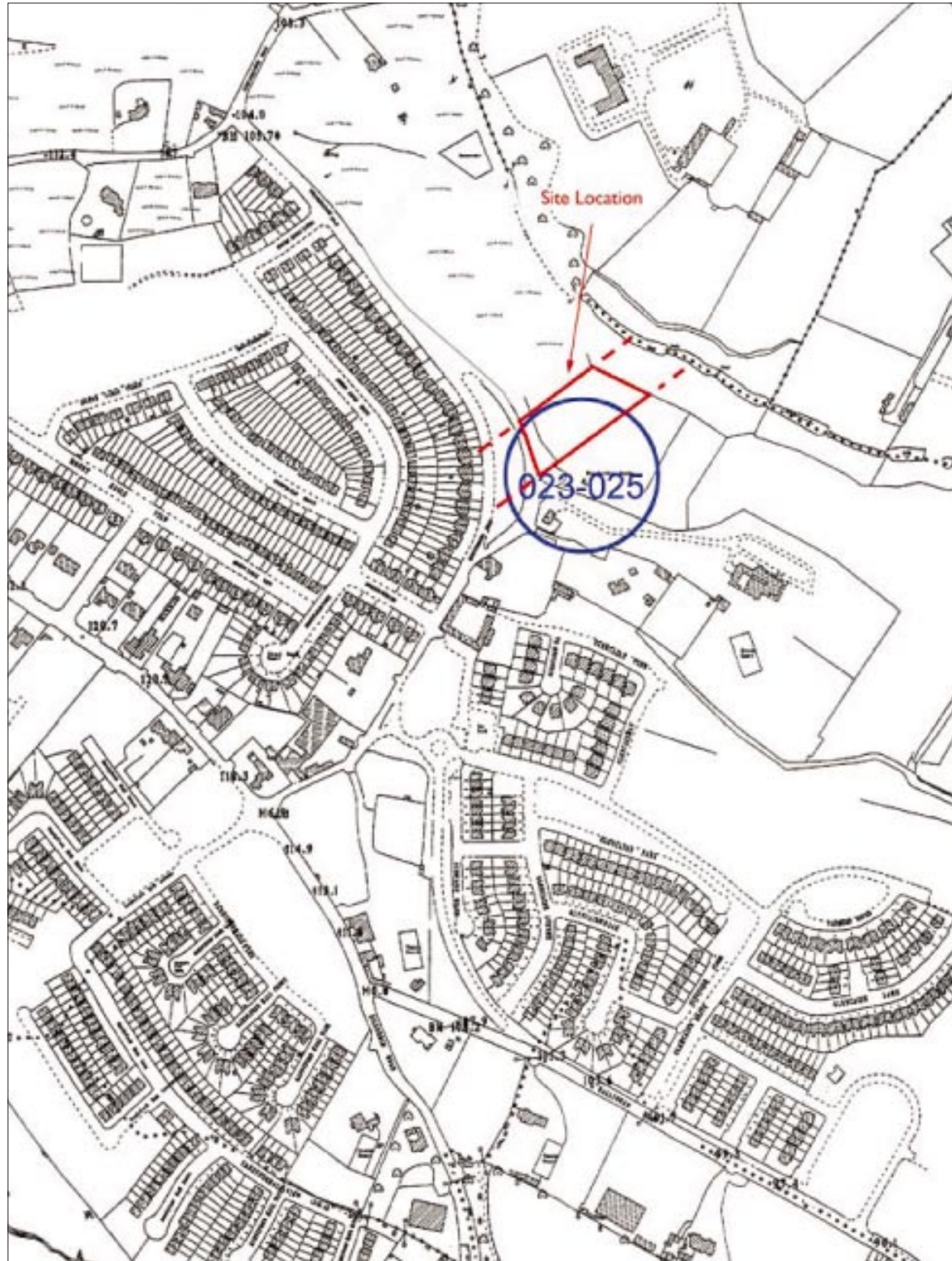


Fig. 1 RMP Site location

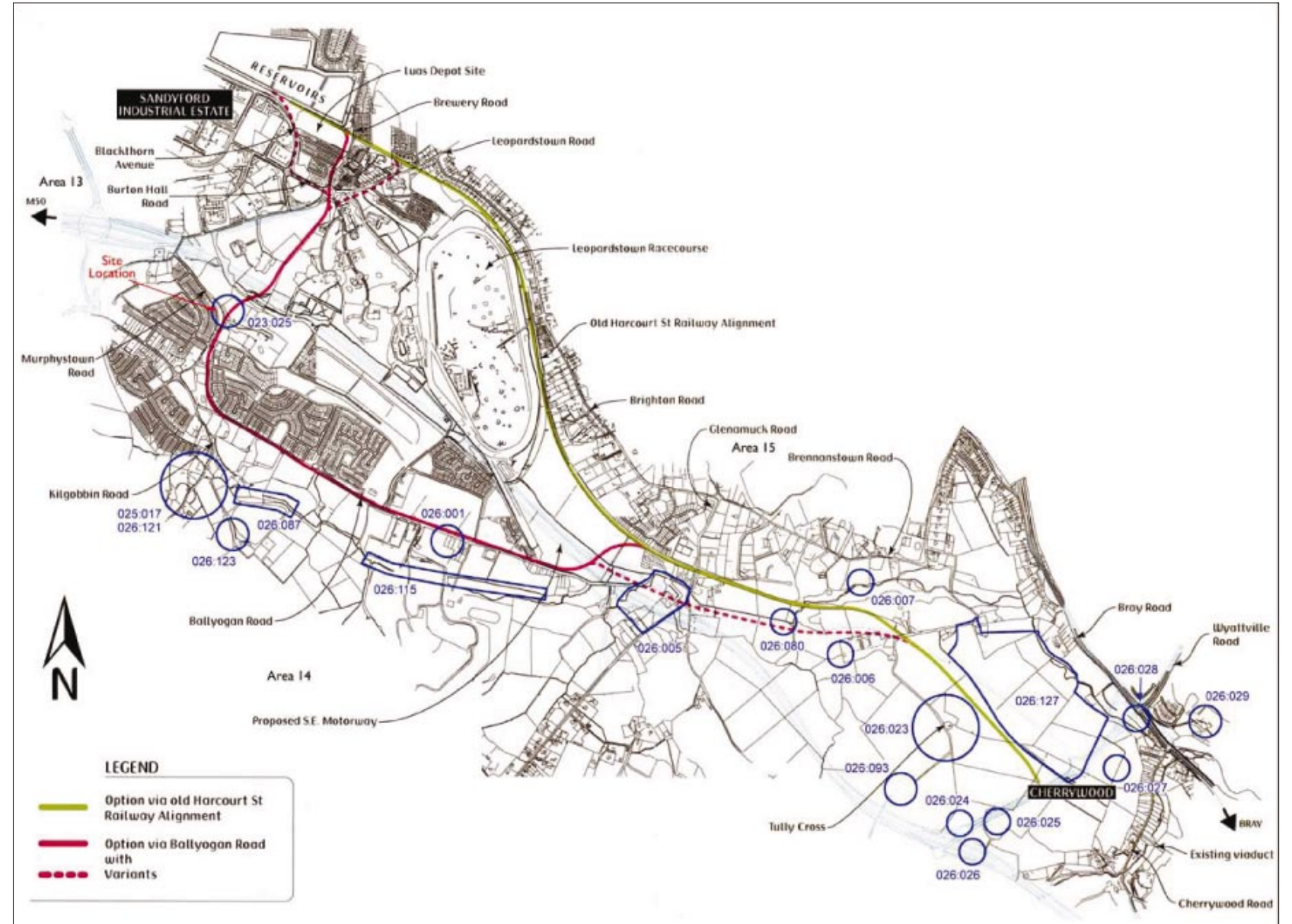


Fig. 2 Luas Line B1 preferred route



Fig. 3 John Rocque, 1756



Fig. 4 John Taylor, 1816

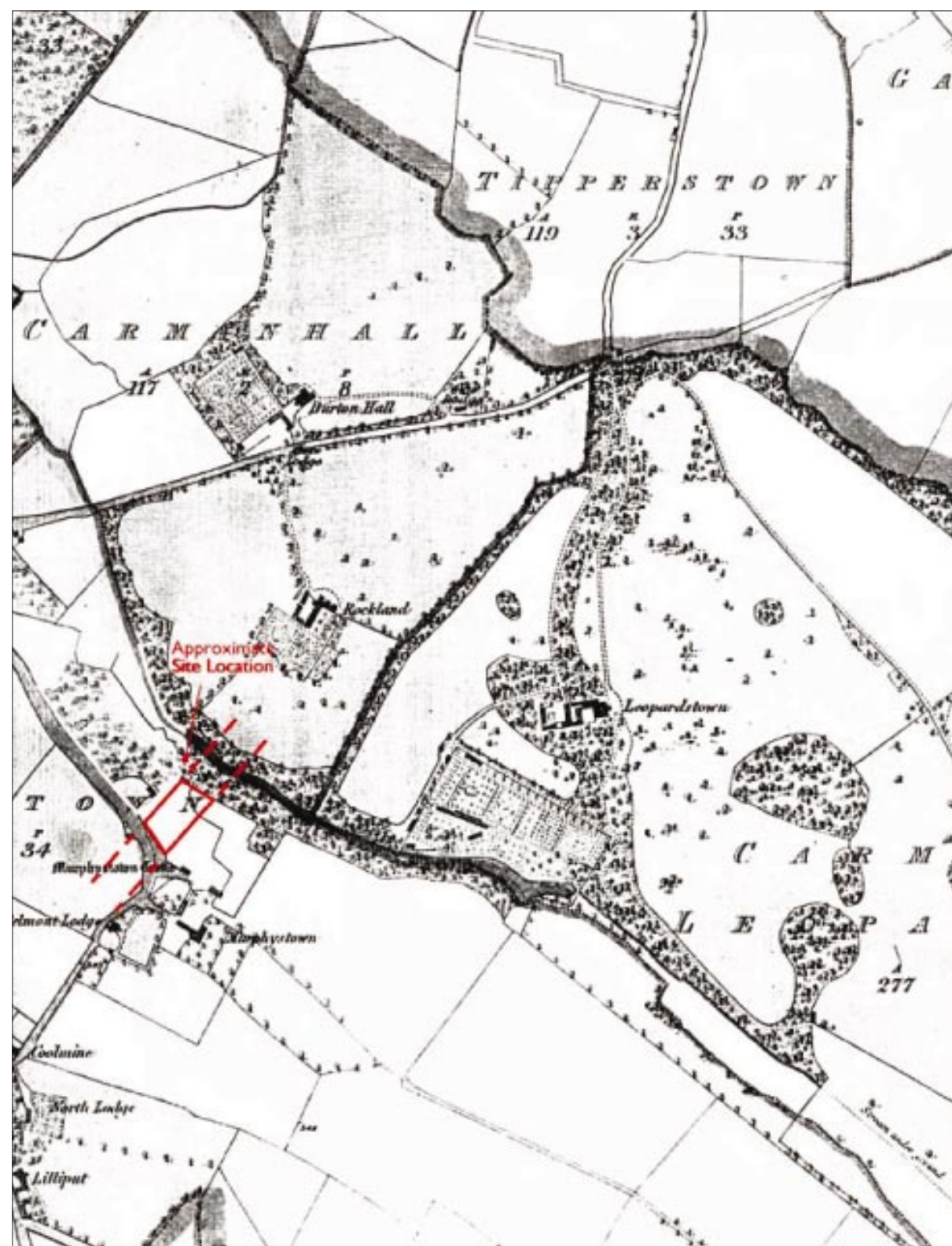


Fig. 5 Ordnance Survey, 1843

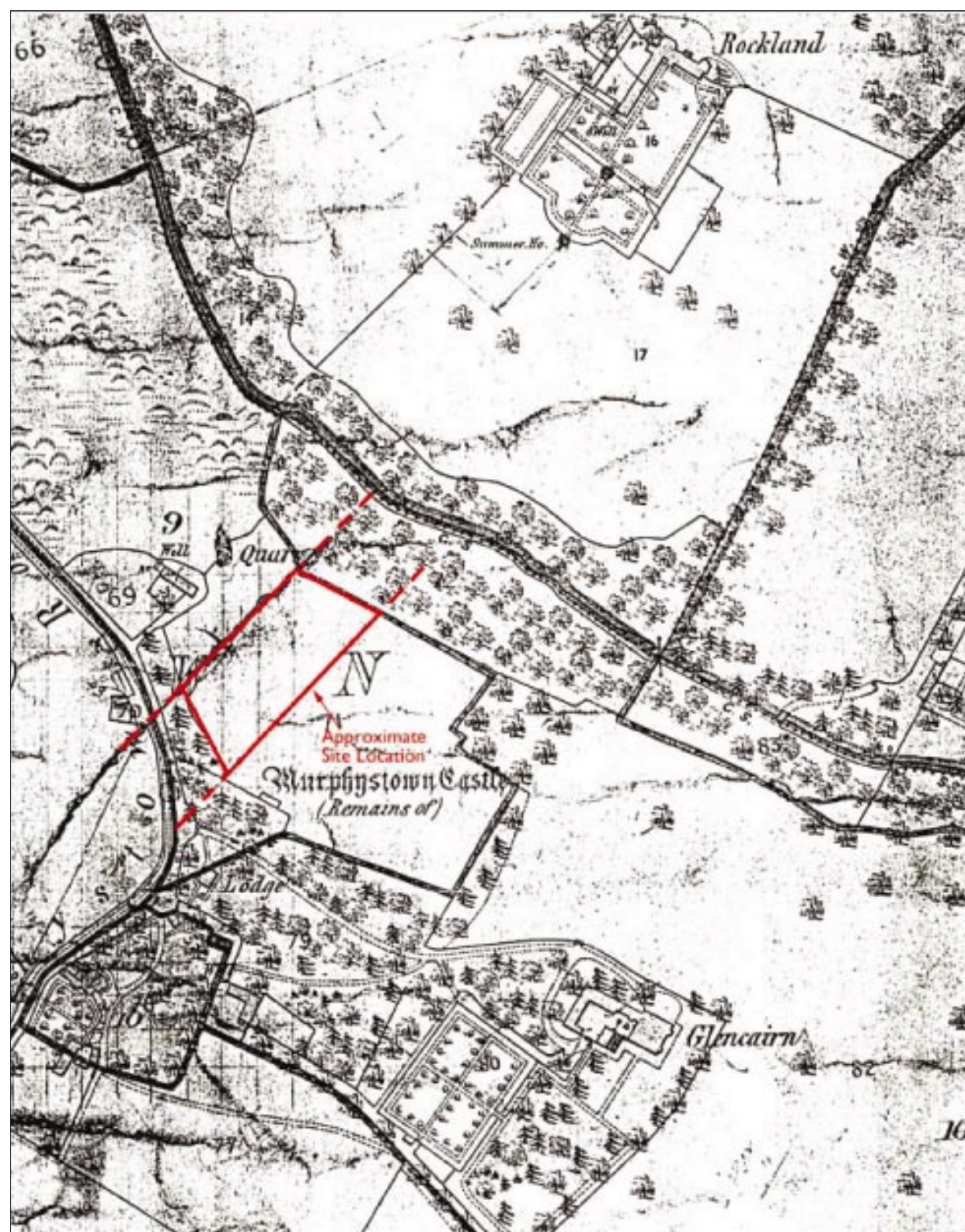


Fig. 6 Ordnance Survey, 1866

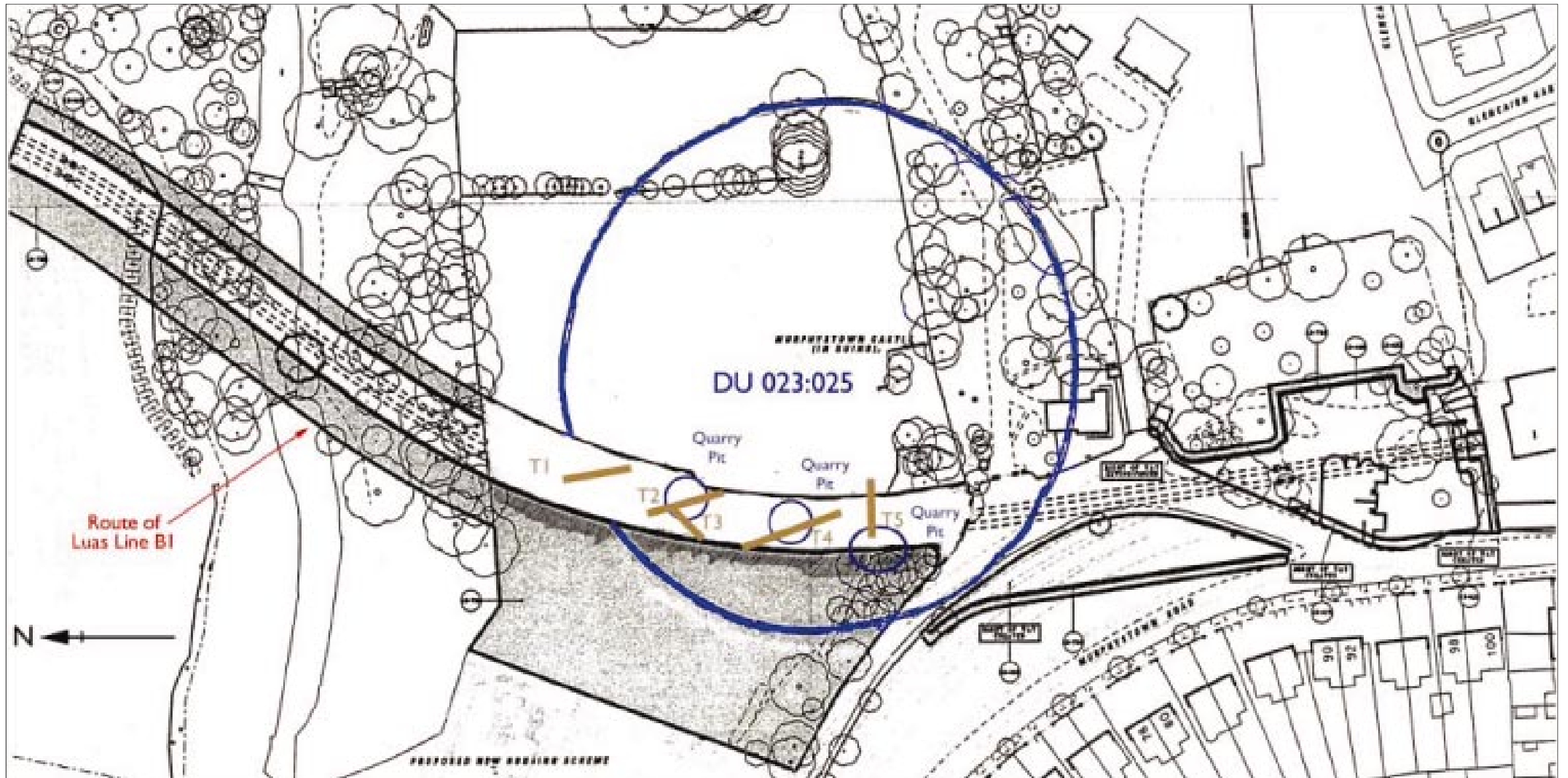


Fig 7 Trench Locations



Plate 1 General view over site to Sandyford, northwest of the castle



Plate 2 Current state of Murphystown Castle remains from the north



Plate 3 Trench 1 - start of rock out-crop from the north



Plate 4 Trench 2 & 3 - exposed limits of large quarry pit from the northeast



Plate 5 Trench 2 - excavated quarrying waste material from base of pit



(left) Plate 6 Trench 4 - quarry pit with fill and water from S



Plate 7 Trench 5 - Western end of trench with large cut filled with water, section showing backfilled with modern dump

