LONGFORD NORTHERN ENVIRONS

LOCAL AREA PLAN

2008-2014

LONGFORD LOCAL AUTHORITIES

IN CONJUNCTION WITH

RPS Planning & Environment

1.0 INTRODUCTION

1.1 Terms of Reference

This Local Area Plan (LAP) relates to lands on the northern environs of Longford Town overlapping the Longford Town Council and Longford County Council's administrative areas, and is a joint venture between Longford Town and County Councils (Longford Local Authorities).

This Local Area Plan process is advanced under Section 20 of the Planning and Development Act, 2000, as the appropriate mechanism to establish a suitable planning framework for the area concerned.

1.1.1 THE NEED FOR THE PLAN

Considering recent population growth witnessed in County Longford over the past four years (10%), and Longford's identified role as a principal town in the broader polycentric model for the Region, the Local Area Plan is required to support the economic development of Longford, building on the strength of the existing industries which have recently located and expanded in this section of the town.

Recent development pressure in the Town and environs area has highlighted a strong need to consolidate strategically important landbanks within the existing bypass. This LAP will promote sustainable landuse patterns through the prevention of development leakage to peripheral areas and consolidating existing development with a palette of appropriate development types. This will result in a reduced need to travel, facilitate transport alternatives to the private car and provide a more attractive living and working environment.

The subject lands were identified as a strategic land bank for the future development of the new urban quarter of Longford for a number of reasons:

- The spatial expansion of the town is limited to the south and west due to the location of floodplains and a lack of adequately zoned and serviced land for development;
- The subject lands are located in close proximity to Longford's town core;
- The subject lands are well accessed by the regional and national network of roads;
- The LAP lands have already attracted substantial development activity comprising new residential, employment and retail developments;
- Noting the need to address deficiencies in the comparison offer in Longford town centre, the LAP lands have been identified as "edge-of-centre" in the 2007 Retail Strategy.
- Longford's main amenity space – the Mall Park and Camlin River are located within the subject lands of the LAP. The LAP will facilitate the expansion and enhancement of these open spaces.
- The local Area Plan will promote sustainable mobility through the consolidation of land uses within the bypass and the facilitation of walking and cycling objectives contained in the current Town Development Plan.

The Local Area Plan is required to provide a framework for development of appropriate and complimentary uses that represent sustainable land use patterns in the study area, while supporting and enhancing the role of the town core.

A comprehensive approach is required to link all commercial, existing and potential functions in the area, having consideration for exiting activities in the town core and surrounds, and any physical constraints. This LAP will have a vital role in defining future development of this important quarter of Longford town and its aspirations as a growth centre over the coming years

1.1.2 LAYOUT OF PLAN DOCUMENT

The Plan is laid out in the following manner:

Section 2 of the LAP sets the context for the document in terms of strategic and statutory planning policy and guidance.

Section 3 focuses on analysis of the LAP area, in order to consider what role it plays in addressing demographic needs in the broader town and County context, as well as the physical and environmental opportunities and constraints that potential development in the area must consider.

Section 4 sets out the aim, strategic objectives, and core policies of this LAP.

Section 5 contains the zoning objectives for the LAP area that work in tandem with the policies set out in Section 4 to achieve the stated aims and goals

Section 6 addresses the implementation of the plan including phasing provisions

1.2 Consultation

As part of the pre-draft phase of this Local Area Plan, the general public were consulted by way of a notice placed in local papers inviting submissions prior to the preparation of the draft plan. Several submissions were received and were considered as part of the Draft Document.

The Draft Plan was also placed on display, inviting submissions, in accordance with the Planning and Development Act 2000, as amended. These submissions were also considered in making this plan.

1.2.1 SEA SCREENING

Strategic Environmental Assessment (SEA) has become a statutory consideration for planning authorities under the Planning and Development (Strategic Environmental Assessment) Regulations 2004.

Under this legislation, an SEA may be required where a Plan or Programme is subject to preparation and / or adoption by a national, regional or local authority, or, prepared by an authority for adoption through a legislative procedure by Parliament or Government. SEA is mandatory for LAP areas with a population of 10,000 persons or more.

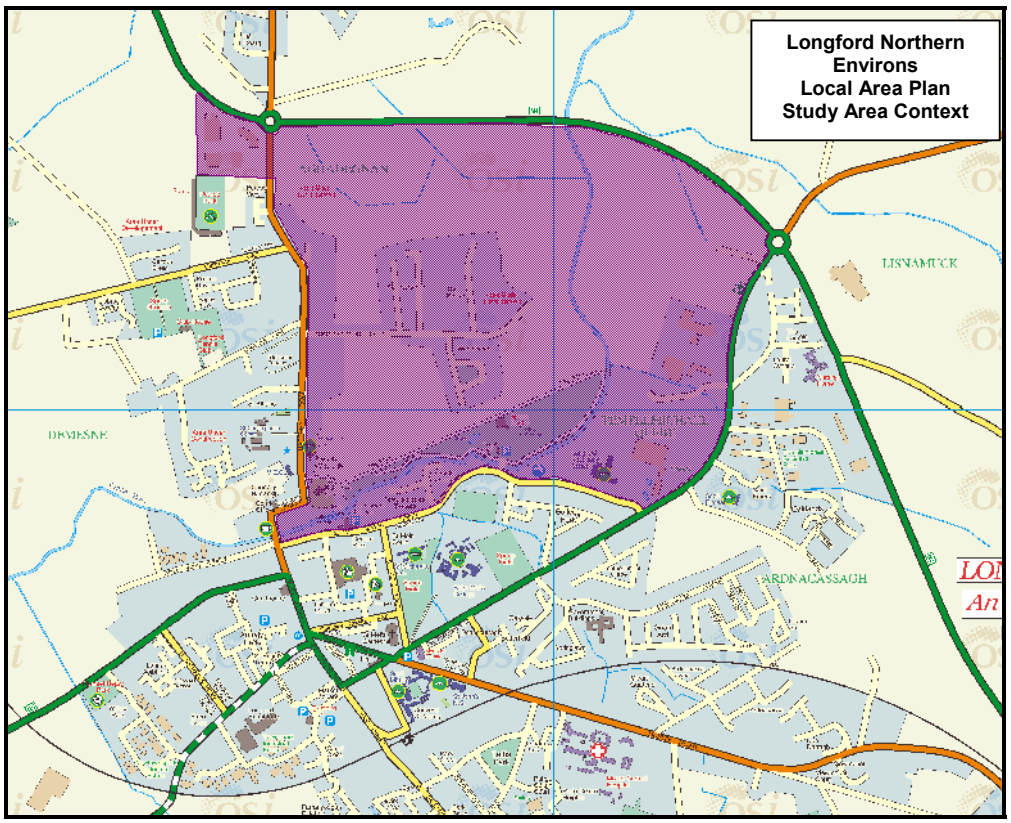
As SEA is not mandatory for the Local Area Plan in question as it falls below the mandatory threshold levels for Strategic Environmental Assessment. In accordance with the SEA Directive (2001/42/EC) and the Planning & Development (Strategic Development Assessment) Regulations, 2004, the proposed Local Area Plan was therefore screened to ascertain if the plan required the preparation of an Environmental Report. The Screening Report was sent to the designated Environmental Authorities and it is the opinion of the Planning Authority that a Strategic Environmental Assessment is not required.

1.3 Context

1.3.1 SITE LOCATION AND DESCRIPTION

The study area relates to lands on the northern environs of Longford Town traversing the Longford Town Council and Longford County Council administrative boundary.

The LAP area is bounded to the east by the Ballinalee Road, College Road/Templemichael Terrace/Great Water Street to the south, Bridge Street/Chapel Street/ Battery Road to the West and the N4 Longford Bypass to the North.



Straddling the Town and County boundaries, the current zonings in the area are predominantly residential, with a fringe of commercial/industrial and employment generating uses. A large recreational area lies to the south of the study area in the form of the Town Mall. Facilities provided at this location include all weather football pitches and indoor sports facilities including courts, a swimming pool and gym facilities.

The Camlin River flows through the area and while it significantly enhances the potential future amenities of the mall area, it is an essential element of the Mall Park, already extensively used as a walking route and for other recreational pursuits.

There has been substantial planning activity in the area over the last number of years, however, this has not been reflected in completed developments on the ground to date.

1.3.2 STRATEGIC PLANNING CONTEXT

National Development Plan, 2007 – 2013

The National Development Plan, 2007 – 2013 (NDP) was published in January 2007 and notes that the Irish economy and society will undergo a transformation almost as radical as the changes experienced in the past decade of growth and development.

This transformation would be driven largely by the continuing increase in the population which is projected to reach over five million people by 2021. The NDP recognises the population growth experienced in the Midlands Region (a 2.8% increase between 2002 and 2006) and estimates a 31.6% increase between 2002 and 2021. It recognises that similar growths have been experienced in the region's economy and employment and predicts that these growths are set to continue.

The NDP aims to capitalise on the important regional and local roles of County Towns (such as Longford) so that they can attract investment and act as local growth engines to strengthen nearby gateways and hubs. These County Towns can, with proper investment, contribute to the balanced development within, as well between, Ireland's regions. The aims and objectives of the NDP were taken into consideration in the preparation of this Local Area Plan.

National Spatial Strategy, 2002 – 2020

The National Spatial Strategy, 2002 - 2020 (NSS) is a 20 year planning framework designed to achieve a better balance of social, economic, physical development and population growth between regions. The NSS sets out a national context for spatial planning which informs regional planning guidelines and strategies, as well as county and city development plans and strategies.

The NSS recognises Longford's strategic location on the Dublin to Sligo Railway Line and on the N4 National Road (which is recognised as a National Transport Corridor). The NSS states that to ensure the enhancement of this County Town, *"high urban design quality, effective water services and clear local development frameworks will be necessary"*.

The NSS also notes that Longford has a great potential for tourism and recreational development which can be used to diversify its rural economy. It also recognises the potential created by the inland waterway networks and scenic landscapes. These factors, Longford's strategic location and the important role it can play at county and regional level, were taken into consideration in the preparation of this Local Area Plan.

Midlands Regional Planning Guidelines, 2004

The Midlands Regional Planning Guidelines (MRPGs) were adopted by the Midland Regional Authority in May 2004. The MRPGs act as a framework for the sustainable development of the region and focus on enhancing the competitiveness and attractiveness of the four Counties of Offaly, Westmeath, Laois and Longford. To achieve this, the MRPGs aim to build the critical mass of the region with regards to population, economy, employment, and education whilst ensuring that both rural and urban areas play their roles in the balanced and sustainable development of the area. The MRPGs also aim to provide better transport and communications to and within the region and to strengthen and develop the area's character and identity. The MRPGs state that:

"Portlaoise and Longford are two strong towns in the relatively weak urban structure of the midlands. Located on the southern and northern periphery of the region, these settlements provide vital links with the adjoining regions in terms of employment, trade and services. They also provide vital support to outlying local settlements and rural areas that depend on them for higher order services, administrative functions and employment".

A key objective of the MRPGs is to develop a settlement strategy that will *"prioritise the linked gateway and principal towns as the foci for development"*. The MRPGs suggest that failure to build on the strengths of principle towns would hinder the achievement of critical mass, regional competitiveness, and balanced regional development.

The MRPGs define five 'development areas' including the Northern Development Area which contains the principal town of Longford. The Northern Development area is characterised by a settlement structure dominated by Longford town where the bulk of the predicted growth in population are expected reside. The MRPGs propose the following for the Northern Development Area:

- *"Targeted accelerated growth and infrastructure investment in Longford Town, including improved transport and communication links to the gateway and the extension of the gas pipeline to the area to consolidate and expand existing industrial and manufacturing strengths in the area.*
- *Development, promotion and expansion of Business and Technology Parks to Longford and of focused and local industrial parks/enterprise centres to serve indigenous industries.*
- *Building on the amenity potential of the inland waterways and the development of alternative and renewable energy sources to utilise the existing well-developed electricity infrastructure".*

The aims and objectives included in the MRPGs were taken into consideration in the preparation of this Local Area Plan.

Retail Planning Guidelines for Planning Authorities, 2005

The updated Retail Planning Guidelines (RPGs) were published in January 2005. The RPGs seek to accommodate additional retail development in a way that is efficient, equitable and sustainable. The RPGs provide a comprehensive framework for the formulation of Retail Strategies for each County, upon which development plan retail planning policy is based. The Longford County and Town Retail Strategy was updated in 2007 and incorporated into the respective Development Plans.

The Retail Strategy identifies a need for significant growth of comparison retail provision up to 2015, and suggests that Longford's retail core has a deficiency of high-end, modern comparison retail. It is considered essential in terms of the sustainable development of the Town going forward that high-end comparison shopping provision is retained and substantially enhanced within the Town core area to prevent leakage to adjacent centres.

The strategy identifies the subject lands as an 'edge of town' location where convenience and retail park/retail warehousing will be considered. However, the retail strategy clearly states that any significant convenience retail development proposed in any area other than the town core or centre will only be considered where this is proposed in tandem with a substantial and appropriate redevelopment

of the core area, with significant and tangible benefits, including improved traffic access circulation and car parking, ensuring the continued vitality and vibrancy of the central area into the future.

Longford County Development Plan, 2003 – 2009

The Longford County Development Plan is the statutory development plan for County Longford for the period of 2003 – 2009. The Plan aims *"to provide a framework for the proper planning and sustainable development of the County over the plan period"*. The Plan recognises that Longford Town plays an important role as the County's commercial, retail, service and industrial centre and seeks to promote and enhance this role with a focus on expanding the town's retail and employment functions.

This Local Area Plan for Longford Town's Northern Environs is partially located within the administrative area of Longford County Council. As such, this is subject to the zoning and objectives of the County Development Plan.

The area of land to the south of the bypass within the County Council's authority has been primarily zoned for either industrial, residential, or residential/commercial. Other land uses include social/community, industrial/commercial and recreational. The Plan notes that:

"These zonings are intended to be flexible, provided that the basic concepts of proper planning, residential amenity and good design practice are adhered to. Any proposed development should be compatible with the primary zoning use and should not detract form the amenity of the area".

These zonings and the policies and objectives included in the County Development Plan were taken into consideration in the preparation of this Local Area Plan[1].

Longford Town Development Plan, 2004 – 2010

The Longford Town Council Development Plan is the statutory development plan for Longford Town and its environs for the period 2004 to 2010. The plan provides a framework for the proper planning and sustainable development of Longford Town in a coordinated manner while simultaneously conserving the town's unique character, heritage and amenities. The plan aims to:

- facilitate a sustainable town centre;
- support the regeneration of derelict areas;
- build upon recent economic growth;
- provide sufficient housing, employment and recreational facilities;
- identify, protect and conserve the town's character and identity;
- incorporate relevant guidelines and strategies at local level;
- promote Longford Town as a centre of regional importance;

The Plan sets out policies and objectives for: residential development; community facilities; roads and infrastructure; traffic management and parking; pedestrian and cycle links; public transport; water and sanitary services; amenity and recreation; the town centre; conservation and built heritage; industry and employment; and tourism.

[1] *While the principles of the Local Area Plan are not inconsistent with the zoning objectives outlined in the CDP and TDP, variations of the CDP and TDP were made in accordance with the statutory development plan variation process as defined by the Planning and Development Act 2000 prior to the adoption of the local area plan for the study area.*

These policies and objectives were taken into consideration in the preparation of this Local Area Plan.

2. ANALYSIS

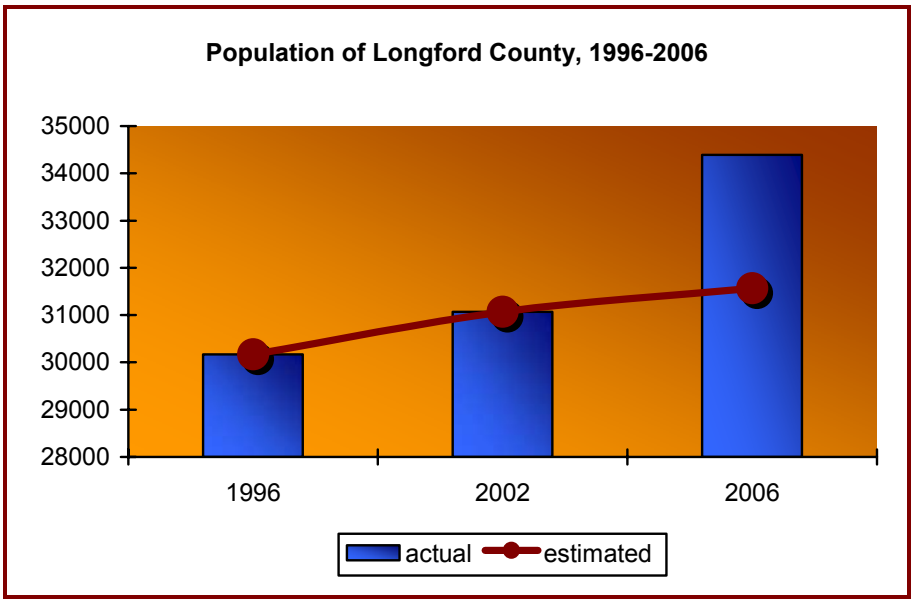
2.1 Demographic Analysis

It is important to understand the nature of demographic trends, in the region and locality that impact on the demand for development, which in turn influences where growth is directed.

Demographic trends have been analysed at regional, county, town and local levels. For the purposes of this LAP, Central Statistics Office (CSO) data is used in conjunction with data produced by development plans and other official government publications.

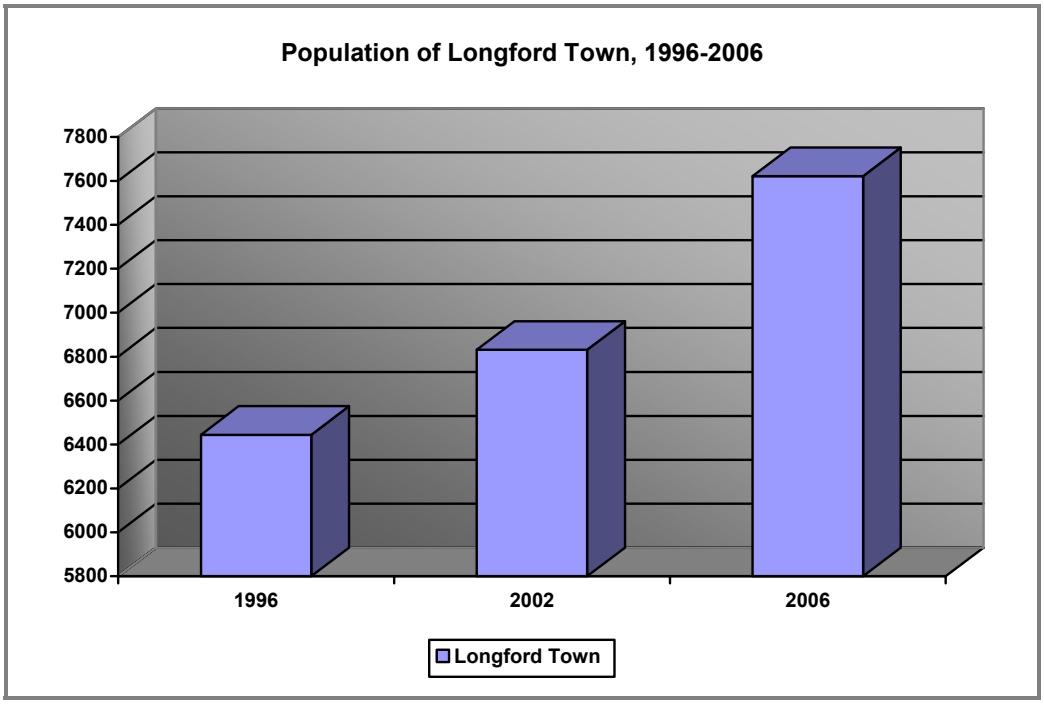
Population
The total population for the Midlands Region was 251,664 persons in 2006. This represented an increase of 10.5% over the 2002 figure which was 225,363 persons.

Similar population growth was experienced in County Longford. The Longford County Development Plan 2003 – 2009 estimated a population of 32,061 for 2009, however, this was based on trends up to 2002, which changed radically over the 2002-2006 census period, giving a growth rate of almost 11% for the County in a four year period.



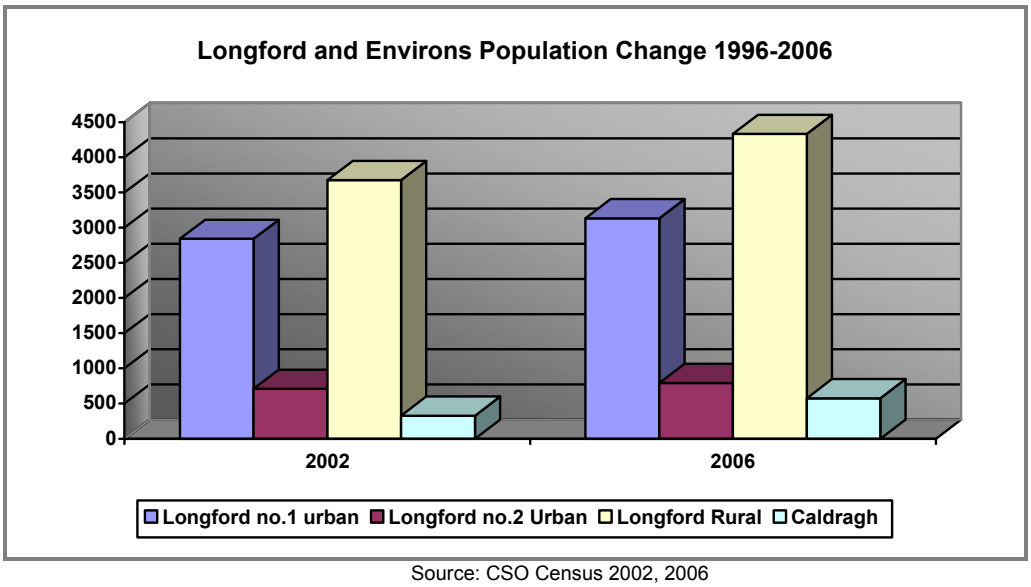
Source: CSO Census 1996, 2002, 2006

This population growth was further exaggerated in Longford Town. The CSO's Aggregated Town Population statistics for Longford town (below) showed an 11.6% growth between 2002 and 2006. This exceeded the increases experienced in the Midlands Region (10.5%) and in the County (10.7%).



Source: CSO Census 2002, 2006

Between 2002 and 2006, the environs of the town witnessed a substantial population growth of 67.2%. This is reflected in the 60.6% increase experienced Longford Rural (part) Electoral Division and the 75.3% increase experienced in Caldragh (part) Electoral Division. This represents a high percentage growth, albeit from a low baseline figure. The LAP area is located within Longford No. 2 Urban ED, which experienced little growth over the period, despite having a substantial residentially zoned landbank. However, several developments now underway or completed have not been enumerated in the last census.



Source: CSO Census 2002, 2006

Future Trends
Based on the most recent census data, the CSO estimates that by 2021, the total population for the Midlands Region will be 296,000 - representing a 15% increase over the 2006 figure. While this figure has not yet been disaggregated, Longford Town is set to retain steady population growth as the main driver for development in the Northern area of the Region.

The Longford Town Development Plan 2004 – 2010 estimates that the population of Longford will reach a population of 12,292 by 2009. This figure is based on a sustained annual growth of 11% over 7 years.

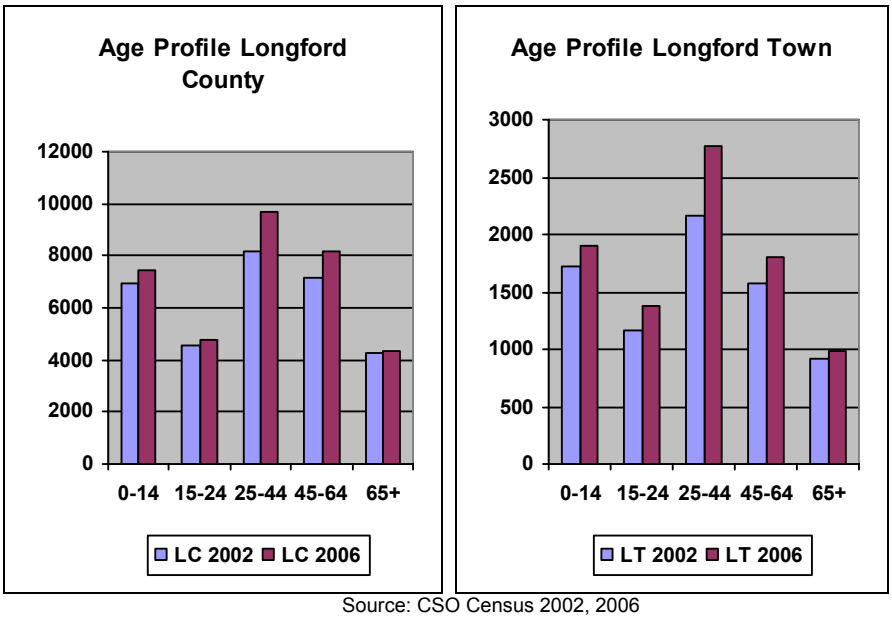
The current Draft Housing strategy indicates a growth of approximately 2,000 persons in Longford Town, a growth of 26%, over the plan period. A growth of 9117 persons (also 26%) is projected for the County area over the same period. The County projection is conservative in the context of the current population allocations in the Regional Planning Guidelines which project a growth of 11,000 persons in the Northern area (which equates to Longford County) over the Plan period. When this is applied to the Longford Town area, the figures are more conservative still, given that much of this projected growth is to be channelled into the town as the main driver of development in the northern area. This is upheld in the settlement strategies of the current and draft County Development Plan and the Midland Regional Planning Guidelines.

The Northern Environs is the main zoned and serviced land bank for the town, so much of this immediate growth can be accommodated within the LAP area.

Age Profile
The age profiles for the State and the Midlands region are relatively similar. The State's population has aged at a slightly faster rate than the Midlands' with decreases in the number of persons aged 15 to 24 years and increases in the number of persons aged 25 to 44 years over the 2002 to 2006 period. However, with its slightly younger population, the Midlands region did not experience these changes as obviously.

In general, Longford County had an older population than the State or Midlands region (11%) with 12.6% of its population aged 65 years and over in 2006.

Unlike the County, Longford town experienced changes in its age profile which were more comparable to that of the State and Midlands region. In 2006, the town had a younger population than the County, Midlands region and State with 47.0% of its population aged between 15 and 44 years. The corresponding figures for the County, Midlands region and State were 42.0%, 44.9% and 46.7% respectively. In 2002, 34.9% of the town's population were outside the working age cohort. This figure dropped to 32.6% by 2006. A similar drop was experienced in the County, Midlands region, and State. This is potentially due to the higher percentage of in migration as a component of population change between 2002 and 2006 over other census periods and indicates that there is, and will be strong demand for educational facilities, from pre-school to secondary levels.



Source: CSO Census 2002, 2006

Household Size

In 2002, County Longford had a total of 10,375 private households. By 2006, this figure had increased to 12,111 private households. On average, there were 2.92 persons per household in the County in 2002. This figure dropped to 2.79 by 2006. This change in household size correlates with the State average which decreased from 2.94 in 2002 to 2.81 in 2006.

In 2002, the CSO's data for the Aggregate Towns of County Longford showed that the average household in Longford's towns contained 2.78 persons. The corresponding figure for 2006 was 2.64. This decline was similar to the decline witnessed at county, regional and national level.

Data from the draft housing strategy indicates that there will be a need for a minimum of 6,045 housing units in the County up to 2016.

2.2 Employment

2.2.1 LONGFORD COUNTY

County Longford was included in the Upper Shannon Rural Renewal Scheme which offered tax incentives for residential and commercial developments that obtained planning permission between 1998 and 2004. As such, the County witnessed an accelerated growth in property development over recent years.

There have been improvements in employment levels as a result of expansion of existing facilities and the development of new enterprises – particularly in Longford town. This increase is more notable in the service sector than any other sector and is mainly due to the opening of large commercial developments in Longford Town.

The economic profile of the County suggests an historical reliance on the agricultural sector which is in a long term decline. High-end commercial and industrial development is needed to replace traditional labour intensive agricultural and manufacturing industries. An attractive, high quality living and working environment is essential in order to attract investors.

2.2.2 LONGFORD TOWN

Longford town is the main centre providing commercial and industrial employment in the northern area of the region. The Longford Town Development Plan 2004 – 2010 notes that the services and industry sectors are steadily growing and that the agricultural sector is declining. It is considered to be vital that the town continues to attract employment generators in the retail, services and industry sectors. The Town Development Plan states that:

> "*Longford town acts as a major regional services centre. For instance, there is an extensive range of retail and commercial facilities available to the consumer in the town. Longford town also accommodates several major financial institutions, representatives of the legal professions, offices, and a significant number of insurance and accounting services*".

Both the Department of Social Welfare and the Irish Prison Service are based in the Longford town. The major industrial employers include large international companies such as Magna Donnelly (Electronics System products), Activant/Triad Systems (CD-based inventory management systems for the automotive industry), Wessel Cable (telecommunications data cables), and Cameron Ireland (valves for oil wells). These are located in the IDA Business Park situated to the west of Ballinalee Road and to the south of the Town.

One of the newest industry based employers in the area is Abbott Ireland's Diagnostic Division. Situated in Lisnamuck (just north of the N4 National Road), Abbott Ireland is expected to provide employment for up to 600 persons.

The major commercial employers include: UK multiples such as Tesco, Argos, and Homebase; German discount retailers including Aldi and Lidl and Irish outlets such as Dunnes Stores and Penneys.

2.2.3 LONGFORD TOWN'S NORTHERN ENVIRONS

Some of Longford town's key employers are located within the area of this Local Area Plan (LAP). Green Isle Foods Ltd. and Panelto Foods Ltd. are located to the west of Ballinalee Road, just north of the IDA Business Park.

A cluster of retail/commercial units are located in the north west of the LAP area at the junction of Battery Road and the N4 National Road. These units include a drive-thru McDonalds, Curves Fitness Centre, Argos, Homebase and several office buildings and other bulky retail outlets.

There is also a strip of c. 25.11 hectares of land that is located along the southern side of the N4 National Road and straddling the administrative boarder between the Town and County Councils. This is currently zoned for "*residential/commercial*" under the Town and County Development Plans, which has yet to be developed.

2.3 Physical Environment Analysis

The study area comprises approximately 166 ha of land and is described in detail at ***Section 1.3.***

Some of the most significant advantages of the Northern Environs area include its proximity to Longford's town centre and the high profile and visibility provided by the town bypass to the north.

The area has certain physical characteristics, both natural and man-made, that have functioned as barriers to the realisation of the area's potential in the past.

The River Camlin bisects the LAP area from east to west and flows westwards along the southern boundary. The river is a key amenity for the town and an integral element of the primary urban recreational area, the Mall Park, which is extensively used for passive and active recreation. It is also a physical and visual barrier that separates a bulk of the lands from Longford's town centre and lands fronting onto Ballinalee Road.

The following Physical characteristics have the potential to become positive catalysts for the development of the area as a driver of the local economy and a desirable place in which to live, work and recreate.

2.3.1 ACCESS

Despite its location within close proximity to the town centre the subject area remains largely undeveloped. The lands form the largest land bank zoned for residential development within the existing town bypass, which has been considered the northern boundary of the core urban area since its construction in the early 1990's.

At present the lands are poorly accessed. Historic properties lining the Battery Road and industrial development on the Ballinalee Road effectively limits access to the LAP area from the west and east respectively. Existing residential estates limit the capacity of established roads through the area. The Camlin provides a physical barrier to the south, while the existing N4 limits access to the north.

Currently, the primary accesses to the lands are via Abbeycarton Lane, Templemichael Glebe and more recently, White Linen Woods, none of which provide significant penetration to the central landbank. While such a lack of permeability was not a significant problem when the lands were mainly in agricultural use, limited accessibility and permeability represents a major constraint in terms of future development.

2.3.2 NATURAL ENVIRONMENT

Ecology and Vegetation

The undeveloped lands within the LAP area mainly consist of agricultural pasture. Hedgerows with occasional trees that articulate fields' boundaries form distinctive element of the local landscape and ecosystem throughthe provision of wildlife corridors. The lands on the northern bank of River Camlin include a local park and amenity walkway. The river and its corridor form the main natural feature and ecological habitat of the area.

River Camlin

River Camlin forms a distinctive element of the local landscape and one of the major amenities of the subject area. The river transects the north eastern section of the LAP lands, meandering south and then west out of the area. There is little emergent vegetation within the river. Most of the riverbanks are covered with rough grassland.

There are also occasional alders, oaks and small areas of shrubs in the riparian zone.

Mature Trees

Mature trees are evident throughout the subject area, primarily along the boundaries of the agricultural lands. There are also a number of significant trees growing within the local park and along the river. Important specimen trees can be also found along local roads within the area. There are no statutory tree preservation orders existing or proposed in the LAP area, however, important specimens or stands of trees should be protected enhanced and/or replaced as part of any proposed development for their landscape and biodiversity value.

Existing Uses

Existing development within the subject area extends along the key thoroughfares – Battery Road and Ballinalee Road. The N4 circumnavigates the northern boundary of the subject site and connects Battery Road and Ballinalee Road.

The Battery Road forms the primary northern approach to the town centre. The N4 /Battery Road junction consists of a four-legged roundabout with crossing traffic from the town centre to Drumlish and Arvagh along the R198.

Although not directly accessed off the N4, the western side of this Roundabout is dominated by a retail warehousing park comprising two high profile bulky goods sales outlets, a gym and a drive-through fast-food facility.

The Battery Road is primarily residential in character with large period dwellings on substantial sites. The character of the approach changes towards the town centre at Church Street, where density is increased and uses become more diversified. St John's Church terminates the street and marks the pedestrian entrance to the Mall – the key pedestrian walkway in the town that follows the southern boundary of the LAP lands.

There are a number of community and institutional uses in the vicinity such as Connolly Army Barracks, the Town Garda station, St. Christopher Day Care centre and the Adult Training College.

The LAP lands follow the route into the town centre via Bridge Street, Crossing the River Camlin and taking in Great Water Street, the old industrial quarter of the town, backing onto the River and now containing several commercial and residential properties with some dereliction. The County Council offices are located along this Street, and, once expanded, will create a civic and administrative centre in this area, flanked by the River and the Mall Park.

The route takes on a more residential character on Templemichael Terrace and onto College Road. Another entrance to the Mall Park, crossing the Camlin River is followed by the local vocational college and fire station.

The Ballinalee Road is Longford's main employment zone. Abbott Ireland, Green Isle and Panelto food processing plants, Fenelon Engineering and several industrial and manufacturing facilities in the IDA industrial estate are located in this area and major contributors to the economy of the North Midlands.

Large portions of land within the centre of the subject area remain in agricultural use, with a number of medium density housing estates accessed off Abbeycartron Lane. An additional housing estate is under construction to the north of the area, accessed of the roundabout to the south of the Red Cow.

2.4 Physical Infrastructure – Roads and Services

2.4.1 ROADS

The LAP lands are bounded by the N4 National Road to the north, the Ballinalee Road to the east, and Great Water Street/College Road to the south. The western boundary is primarily formed by the Battery Road, which is the main access to the town from the north via the Red Cow Roundabout.

Abbeycarton Lane is an established residential access road into the centre of the LAP area serving several small housing estates. A new east-west distributor located off the small roundabout to the south of the main Red Cow roundabout on the N4. This serves White Linen Woods, a housing estate in the north of the LAP area which is currently under construction.

2.4.2 WATER

The subject area falls under Longford Central Regional Water Scheme (RWS). The water for the subject area is provided by the Lough Forbes Water Treatment Plant. Presently, over 90% of the population receives a piped water supply treated to EU standards.

The Water Services Investment Programme Assessment Report (2006) identified that there is insufficient spare capacity available in the Longford Central RWS to provide for the short-term projected growth in the Region. The assessment also indicated that the overall storage capacity of the system is limited, which causes interruptions of services to customers in the event of burst.

Upgrading of the network, source replacement and augmentation of the storage system were identified as an objectives in the Water Services Investment Programme, 2007 – 2009. This objective was also designated as a top priority for investment. The County Water Services Department also introduced a water conservation scheme for the RWS.

2.4.3 SANITARY SERVICES

Wastewater from the subject area is treated by the Longford Sewage Treatment Plant. The treatment plant has a capacity of 20,000 population equivalent.

The report indicates that the plant was designed to facilitate the expansion to 40,000 population equivalent. The expansion of the treatment work was identified as an objective for the 2007 – 2009 Investment Programme and is identified as an objective in the Town Development Plan.

The LAP area has access to local piped services such as water and sewage. Considering the Longford Town Council stormwater management policy, it is likely that future developments will have to incorporate location of retention facilities and other principles of Sustainable Urban Drainage Systems.

2.4.4 POWER SUPPLY

The area has good access to regional and local ESB network. There is a 38 kV ESB substation located within the subject area. The development of the subject lands will require the provision of additional substations and appropriate network infrastructure.

2.5 Social Infrastructure

The provision and enhancement of open space and local social facilities are key elements of the proposed Local Area Plan. Adequate provision of social infrastructure is essential in terms of the attractiveness of the area as a place within which to live and work but also to promote sustainable mobility, social inclusion and prevent marginalisation.

The Local Area Plan acknowledges that the subject area contains significant community facilities that relate to the wider Longford area including the Mall and County Leisure Centre. The planning strategy indicates how these spaces and uses can cater for the future population of the town and its environs as well as for the needs of local population of the district.

2.5.1 RECREATIONAL FACILITIES AND PUBLIC OPEN SPACE

The Mall is Longford Town's main park and is extensively used for both active and passive recreation throughout the day and contains the local Sports and Leisure Centre, which is open seven days, six of these until 10pm. The park includes play areas for children and walkways that form part of the overall town walkway network (see **Map 2**).

The LAP area includes almost 19 % of the overall lands zoned open space within the functional area of Longford Town. The Mall comprises approximately 8.8 ha of land with a potential for future expansion to almost 19.8 ha.

2.5.2 EDUCATION

There is significant provision of primary educational facilities within immediate environs of the subject area, which cater for the town as a whole and its environs. A number of Longford's primary schools are located in close proximity to the LAP lands. These schools include: St. Emer's NS at Ballinalee Road, St. John's NS at Battery Road and St. Michael's NS at St. Mel's Road.

Secondary education facilities within immediate environs of the subject area include the Longford Vocational School at Ballinalee Road and St. Mel's College at St. Mel's Road.

Analysis of the age structure of Longford Town revealed that:

- 7% of current population (618) is in early school age (5-9)[2]
- 6.9% of current population (609) in primary school age (10-14)
- 15% of current population (1,325) in secondary school (15-19)

For the purpose of this analysis it is estimated that future population of Longford will retain the current age structure. Therefore, the anticipated growth in population will be approximately 4,600 persons within the next 4-5 years (based on estimations in the Longford Town Development Plan 2004 - 2010). This will result of the following demand for school facilities:

- Primary schools: an additional 644 persons
- Secondary Schools: an additional 690 persons

It is anticipated that the demand for new facilities will gradually rise over a longer period of time. In the mid to long-term there will be a demand for a primary school

[2] Interpolating from Longford County average

facility on the subject lands, and it therefore logical to indicate a suitable site for this purpose in the LAP. Two indicative sites for the provision of educational facilities have been identified on the attached map. These sites have been chosen due to their location adjacent to potential neighbourhood centres and recreational facilities.

2.5.3 CHILDCARE FACILITIES

Childcare facilities shall be provided commensurate with the likely demand for the anticipated population and in accordance with government guidelines. Generally, a facility with 20 spaces will be required for every 75 housing units.

If possible the childcare facilities should be located in conjunction with and in the vicinity of other neighbourhood community services. However, the preferred location would also allow for the provision of or access to a supervised outdoor play area for children. The centre should also occupy a location that is easily and safely accessible by all transport modes.

2.6 Conclusions

2.6.1 NEED FOR LAP

This land bank is of strategic importance to the town centre, providing the potential to deliver a significant level of residential land in tandem with uses that will complement the town core and add to its attractiveness and viability. The development of this area also provides the potential to create and maintain a sustainable mobility framework in accordance with the principles of sustainable development.

This land has remained undeveloped over several town and County Development Plans. As such, this Local Area Plan has been formulated to act as a catalyst for the development of this area, with a suite of development goals, policies and objectives outlined in the following sections to promote appropriate and sustainable development.

Residential zonings will be proposed to cater for the orderly development of this quarter of the town over the plan period. However, limits on these zonings and appropriate residential density guidelines have been applied in order to protect the position of Longford Town in the settlement hierarchy and ensure an appropriate physical development structure for the settlement itself in line with the level of existing and potential future infrastructure provision.

Longford is located wholly within the Northern Development Area, as identified in the Midland Regional Planning Guidelines, 2004. Given the level of industrial development, and availability of suitable lands for such development to expand, in addition to the infrastructural links and position of Longford Town within the settlement hierarchy defined by the Midland Regional Planning Guidelines and County Development Plan, a mixed use land zoning strategy is considered appropriate and expanded upon in the following sections.

Considering the possible population growth scenarios and current development patterns it is reasonable to assume that the lands will not be developed entirely within the life of this LAP, but more likely over two development plans. It is important that the long-term pattern of future development is established at an early juncture to ensure the sustainable development of the area.

2.6.2 OPPORTUNITIES AND CONSTRAINTS

The following bullet points summarise the foregoing analysis of the LAP lands and form the basis of the following strategy:

Opportunities

- The subject lands provide a substantial land bank for the future residential and commercial development of Longford Town;
- The LAP provides the opportunity to improve the existing infrastructure of the area in order to facilitate future development while promoting sustainable mobility and transportation patterns
- River Camlin is a major natural and recreational amenity for the town. There is an opportunity to augment the river's corridor by creating a semi-natural open space along its banks;

- There is a possibility to expand the Mall further north. Additional space could allow for location of additional facilities for active recreation;
- There is a potential to accommodate an additional crossing over river Camlin within the town centre area (parallel to Bridge St) to increase the permeability of the area and provide additional strong connections between the town core and LAP area; and
- To increase the permeability of the area and provide additional strong connections between the town core and LAP area.

Constraints

- There is a need to upgrade existing interconnectors within the LAP area to allow for a comprehensive development of the subject lands which supports a localised road network, thus protecting the existing capacity of the adjoining N4 bypass;
- Existing frontage development along Battery Road and Church Street limits the vehicular access to the back lands within the subject area. Existing junctions may therefore require upgrading.
- The importance of the N4 national road must be taken into consideration and national policies that relate to it must be respected; and
- River Camlin creates a barrier which limits permeability and ease of access between the lands on the both sides of the river.

3. STRATEGY

3.1 Aim of the LAP

The aim of this LAP is to set out a clear framework for the next 6 years in support of the sustainable development of the Northern Environs of Longford Town through the creation of a new dynamic urban quarter, which will positively link into and facilitate the natural expansion of Longford Town by identifying suitable lands to cater for the town centre's natural expansion.

This will be achieved having regard for housing, retail, industrial, commerce, recreational, educational, amenity, Social and community needs in the area, whilst protecting and preserving the area's intrinsic character, heritage, amenity and positively contributing to a better quality of life in the area.

The attractiveness, vitality, viability, and quality of a place are key considerations for any business or individual in deciding where to locate. Therefore, the quality and type of the built environment that will be created is fundamental in achieving the social, economic and environmental goals for the area.

3.2 Strategic Objectives of the Local Area Plan

The following strategic objectives will provide the framework for guiding the cohesive development of the Northern Environs area.

It is a strategic objective of this Local Area Plan to:

- establish a robust framework for the town's extension;
- reinforce the aims and objectives of the County Retail Strategy;
- provide direction and guidance to landowners and potential developers in the LAP area
- To establish a zoning strategy that provides for a range of compatible and complementary uses across the areas and linking into the town core
- provide an integrated approach to mobility and land use;
- establish a permeable and interconnected road network;
- promote development of the 'walkable neighbourhood';
- integrate the natural and built environments in future proposals, to the benefit of existing and future residents/workers.

3.2.1 SUSTAINABLE DEVELOPMENT

Longford County Council has stated its commitment to placing sustainable development principles at the heart of its decision making. The principles of sustainability as embodied in the County Development Plan 2003-2009 and the Town Council Development Plan 2004-2010 are reflected in the approach adopted in this document.

A sustainable approach is one that lasts. This needs to encompass not only an ecological and environmental understanding of the true impacts of development, but also recognition of the need for the proper promotion and support of the existing local economy.

In land use terms the principles of sustainable development are reflected in the LAP by the adoption of a range of policies and proposals which seek to:

- accommodate new development needs in an environmentally sensitive manner;
- permit a wide range of land uses under each zoning objective to help reduce the need to travel;
- promote a more compact urban form in the vicinity of strategic public transport corridors and in the urban centre;
- promote the re-use of brownfield sites and derelict buildings;
- conserve existing urban areas, buildings and features recognised as important elements of the unique identity of the area
- promote the use of cycling and walking and reduce reliance on private car usage;
- Protect natural habitats, ecological resources and quality landscapes and the promotion of bio-diversity;
- ensure the provision of high quality public water supply and drainage systems; and
- Promote waste prevention, reduction, recycling and re-use.

3.4 DEVELOPMENT STRATEGY

This Local Area Plan provides a framework for development of appropriate and complimentary uses in the LAP area that are in accordance with the principles of sustainability. These support and enhance the role of the town core area, particularly in the context of the Town and County Retail Strategy.

The area is addressed in a coherent manner, which links all commercial, residential and amenity uses, having consideration for any existing physical constraints.

The Plan addresses all aspects of the physical development of the northern environs of Longford Town according to the following urban design principles.

3.4.1 URBAN DESIGN

Urban design is concerned with the creation of places that facilitate specific or a wide range of functions in a manner that is attractive, secure and inviting, particularly to the pedestrian. These spaces in turn form part of a hierarchy in the urban area that provides identity, legibility and distinctiveness.

Derived from related topics such as planning and transportation policy, architectural design, development economics, landscape and engineering, good urban design has significant implications for how an area is experienced and perceived.

General Principles

The Urban Strategy is based on the following principles of development[3]:

Places for People

For places to be well-used and well-loved, they must be safe, comfortable, varied and attractive. They also need to be distinctive and offer variety, choice and opportunities for meeting people.

Enrich the Existing

New development should enrich the qualities of existing urban places. This means encouraging a distinctive response that arises from and complements its setting. This applies at every scale - region, city, town, neighbourhood, and street.

Make Connections

Places need to be easy to get to and be integrated physically and visually with their surroundings. This requires attention to how to get around by foot, bicycle, public transport and the car - and in that order.

Work with the Landscape

Places that strike a balance between the natural and man made environment and utilise each site's intrinsic resources - the climate, landform, landscape and ecology - to maximise energy conservation and amenity.

Mix Uses and Forms

Stimulating, enjoyable and convenient places meet a variety of demands from the widest possible range of users, amenities and social groups. They also weave together different building forms, uses, tenures and densities.

Manage the Investment

For projects to be developable and well cared for they must be economically viable,

[3] Llewelyn Davis (2000) Urban Design Compendium, English Partnerships

well managed and maintained. This means understanding the market considerations of developers, ensuring long term commitment from the community and the local authority, defining appropriate delivery mechanisms and seeing this as part of the design process.

Design for Change

New development needs to be flexible enough to respond to future changes in use, lifestyle and demography. This means designing for energy and resource efficiency; creating flexibility in the use of property, public spaces and the service infrastructure and introducing new approaches to transportation, traffic management and parking.

3.4.3 BUILT FORM

The consideration of Built or Urban Form is integral to the relationship of development and transport, and the maximisation of the use of walking, cycling and public transport

The built form of a town has a significant influence on how people move, and their choice of mode in undertaking daily activities. Various street/ road networks and residential layouts have different impacts on travel.

In order to support the aims and objectives of the Strategy, the proposed urban form must facilitate the reduction of the number of miles travelled per person per day between workplace, home, school, shops and leisure activities. Residential layouts shall encourage and facilitate multi-modal trips, and soft transport networks. Development proposals should aim to improve interconnectivity and links between different areas and the town core in particular. Therefore, residential layouts will promote pedestrian permeability and create safe, attractive and overlooked pedestrian linkages.

The integration of planning and transport as proposed under this LAP will remove unnecessary barriers to movement. Many activities of daily living will occur within walking distance, allowing independence to those who do not drive, especially the elderly and the young. Interconnected networks of streets will encourage walking, reduce the number and length of automobile trips, and promote energy conservation.

The integration of uses promotes links between areas, in order to support neighbourhood, village and district centre facilities in the study area by:

- encouraging layout design that promotes walking, cycling and the use of public transport, and
- promoting linkage to basic local facilities (schools, shops, crèches, workplace, public transport stations/ stops)

Key Issues

The following are some of the key issues relating to movement, mobility, and built form. This Strategy does not attempt to provide a blue print for urban design in the Study Area, but highlights principles and objectives that developments should adhere to. The following recommendations should be incorporated into any large development (commercial and residential) scheme or masterplan occurring in the study area.

- Developments should adhere to neighbourhood development principles and seek to promote mixed-use development, and the provision of daily/ weekly activities within convenient walking distance;
- The layout of all schemes should provide for short, legible and direct journeys and encourage pedestrian trips to local facilities as the preferred option.
- Streets should be laid out in a network, so that there are alternate routes to most destinations. This permits neighbourhood level streets to be smaller with slower traffic as well as having parking, trees, footpaths and buildings with potential shared surfaces for both vehicles and pedestrians.
- 'Gated developments' shall be discouraged within the subject lands. The design of new developments should ensure that schemes are overlooked, secure and well connected, with pedestrian and cycle routes to and from the town centre and areas of employment. The public character of the residential streets shall be retained;
- Buildings should be laid out so as to create continuous frontages and maximise activity at ground level, creating and maintaining an inviting pedestrian environment.
- A clear distinction shall be maintained between private spaces, streets and public spaces, avoiding the creation of dead areas of land which no one uses or cares for and creating a hierarchy of spaces that promotes identity and legibility of the urban area.
- Open space should be provided in the form of specialised squares, playgrounds, and parks.
- Where possible, civic buildings (schools, meeting halls, theatres, churches, clubs, museums, etc.) should be placed on squares or at the termination of street vistas. These buildings serve as landmarks, enhancing legibility and identity.
- Buildings and places should be capable of being used for a range of activities at different times of the day. The buildings should be diverse in function but compatible in size and in disposition on their plots. The occupation of ground floors by uses that relate directly to pedestrians in town and neighbourhood centres will be encouraged.
- Consideration should be given to ways of improving permeability through existing cul-de-sacs for pedestrians, cyclists and public transport.

4. LOCAL AREA PLAN OBJECTIVES

The Longford Northern Environs LAP will establish a vision for the orderly expansion of the town. It will provide a framework for the rational and coherent expansion of the town, striking a balance between providing amenities for residents and addressing the future commercial and residential needs of the area. The objectives of the Longford Northern Environs LAP are:

LAP 1	To ensure that the area is developed in accordance with the principles of Sustainable Development.
LAP 2	To support the appropriate growth and development of Longford Town, in line with its role identified in the Midland Regional Planning Guidelines 2004 as a principal town in the polycentric model for the region.
LAP 3	To promote the appropriate development of this strategic land bank to benefit the town, addressing population growth, commercial expansion, employment generating uses and amenity/leisure facilities.
LAP 4	To ensure a coherent approach across Local Authority administrative boundaries in the LAP area.
LAP 5	To support and facilitate appropriate retail development in the LAP area.
LAP 6	To facilitate direct vehicular linkages and interconnections within the LAP area, both east and west and south into the town centre via a new bridge (or bridges) over the Camlin River.
LAP 7	To provide for a legible and permeable road network for the area, that will make connections possible across the LAP area having regard to the need to protect the national road network.
LAP 8	To ensure that the proposed network of streets will allow for pedestrian permeability and the design of the streets will encourage walking/cycling.
LAP 9	To promote, expand, develop and enhance amenity space (Mall /Camlin River), and sports facilities.
LAP 10	To promote a high standard of architectural design, and quality of materials utilised throughout the LAP area, that is appropriate in scale, and form to its location.
LAP 11	To encourage the location of employment generating developments in the area.
LAP 12	To support mixed-use commercial development, on appropriate zoned land, that facilitates the overall increase in commercial floor area of the town.
LAP 13	To ensure that community and social infrastructure facilities are adequately addressed in the delivery of new development in the LAP area.
LAP 14	To protect and enhance the architectural and archaeological heritage in the LAP area, particularly in the vicinity of Battery Road/Church Street.
LAP 15	Require that adequate provision shall be made to enable people with disabilities to safely and independently access and use buildings. This policy shall also apply to any works that effect or involve public open space, including footpaths, in order to ensure accessibility of the built environment and promote social inclusion
LAP 16	To ensure the development of the area subject to compliance with technical, legislative, environmental and design standards.

4.1 MOVEMENT FRAMEWORK

To be read in conjunction with Maps 1 and 2

Movement in the LAP area is perhaps the most important issue for how the lands are to be developed in the future. Establishing a robust framework at the LAP stage will help to improve the choices people have in terms of mode of transport, and accessibility.

The movement framework (which is reflected in the road proposals in the LAP map) supports the LAP's objective to provide a legible and permeable road network for the area that will make connections possible across the LAP area having regard to the need to protect the national road network.

The main aim of the movement framework is to reduce the need for vehicular movement across the LAP area and to create strong linkages between the town centre area and the LAP lands.

The LAP envisages strategic vehicular connections in tandem with the implementation of the walkway/cycleway objective contained within the Longford Town Development Plan 2004-2010 and further expanded on for the purposes of this plan:

- Enhanced walking and cycleway network with additional routes through the Mall area and across the eastern portion of the LAP lands.

- Identified capacity improvements (see Section 6.1.2) to be funded by development contributions.

- Council provided access linking Longford town centre to the LAP area across Camlin River at Great Water Street, to include a spine road parallel to the Mall amenity area. This would involve the installation of a new bridge into the town centre (the Mall to Great Water Street). It is proposed to fund this link through the application of levies on relevant development in the area.

- Potential developer-led interconnectors across the LAP area providing access to and within the site, bridging the Camlin River and facilitating east-west vehicular movements as alternatives to the use of the existing N4/N5.

The phasing of this framework is outlined at **Section 6.1**

4.1.1 PEDESTRIAN[4] AND CYCLE LINKAGES

To be read in conjunction with Maps 1 and 2

The LAP supports walking and cycling as sustainable modes of transport through promoting a range of compatible land uses in the area and promoting permeability in design and the development of safe environments for pedestrians.

Design proposals in the area should focus on providing interaction at street level, with a distinct pedestrian scale throughout proposed developments.

Provision of enhanced pedestrian connections will integrate the new urban quarter with the existing Longford Town Core. The connections will also ensure better access to existing and potential public transport nodes.

Under Local Area Plan Objectives LAP 8 the following strategic objective is set out in relation to pedestrian and cycle facilities:

LAP 6 To ensure that the proposed network of streets will allow for pedestrian permeability and the design of the streets will encourage walking/cycling.

This strategic objective is further supported by the following specific policy statements:

PE 1. Ensure that all development proposals provide for a street network that promotes direct linkage, particularly to the town core and outlying employment areas, and encourages the use of sustainable transport alternatives to the private car;

PE 2. Provide a pedestrian/cycle avenue as part of any future plans for the Mall amenity area;

PE 3. Promote the implementation of layouts that maximise passive security of public spaces and pedestrian corridors within new residential developments;

PE 4. Provide clear, legible, attractive and safe pedestrian linkages throughout the LAP area in accordance with the walkway/cycle network as indicated in Map 2

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4 Please note that where the term "pedestrian" is used, this is taken to include all pavement users, such as wheelchair users, prams and buggies and the elderly. In this regard, footpaths and open spaces should be designed accordingly and with reference to the publication, "Buildings for Everyone" or subsequent update

4.1.2 ROAD LINKAGES

To be read in conjunction with Maps 1 and 2

The proposed road network shown is based on existing and permitted routes in the area, their capacity and their potential to be expanded to cater for additional traffic as part of the future development of the area.

Under Local Area Plan Objectives LAP 6 and LAP 7 the following strategic objectives regarding roads are set out:

LAP 7 **To facilitate direct vehicular linkages and interconnections within the LAP area, both east and west and south into the town centre via a new bridge (or bridges) over the Camlin River.**

LAP 8 **To provide for a legible and permeable road network for the area, that will make connections possible across the LAP area having regard to the need to protect the national road network.**

These strategic objectives are further supported by the following specific policy statements concerning the provision of the new road linkages:

RO 1. Require the upgrading of the permitted pedestrian bridge to a vehicular bridge linking the new development areas east and west of the Camlin River

RO 2. Support the delivery of strategic road linkages across the area by extending and upgrading existing and potential routes.

RO 3. Ensure that a permeable network of secondary roads will be developed within the LAP lands connected to the primary road network for the area*;

RO 4. Have regard to National Policy concerning preservation of N4 traffic for regional / national traffic;

RO 5. Facilitate the delivery of north-south, and east-west road connections in the LAP area, that improve connections and linkages between the town core and east and west of the LAP area.

RO 6. Develop the Southern Spine Road linking Longford town centre with the LAP area, from junction of Great Water Street and St. Mels Road, via a new bridge over the River Camlin to the Mall, and then following the direction of the Mall, eastwards to the location of the permitted pedestrian bridge over the Camlin to the east.

RO 7. All developments within the LAP lands will benefit from the provision of the Strategic Road Infrastructure described at **RO6** above, and will be levied in accordance with a special contribution scheme.

RO 8. Undertake required road capacity junction improvements on the N4/N5

** The exact road line and access and egress points within this area will be designed in tandem with the Roads Department of Longford County and Town Councils*

4.2 Retail Policy

The 2007 retail policy update contained in both development plans identifies the LAP lands as an 'edge of town' location where convenience and retail park/retail warehousing will be considered in tandem with suitable town core development.

This LAP presents an opportunity to simplify the existing zoning objectives along this urban edge, and designate lands for '*employment/mixed-use'* zoning. The principle behind this zone is to accommodate development not readily accommodated within the town core, including larger building floor plates and light industries.

Applications for significant retail development will only be considered in lands designated *'employment/mixed-use'* at **Section 5.2.** The policies and objectives contained in this LAP further clarify that significant retail development will ***only*** be considered where linked to the improvement of comparison retail offer contained in the town centre.

In assessing the application for retail developments in this area, the Council will continue to have regard for the Longford County Retail Strategy, and the Retail Planning Guidelines 2005.

Under Local Area Plan Objectives LAP 5 the following strategic objectives is detailed in relation to retail development:

LAP 5 To support and facilitate appropriate retail development in the LAP area

This strategic objective is further supported by the following specific policy statements:

RP 1. Ensure that retail development on the subject lands is in compliance with Development Plan Retail Policy;

RP 2. Significant retail proposals shall be subject to sequential test as detailed in the retail strategy and transport assessment where appropriate;

RP 3. Ensure that any substantial retail development within the subject lands provides improved access, circulation and car parking, integration and linkages with the town centre and adjoining uses; ensuring the continued vitality and vibrancy of the central area into the future.

RP 4. Support location of the small scale, corner shops within the lands zoned residential.

4.3 Residential Policy

The lands within the core area of this Local Area Plan are considered to be the major serviced land bank for immediate residential development in Longford. One of the core aims of this local area plan is develop these lands in a manner that recognises the interrelationships between internal and external land uses. The establishment of a vibrant urban quarter in this area will promote dynamic links with the town centre through appropriate land use provisions, innovative design measures, and efficient, secure and attractive access provision.

Under Local Area Plan Objectives LAP 2, 3 and 8 the following strategic objectives regarding the development of residential lands are set out:

LAP 2. To support the appropriate growth and development of Longford Town, in line with its role identified in the Midland Regional Planning Guidelines 2004 as a principal town in the polycentric model for the region.

LAP 3. To promote the appropriate development of this strategic land bank to benefit the town, addressing population growth, commercial expansion, employment generating uses and amenity/leisure facilities.

LAP 8.To ensure that the proposed network of streets will allow for pedestrian permeability and the design of the streets will encourage walking/cycling.

These strategic objectives are further supported by the following specific policy statements:

RES 1. Promote residential development in accordance with the principles of sustainability, that create strong physical, social and economic relationships with adjacent land uses in the LAP area and with Longford town centre;

RES 2. Facilitate the development of the road network for the area as identified on **Map 1**, in tandem with new development proposals on appropriately zoned lands;

RES 3. Require developers to contribute to or provide the full costs of piped services, public lighting and other infrastructure which facilitate all new residential developments, including roads, footpaths, piped services and other facilities, whether within or outside the site.

RES 4. Proposals for residential development shall provide for high quality Layout design and material finish, with reference to the Built Form principles outlined at **Section 3.4.3** and including the provision of decorative street furniture and lighting, appropriate pavement treatments and lighting.

RES 5. Future residential development proposals shall enhance, maintain or create strong physical and ecological connections with existing amenity areas through provision of walking and cycling routes;

RES 6. All residential development proposals shall comply with relevant policy in the respective development plans with regard to development standards, including heritage and landscape protection and enhancement, provision of public and private open space and compliance with Part V of the Planning Development Act, 2000 (as amended)

4.4 Employment

The LAP presents an opportunity to designate lands for employment generating use and to facilitate development not readily accommodated within the town core.

The areas zoned for 'mixed-use' on the LAP map, have been identified as being fundamental in the creation of an area with strong internal interrelationships, promoting sustainable land-use and mobility patterns and good connections with the town centre.

Under Local Area Plan Objectives LAP 2, 3 and 11 the following strategic objectives regarding commercial development and employment generating uses are set out:

LAP 2. To support the appropriate growth and development of Longford Town, in line with its role identified in the Midland Regional Planning Guidelines 2004 as a principal town in the polycentric model for the region.

LAP 3. To promote the appropriate development of this strategic land bank to benefit the town, addressing population growth, commercial expansion, employment generating uses and amenity/leisure facilities.

LAP 11.To encourage the location of employment generating developments in the area.

These strategic objectives are further supported by the following specific policy statements:

It is the policy of the Council to:

EM 1. Promote a sustainable mix of development types, reflecting a variety of land uses appropriate to the area, including light industrial, technological, commercial, office based employment and warehousing related activities;

EM 2. Require developers to contribute to or pay the full cost of all infrastructure, which facilitates development, including roads, piped services, footpaths and other utilities;

EM 3. Facilitate the continuity and expansion of enterprises while sustaining and enhancing the attractiveness of the town and protecting the amenity of neighbouring areas.

EM 4. Ensure that all sites are designed to the highest architectural standards that demonstrate a commitment to waste management, energy conservation and maintain the quality of the surrounding environment.

EM 5. Support delivery of a permeable layout within commercial/mixed-use developments, facilitating pedestrian mobility and live-work interaction across the area in accordance with principles outlined in this LAP;

EM 6. Require that adequate access, parking and manoeuvring/circulation areas are provided, in tandem with pedestrian links to public transport facilities. These requirements shall be to the relevant County and Town Development Plan Standards, where appropriate, and to the satisfaction of the Council;

4.5 Open Space/Recreational Policy

The Mall and the Camlin River are important physical, social and economic assets to the town, as evident in their consistent and intensive use, particularly for recreation and leisure. The existing Mall sports complex, now including a swimming pool, is an important resource for both local sporting organisations and individuals.

Successive Town Development Plans have included robust provision to protect the amenity of these lands, which shall be reinforced as part of this Local Area Plan. The forging of stronger links between the Mall area, outlying employment and residential areas, both existing and proposed, will be promoted as part of this plan, as well as creating closer associations with the town centre.

It is also vital that potential residential developments deliver high quality, usable public space in accordance with the Development Control Standards set out at Section 4 of the Town Development Plan. The space provided should, where possible, link into adjoining spaces where possible, such as the existing mall area, providing a linked amenity network and wildlife corridor to protect and enhance biodiversity.

Under Local Area Plan Objective LAP 9 the following strategic objective regarding Open Space/Recreational Amenity is set out:

LAP 9. To promote, expand, develop and enhance amenity space (Mall /Camlin River), and sports facilities.

These strategic objectives are further supported by the following specific policy statements:

It is the policy of the Council to:

OS 1. Provide clear and legible connections to the Mall/Camlin River amenity area from the town centre and Northern Environs area;

OS 2. Require that development proposals within the LAP area, where possible, positively contribute to the Mall/Camlin River amenity zone, in terms of landscape, leisure and recreational facilities and biodiversity.

OS 3. Enhance active recreation space within the Mall amenity zone

OS 4. Ensure that flood risk is taken into account at all stages during the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas of highest risk.

OS 5. Require that high quality public open space is delivered in new residential development in accordance with the Development Control Standards set out at the Town and County Development Plans.

4.6 Education and Community Facilities Policy

This LAP provides for the proper planning and development of an extensive area of land on the edge of Longford Town Centre. As highlighted under the Social Infrastructure Analysis above, it is essential that the introduction of the significant new populations requires the consideration of appropriate community and education facilities.

The majority of the residential lands are well serviced, given their location between the town centre, and new mixed use developments along the N4 edge of the LAP area. Amenity and recreation uses are also comprehensively addressed in the Camlin River/Mall area. It is also important to ensure that the future population of the area is well provided for in terms of education facilities. In this regard, it is considered prudent to include an objective designating a site as an appropriate potential location for a new primary school in the medium to long-term.

Under Local Area Plan Objectives LAP 3 the following strategic objective regarding education is set out.

LAP 1 To promote the appropriate development of this strategic land bank to benefit the town, addressing population growth, commercial expansion, employment generating uses and amenity/leisure facilities.

This strategic objective is further supported by the following specific policy statement:

It is the policy of the Council to:

ED1 Facilitate and promote the expansion and improvement of existing educational facilities and/or the establishment of new facilities as appropriate, as indicated on **Map 1** and in accordance with the standards defined by the Department of Education and Science.

ED3 Co-operate with and assist statutory and voluntary bodies in the provision of new educational and community facilities

4.7 Built Heritage Policy

The LAP identifies the Battery Road an important approach to the town centre, with mature trees and distinctive architecture, the vista on the approach terminates in Church Street, a row of terraced buildings that represent the historic core of Longford. The oldest remaining structure in the town is opposite this terrace, the former Longford Castle, which now forms part of the wall of the Military Barracks.

The built heritage of the area is a considerable asset to Longford Town, and, as such, this LAP promotes the preservation of the historic fabric and its setting through the following measures.

Under Local Area Plan Objectives LAP 14 the following strategic objective regarding the built heritage is set out:

LAP 14 To protect and enhance the architectural and archaeological heritage in the LAP area, particularly in the vicinity of Battery Road/Church Street.

This strategic objective is further supported by the following specific policy statement:

It is the policy of the Council to:

BH1 Protect and conserve the approach to the town along Battery Road as a valuable architectural and cultural asset to the town, and resist the subdivision of plots along this approach that would detract from character of this area;

BH2 Consider the potential of Church Street for the development of a public plaza, partially enclosed by the existing historical terrace.

BH3 Prohibit any development, alterations or modifications to buildings and features identified as important as part of this LAP, that would detract from or destroy the character of the area.

BH4 Refer all planning applications for development potentially affecting any protected or proposed protected structure and/or its setting to the Department of the Environment, Heritage and Local Government and the Architectural Advisory Unit for comment. Where proposed development would have an unacceptable negative impact on such a structure/feature/its setting, such development will be subject to specific mitigating measures or shall be refused, as considered appropriate on the advice of the DoEHLG.

BH 5 Proposed works, including repairs and extensions, to historic buildings should be carried out in accordance with advice from and under the supervision of a suitably qualified conservation professional.

5. Zoning and Road Layout

To be read in conjunction with Maps 1 and 2

The following sets out a description of the Zoning Objectives illustrated in the LAP Map.

5.1 Residential

To provide primarily for residential development in association with the delivery of necessary strategic road infrastructure; to preserve and improve residential amenity, dwellings and normal ancillary uses including social and community facilities, open spaces and local shopping facilities but not extensive shopping, workshops or industry.

- It is intended to achieve the residential distributor roads through the development management process, as conditions on any future planning permissions. The exact road line and access and egress points within this area will be designed in tandem with the Planning and Roads Departments of Longford County Council.

- Development Plan standards require that all new developments provide a minimum of 15% of the total development site area as public open space. The developers may provide financial contribution in lieu of provision to the Local Authority in certain cases where this can secure the provision of networked open spaces or the assembly, upgrade and enhancement of larger portions of recreational land that will serve the development.

5.2 Employment/mixed-use

To primarily provide for employment generating uses (office/ light industrial /commercial/retail associated with town centre development) and residential where appropriate, in association with the delivery of necessary strategic road infrastructure.

- In accordance with the Longford County Retail Strategy, convenience retail will only be considered at strategic sites under this zoning, where it can be clearly demonstrated that a substantial and appropriate redevelopment of the town core area can occur, that provides significant tangible benefits for the town including improved access circulation and car parking thus ensuring the continued vitality and vibrancy of the central area into the future.

- It is intended to achieve the parallel distributor road and other internal linkages indicated on **Map 1** through the development management process, as conditions on any future planning permissions. The exact road line and access and egress points within this area will be designed in tandem with the Roads Department of Longford County Council.

5.3 Urban Regeneration area

To primarily provide for mixed use development appropriate to high amenity town centre location with an emphasis on the provision of public spaces, civic offices and uses that provide pedestrian interaction at street level.

- Institutional, social/community and civic facilities will be prioritised where of a nature and scale appropriate to the location. Development under this zoning, including commercial development, will also be considered in the context of any master plan setting out an urban regeneration framework for the area directly to the south of this zoning.

- The provision of the Southern Spine Road (see **Map 1**) must be considered as part of any proposed development under this zoning objective. Developments will be levied in accordance with a special contribution scheme for the provision of this road.

5.4 Primarily Industrial/Commercial

To primarily provide for industrial and commercial/office development.

- The intention is to provide high quality industrial areas at these locations. Lower order commercial/repair activities shall not be considered under this zoning (i.e. puncture repair, tyres etc). It is intended to achieve the internal distributor road network indicated on **Map 1** through the development management process, as conditions on any future planning permissions. The exact road line and access and egress points within this area will be designed in tandem with the Roads Department of Longford County Council.

5.5 Primarily Residential/Commercial

To primarily provide for residential development and/or commercial/retail development, in association with the delivery of necessary strategic road infrastructure.

- The redevelopment of derelict buildings and brownfield sites will be prioritised as part of this zoning objective. Proposed developments shall recognise the riverside location in terms of the protection and enhancement of visual, recreational and environmental amenity

5.6 Churches Burial grounds

To facilitate Churches and burial grounds, and structures ancillary to Churches and burial grounds.

- This zoning shall also provide for the protection of this category of important historical structures and their settings (see **Map 3**)

5.7 Primarily Public utilities and hospitals

To primarily allow for the expansion and development of public utilities and hospitals.

- This zoning objective in the LAP area includes the Fire Station and its attendant Grounds which shall be protected from inappropriate development

5.8 Social Community

To primarily provide for social and community facilities

- This zoning objective includes the provision of educational facilities as part of proposed LAP development. Potential school sites are indicated on **Map 1** and are incorporated as part of this zoning.

5.9 Primarily Recreational / Open space

To primarily provide for and/or enhance recreational open space, sporting facilities and ancillary structures.

- This zoning provides for the expansion of the Mall Park, sporting facilities and the development of a wildlife corridor along the Camlin River to preserve and enhance biodiversity. Existing sports grounds are also covered by this zoning.

- It is anticipated that these open spaces will be provided throughout the LAP area. The proposed extension of the Mall will allow for the accommodation of the required amenities that will cater for a larger population such as playing pitches or neighbourhood equipped play areas.

- These new areas may be expected to include features such as new planting, extension to walkways or facilities for active recreation such as playing pitches and cycle tracks. The extended semi-natural open space along River Camlin will reinforce the existing biodiversity enhancing wildlife corridor and function as flood attenuation feature for the LAP area.

6. Implementation

To be read in conjunction with Maps 1 and 2

By virtue of various land ownerships, and existing planning permissions, development will occur in different areas of the LAP at different rates. When considering the future phasing of the LAP lands, the goal must be to ensure that key infrastructure, and amenities are provided at the appropriate juncture, and in a timely manner.

The two types of Roads infrastructure shall be provided in the following manner:

- The Southern Spine Road, which facilitates traffic movements between the Ballinalee road and the Town Centre which will be provided by the Local Authorities, funded by a special contribution scheme which will be levied on development in the LAP area.

- Capacity improvements on the N4 Roundabouts shall be provided. Development requiring access to the N5 Ballinalee Road shall install a Roundabout with appropriate provision for pedestrians and cyclists.

- The Parallel distributor road to the north of the area which shall be provided by developers, at their own expense, along with the other internal links, as the area is developed. This is detailed further below.

Walkways and cycle routes shall be provided in tandem with development as part of the individual planning applications.

6.1 Phasing

The development of the lands contained within this Local Area Plan shall be subject to the availability of appropriate infrastructure to serve the proposal. Much of the water services and utility infrastructure is available on the site and shall be fully addressed as part of any development proposal.

The movement framework has been emphasised throughout the LAP as integral to the sustainable development of the area. The following sections deal with the phasing of movement infrastructure throughout the area s indicated in **Map 1.**

6.1.1 VEHICULAR CIRCULATION

- The indicative line of the Southern Spine Road on **Map 1,** is to be provided by the Local Authority through the application of a Special Contribution Scheme (under the provisions of Section 48 of the Planning an Development Act, 2000) that will apply levies to all development throughout the Plan area. The achievement of this strategic link shall be actively pursued by the Local Authority, and shall be progressed and appropriately prioritised to achieve the required linkage with the town centre at the earliest possible time.

- Junction capacity improvements on the N4 shall be implemented as required and as illustrated on Drawing Nos; D4650.20:TSK002 and D4650.20:TSK300 contained in the supporting technical document at Appendix 2[5].

- Roads indicated "developer provided" shall be installed to Road Design Standards at the developer's expense as part of any proposed development on the relevant landholding. These include the Parallel Distributor Road, which will facilitate internal circulation within the LAP lands as they develop in accordance with the zoning provisions outlined in **Section 5**. The roundabout on the Battery Road and approximately 25% of the Parallel Distributor Road between the Battery Road and the Camlin River has already been constructed to the appropriate standards.

- A transport study of the LAP area was compiled to ensure that the development of the LAP area did not negatively impinge on the N4 national route. This study compiled by ARUP Consulting Engineers, indicates that traffic along the existing N4 bypass shall not be affected by the expected quantum of development in this area by 2013, subject to the implementation of a number of mitigation measures. This quantum of development is contained at Table 16 of the supporting transport study (contained in Appendix 2). The report indicates that it is only once this quantum of development is reached (expected 2013) that additional capacity is required, including the need for a complete Parallel Distributor Road.

- However, in order to fully protect the capacity of the national route and ensure the delivery of the Parallel Distributor Road, it is a pre-requisite of development in this area that the road is provided. This ensures that the quantum of development, that would affect the capacity of the national route, cannot occur prior to the provision of the Parallel Distributor Road, which is proposed to facilitate circulation within the northern section of the LAP lands as they develop.

- Where necessary, it may be required to monitor vehicular flows generated by the development of the LAP lands, to ensure acceptable traffic conditions are maintained along the existing bypass.

- The PDR, as outlined in ***Map 1***, shall be provided by developers at their own expense as each parcel of land is developed. This will be achieved by way of conditions of planning permission, in which the provision of the road shall be prioritised as part of the phasing of the development. Conditions may provide for the completion of a road section within a certain timeframe e.g. within two years and/or prior to the commencement of other aspects of the development.

- The Parallel Distributor Road bridge across the River Camlin shall be provided by way of development contribution under a special scheme to be drawn up covering the local area plan areas that will benefit from its construction.

- The walking and cycling routes indicated on **Map 2** shall be provided as part of any proposed development in the Plan Area. Additional pedestrian/cycle links proposed as part of the LAP are marked in pink, while existing routes proposed

[5] These Drawings are not representative of the exact design and technical detail of the proposed junction capacity improvements and may change in accordance with technical requirements.

as part of the Current Town Development Plan are marked in green and include:

6.1.2 PEDESTRIAN AND CYCLIST INFRASTRUCTURE

- ***The Mall Route Extensions:*** Linking Abbeycarton Road and N5 Ballinalee Road across the Camlin River through the Longford Business Park site.

- ***Battery Road-Ballinalee Road Primary Connector:*** This route runs parallel to the current N4 Bypass to provide the major pedestrian and cycle route through the LAP area. Proposed development in the area will recognize the route as an integral element at the design stage, providing attractive and vibrant, pedestrian scale frontage and passive overlooking to encourage the use of alternative transport modes within the LAP lands.

- ***Pedestrian Crossings:*** Pedestrian crossings are proposed at the existing roundabout south of the Red Cow accessing White Linen Woods and the Axis Centre.

- Pedestrian crossings should be installed as part of any roundabout facilitating access onto the N5 Ballinalee Road.

- These roundabout crossings will take the form of new paving, signage and minor realignment to reduce pedestrian/vehicular conflict at the roundabouts.

- It is also proposed to extend the planned Camlin River Walk under the current bypass to add a pedestrian/cycle crossing point.

- Pedestrian movements across the N4 bypass will, however, continue to be minimal throughout the term of this LAP as no additional major developments are planned immediately north of the bypass other than the Abbot Site expansion.

- ***Post-N4 Bypass Upgrade Strategy:*** Should the N4 Bypass be brought offline in the future and the current carriageway downgraded, a more complex suite of cycle and pedestrian links could be pursued in conjunction with a reduction in traffic speed and general modifications to the road cross-section to match its new district distributor role.

MAP 1
ZONING AND ROAD LAYOUT
Scale - 1 : 6,500

N4 NATIONAL ROAD

Parallel Distributor Road

Junction Improvements Required

ABBEYCARTON LANE

LISBRACK ROAD

BATTERY ROAD

Southern Spine Road

THE MALL

TEMPLEMICHAEL GLEBE

COLLEGE ROAD

CHURCH STREET

BRIDGE STREET

GREAT WATER STREET

BALLINALEE ROAD

LISNAMUCK

ARDNACASSAGH

N

W E

S

LEGEND

- Employment/Mixed Use
- Residential
- Open Space/Recreational
- Industrial Commercial
- Social/Community
- Public Utility/Hospital
- Residential/Commercial
- Churches/Burial grounds
- Urban Regeneration
- Roads - Developer provided
- Southern Spine Road - Council Levy

MAP 2
Proposed Walking/Cycle Routes
Scale - 1 : 6,500

Longford Town Development Plan, 2004-2010

Additional routes
Draft Northern Environs LAP

N
W E
S

LISNAMUCK

TEMPLEMICHAEL
GLEBE

LONGFORD

APPENDIX 1 - PROTECTED STRUCTURES

The Longford Town Development Plan 2004 identifies the following protected areas/ elements of the natural and cultural heritage:

(1) Ringfort with earthen bank and ditch; partly destroyed (SMR LF013-013) at Aghadegnan
(2) Ringfort; partly destroyed (SMR LF013-012) at Aghadegnan
(3) Detached three-bay single-storey double-fronted villa, c. 1850 with two –storey gabled breakfront and later two-storey extension; detached farm outbuildings at Cartron Abbey, Battery Road
(4) Detached three-bay single-storey over half basement villa, c.1845 with projecting porch approached by flight of steps at Battery Road
(9) Jacobean Revival three-bay two storey Masonic Hall, built 1890 with brick façade having a profusion of moulded brick and terracotta detail including pilasters, hood mouldings, decorative panels eaves course and shaped false gable; cast-iron railings and gate to roadside single-storey extension to rear; at Masonic Lodge, Battery Road.
(10) Detached five-bay arts and crafts schoolhouse, built 1886, combining single-storey classrooms and two-storey teachers residence; single storey lean-to extension to front; at Old National School, Battery Road.
(13) Free standing church, built 1710; altered , c. 1785 and 1812; having three-bay façade with stone dressings, classical doorcase flanked by round-headed niches and tree stage tower with needle spire; apsidal sanctuary and northern transcept added c.1812, at St. John's Church, Church Street, Longford.
(14) Terraced three-bay three-storey double-fronted house, c.1835 having a block and start stone doorcase with segmental fanlight; at Church Street
(16) Terraced five-bay two-storey Italianate-style church hall, c. 1865 with rusticated and coursed ashlar limestone facings, round-headed openings with moulded dressings and plain modillion eaves cornice, at Church Street.
(24) Graveyard to St. Johns Church, c.1710; at Church Street
(25) Monumental headstone, c.1880 commemorating Private Joseph Ward, V.C.; at St. Johns Church, Church Street, Longford.

National Monuments

Church Street/town centre area:

SMR LF013-2601 – Priory
SMR LF013-2602 – Church and graveyard
SMR LF013-026 - Friary
SMR LF013-061 – Friary
SMR LF013-062 – Castle

Lands north of Longford Vocational School, Ballinalee Road

SMR LF013-017 – Castle
SMR LF013 – 016 - Church

Legend

- Protected Structures
- National Monuments

Local Amenity Areas

- Castle Street Corridor
- River Camlin Corridor

N4 NATIONAL ROAD
LISBRACK ROAD
ABBEYCARTON LANE
BATTERY ROAD
THE MALL
COLLEGE ROAD
BALLINALEE ROAD
TEMPLEMICHAEL GLEBE
CHURCH STREET
BRIDGE STREET
GREAT WATER STREET
Battery Road
Church Street
Bridge Street
Great Water Street
Camlin River

1 2 3 4 9 10 13 14 16 24 25
LF013-062
LF013-02601
LF013-061
LF013-02602
LF013-026
LF013-016
LF013-017

Client: Longford Local Authorities

Project: *Longford Northern Environs LAP*

Title: **Protected Structures and Amenity Areas**

Figure: **A**

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Date:	28/11/2007	Rev.	D05

Notes
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APPENDIX 2 – STRATEGIC TRANSPORT STUDY

Arup Consulting Engineers

Longford County Council

Longford Northern Environs LAP

Strategic Transport Impact Assessment

Arup Consulting Engineers

Longford County Council

Longford Northern Environs LAP

Strategic Transport Impact Assessment

Final

2008

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Contents

Appendices

Executive Summary

This report presents an assessment of the transport impacts of the proposed Draft LAP for the Longford Northern Environs. This LAP relates to lands north of Longford Town overlapping the Longford Town Council (LTC) and Longford County Council's (LCC) administrative areas, and is a joint venture between Longford Town and County Councils.

The assessment is based on work previously undertaken for Longford Town Council, the Longford County Council and the National Roads Authority. It builds upon the assessment tool developed for the Longford Traffic and Transportation Study (LTTS) 2003, the N5 Bypass Study 2005 and the N4 Longford Bypass Upgrade Feasibility Study (N4 LBU FS) 2007. By adopting the same platform, a consistent view of the critical transport issues is made.

The transport assessment looks at the impact of the planned development within the LAP lands and its immediate environs for the assumed development year of 2013, prior to the opening to the anticipated Longford Bypass Upgrade. This stage represents the critical stage prior to a major increase in road traffic capacity in the area, resulting from the diversion of through traffic away from the existing Longford N4 Bypass.

The level of development assessed include not only the LAP lands but also undeveloped zoned lands from the Longford Town Council Development Plan 2004- 2010 and the Longford County Council Development Plan 2003-2009, as well as sites earmarked for development North of the N4 Bypass.

It should be noted however that the full development of the LAP would likely extend beyond the life of this LAP. The assessment therefore looked at two alternative scenarios, an accelerated or "worst" case scenario with full development by 2013, and an "expected" or more realistic scenario.

The "expected" case scenario was developed in consultation with LCC and LTC Planning Departments and reflects the likely maximum level of development to be implemented by 2013.

The "worst" case scenario assumes full development of the designated sites is accelerated and completed by 2013. This therefore represents more of a stress test of road network.

The forecast AADTs and design hourly flows were analysed to establish future traffic conditions. The AADTs were compared against the N4 link capacity quantified by the Congestion Reference Flows (CRF). The junction design flows were assessed in ARCADY to quantify delays and flow to capacity ratios.

Under the "expected" scenario, it was established that the links and improved junctions will continue to operate under capacity.

For the "worst" scenario, although the links will continue to operate under capacity, it is anticipated that the junctions will exceed capacity.

It is therefore concluded that:

- The lap implementation as envisaged by LCC will result in traffic levels operating within capacity up to 2013 on the N4.
- The capacity of the N4 junctions will be exceeded sometime thereafter and are likely to be exceeded in the "worst" case scenario.

1 Introduction

This report presents an assessment of the transport impacts of the proposed Draft LAP for the Longford Northern Environs. This is an update of the original Strategic Transport Assessment (STIA) report prepared in 04 February 2008 and the two subsequent Technical notes (20 February and 4 March 2008).

This LAP relates to lands north of Longford Town overlapping the Longford Town Council and Longford County Council's administrative areas, and is a joint venture between Longford Town and County Councils. The area primarily relates to a section of the town bounded by the N4 bypass to the north and east, the Ballinalee Road/Templemichael Terrace/Great Water Street to the south and Bridge Street/Chapel Street/ Battery Road to the West. The area comprises some 166 hectares. The Transport Assessment is set out as follows:

- Transportation context
- The assessment methodology
- The development of the transport assessment model
- Saturn model assignment results
- N4 bypass junction capacity assessment results
- Pedestrian and cycle facilities
- Conclusions

2 Transportation Context

The growth of Longford and other regional centres has increased traffic on the national road network dramatically over the recent years. This is particularly true for the N4 and the N5 which have recorded growth of over 20% overt the last 2 years. The N4 and N5 segments in Longford are therefore subjects of current studies by the National Road Authority. To this end a new N5 and N4 bypasses are anticipated to be introduced by 2009 and 2013.

The LAP land which lies on the northwest area of Longford Town will be bounded in the west by the new N5 Bypass and in the north by the current N4 bypass. As such, both roads would be sensitive to the resulting traffic patterns that the LAP lands would generate. The layout of the LAP Lands is presented in Figure 1.

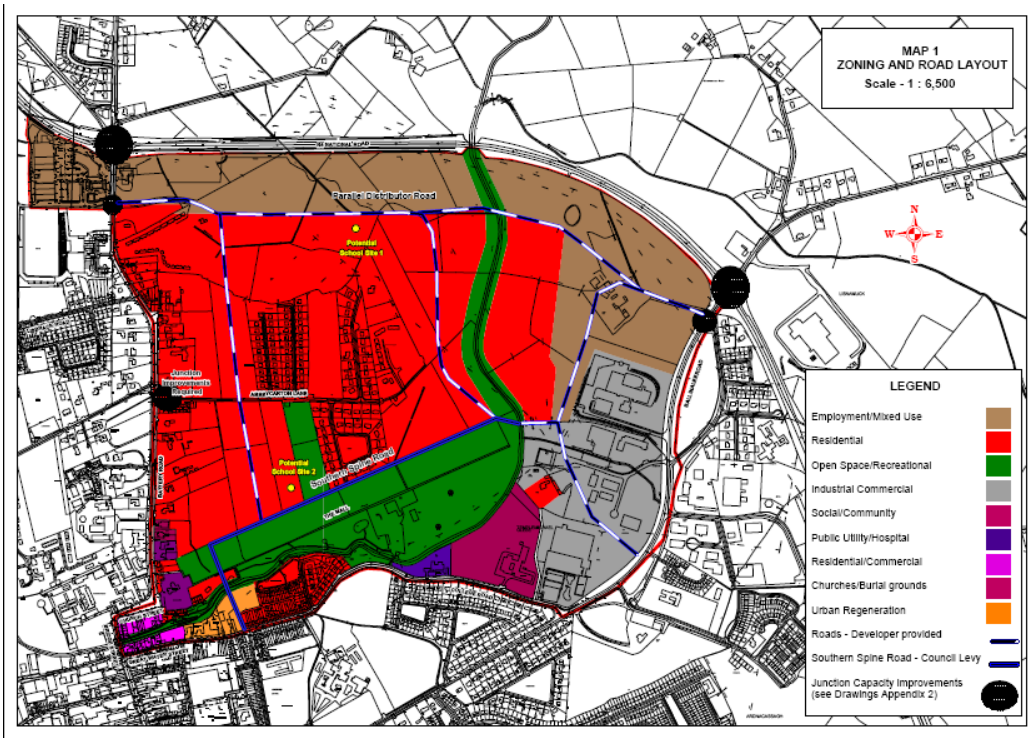


Figure 1: Proposed LAP

Part of the LAP proposal is therefore the provision of an internal link road intended to accommodate local traffic thereby preserving the national road network capacity for strategic traffic.

The transport objectives of the proposed LAP Roads can be summarised as follows;

- To facilitate the efficient transportation of goods and people to and from the LAP lands
- To provide relief to the current N4 bypass until such time as the opening of the new bypass
- To provide relief to existing congested sections in the local road network particularly the town centre
- To facilitate the continued planned development of the Longford Northern environs
- To facilitate improved public transport linkages across the Camlin River and Longford Town by providing an alternative northern circumferential route to the N4.

3 Methodology

3.1 General Methodology

The transport assessment looks at the impact of the planned development within the LAP lands and its immediate environs for the assumed development year of 2013 and horizon year 2023. It should be noted however that the full development of the LAP would likely extend beyond the life of this LAP. This assessment therefore looks at two alternative scenarios, an accelerated or "worst" case scenario with full development by 2013, and an "expected" or more realistic scenario. Nevertheless, it paints a complete picture of the long-term pattern of future development to ensure the sustainable development of the area.

The assessment is based on work previously undertaken for Longford Town Council, the Longford County Council and the NRA. It builds upon the assessment tool developed for the Longford Traffic and Transportation Study (LTTS) 2003, the N5 Bypass Study 2005 and the N4 Longford Bypass Upgrade Feasibility Study (N4 LBU FS) 2007. By adopting the same platform, a consistent view of the critical transport issues is continually addressed.

The transport model used has been developed from an existing 2005 AM, PM and Mid-day peak hour model of Longford developed by Transportation Planning International (TPi). The model has been refined to address the transportation issues that would likely arise from the LAP implementation. These refinements are discussed further in the succeeding sections.

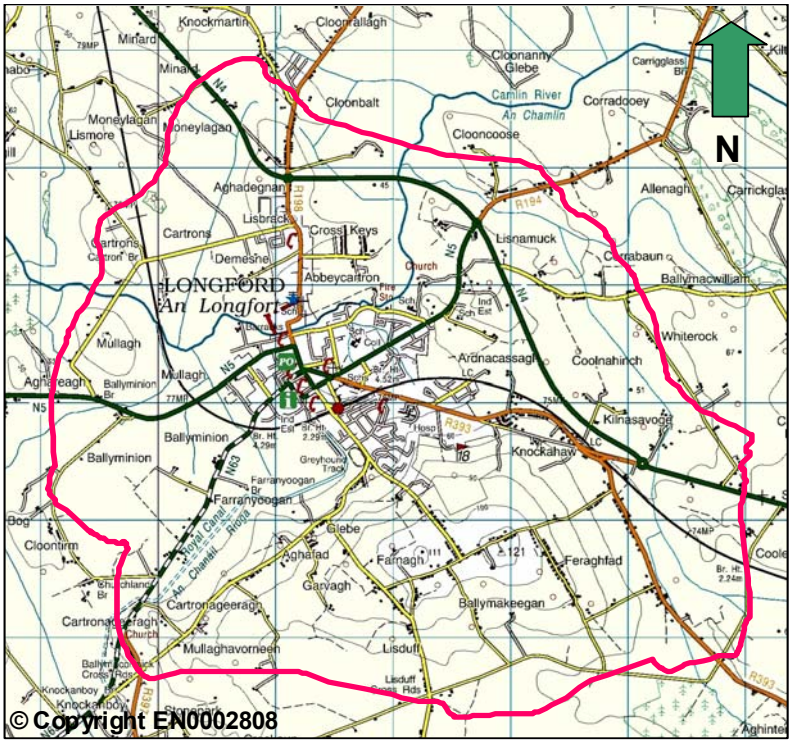
3.2 The Longford N5 Bypass Model

TPi developed the Longford model in 2006 as an update to its original 2003 LTTS model. This model was revalidated to 2005 traffic flows.

Model Road Network

The model coverage is shown in Figure 2. It includes the local and regional national highway within the Longford Town boundary and the immediate county lands.

Figure 2: Model Area



Model Zoning System

The zoning system is configured to represent the traffic generators and attractors in the model area. The study area was divided into 35 zones split between 22 internal (Zones 1-22) and 13 external zones (Zones 23-35). Movements between these 35 zones constitute the SATURN trip matrix.

The representation of the local road network into SATURN links is shown in Figure 3.

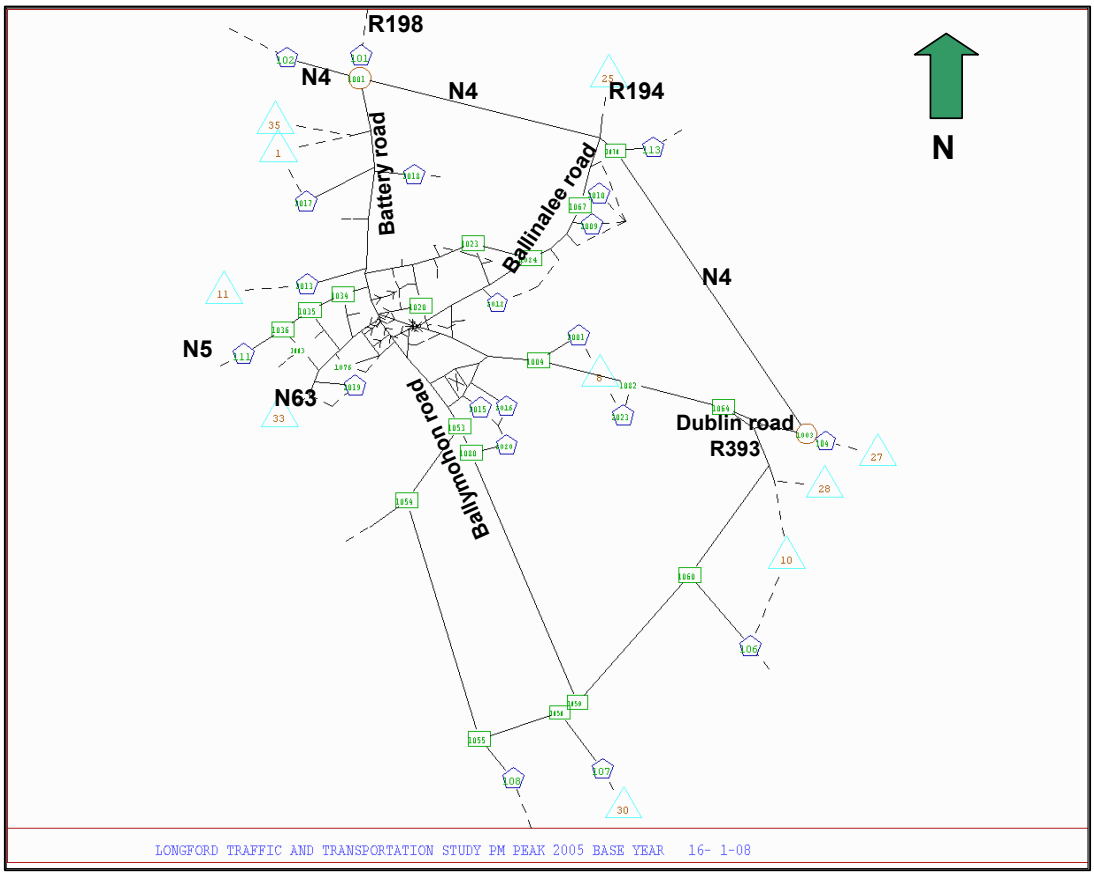


Figure 3: SATURN Local Area Network Model

Model Time Periods

The model simulated three representative average weekday time periods which corresponded to the busiest traffic periods:

- AM Peak hour 08:30 – 09:30;
- Mid-day Peak hour 12:00 – 13:00; and
- PM Peak hour 17:00 – 18:00.

4 Model Development

4.1 Road Network

4.1.1 Network Modification

The 2005 N5 base network was adopted as the base model for the LAP assessment. In order to more accurately reflect the movement of traffic within and around the LAP, a number of network modifications were made.

Zone Disaggregation: The traffic zones representing the LAP lands were subdivided into smaller zones to reflect the variations in land use and access arrangement. The resulting zone equivalence in presented in the Table 1 below and illustrated in Figure 4.

Table 1: Zone Disaggregation

Zone No	
LTTS Model	Revised LAP Model
1	101, 102
2	201, 202, 203, 204
3	301, 301
4	401, 401, 402, 204
21	211, 212

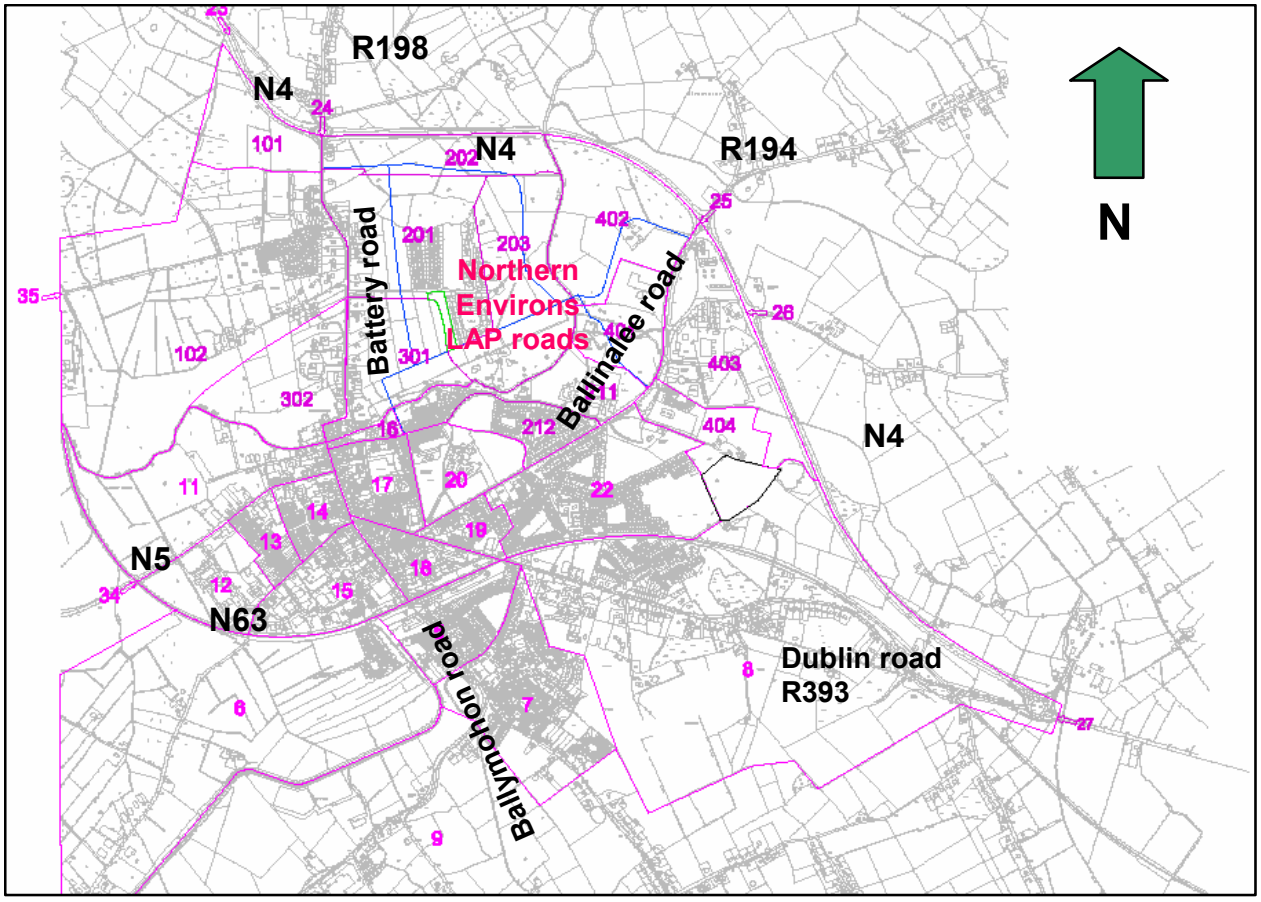


Figure 4: LAP Model Zone Boundaries

Road Links: The network was correspondingly modified to reflect the smaller zones and the preliminary layout of the roads serving the LAP. As detailed road layouts are not available at this stage, the internal LAP junctions were coded as small roundabouts to allow unconstrained traffic movement. This would ensure that LAP traffic is fully assigned onto the local road network. The modified SATURN network is presented in Figure 5.

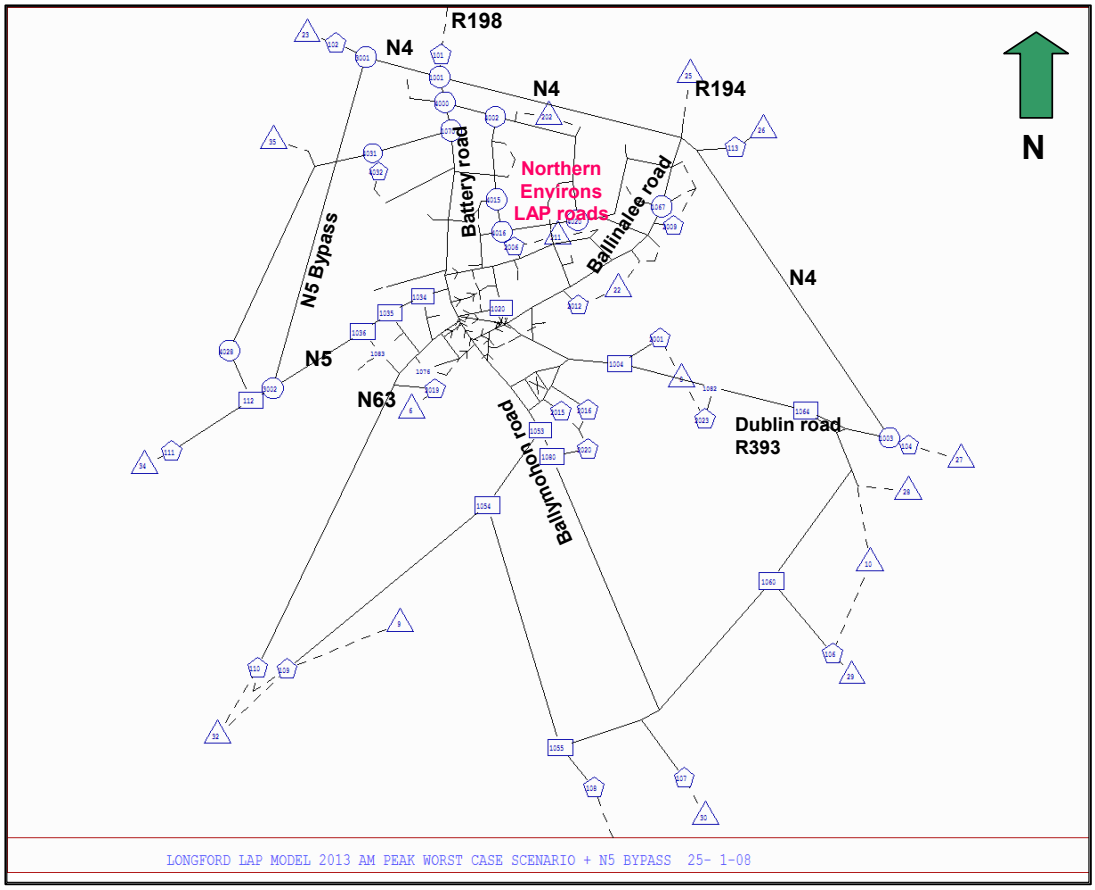


Figure 5: Refined LAP SATURN Network

4.1.2 Model Recalibration

To ensure that the model refinements did not result in any unexpected traffic routing, the assignment results from the refined and the original N5 model were compared. As, no significant discrepancies were noted, the same modifications were incorporated to the post-N5 Bypass Network Model (LTTS and N5 year 2023 road Network). This network was adopted as the 2013 road network before any N4 Bypass upgrade.

4.2 Trip Generation

4.2.1 2013 Matrix Building

The 2005 N5 Model matrices were used as the basis for constructing the 2013 matrices. The two user class (HGV and LGV) configuration was retained. The forecast 2013 traffic levels account of two main elements of growth as follows:

- the “background” growth due to the combination of general economic growth outside the study area and the non-development related growth within Longford (increased car ownership and use); and
- the growth due to development in Longford.

Background traffic growth was assumed to occur for all zones. Development traffic growth was added on top of this. This has resulted in a conservative traffic growth assessment due to potential double counting of local development trips. Furthermore, it should be noted that

the modelling exercise does not include any element of modal change. That is, no adjustment has been made to the forecasts to take account of the effects of policy and management measures (i.e. "mobility management") being introduced to encourage the use of sustainable modes of transport such as public transport, cycling and walking.

4.2.2 Background Traffic Growth

Background traffic growth was based on the National Road Authority Future Traffic Forecasts 2002-2040 (August 2003) technical memorandum. These are reproduced below in Table 2. Internal (i.e., one trip end at least within the model internal zones) and external trips were treated separately when applying 2013 factors to the 2005 matrix. External-External trips were treated as strategic trips and therefore subject to the growth factors anticipated for National Roads. Internal-Internal and Internal-External trips were adjusted using the Non-national Road factors. This simplified the application of growth rates to the matrices.

Table 2: Background Traffic Growth: 2005 -2013

Trip Type/Matrix Element	HGV Factor	Car/LGV Factor
External-External Trips	1.28	1.26
Internal- External & Internal- Internal Trips	1.12	1.13

4.2.3 Development Growth : Worst Case

Traffic growth due to development was based on applying trip rates from TRICS to the estimated floor area to be accommodated by future development sites. The development sites included:

- LAP Land development including retail, residential, employment, community and recreation/open space uses.
- Undeveloped zoned lands from the Longford Town Council Development Plan 2004- 2010 zoning strategy map and the Longford County Council Development Plan 2003-2009, Longford Environs Zoning Map 1 and 2.
- Earmarked development lands North of the N4 Bypass. These are land parcels identified by LCC for which planning has been granted or for which an application is imminent.

The locations of these lands are presented in Figures 6 and 7.

Figure 6: Longford Development Plan Sites

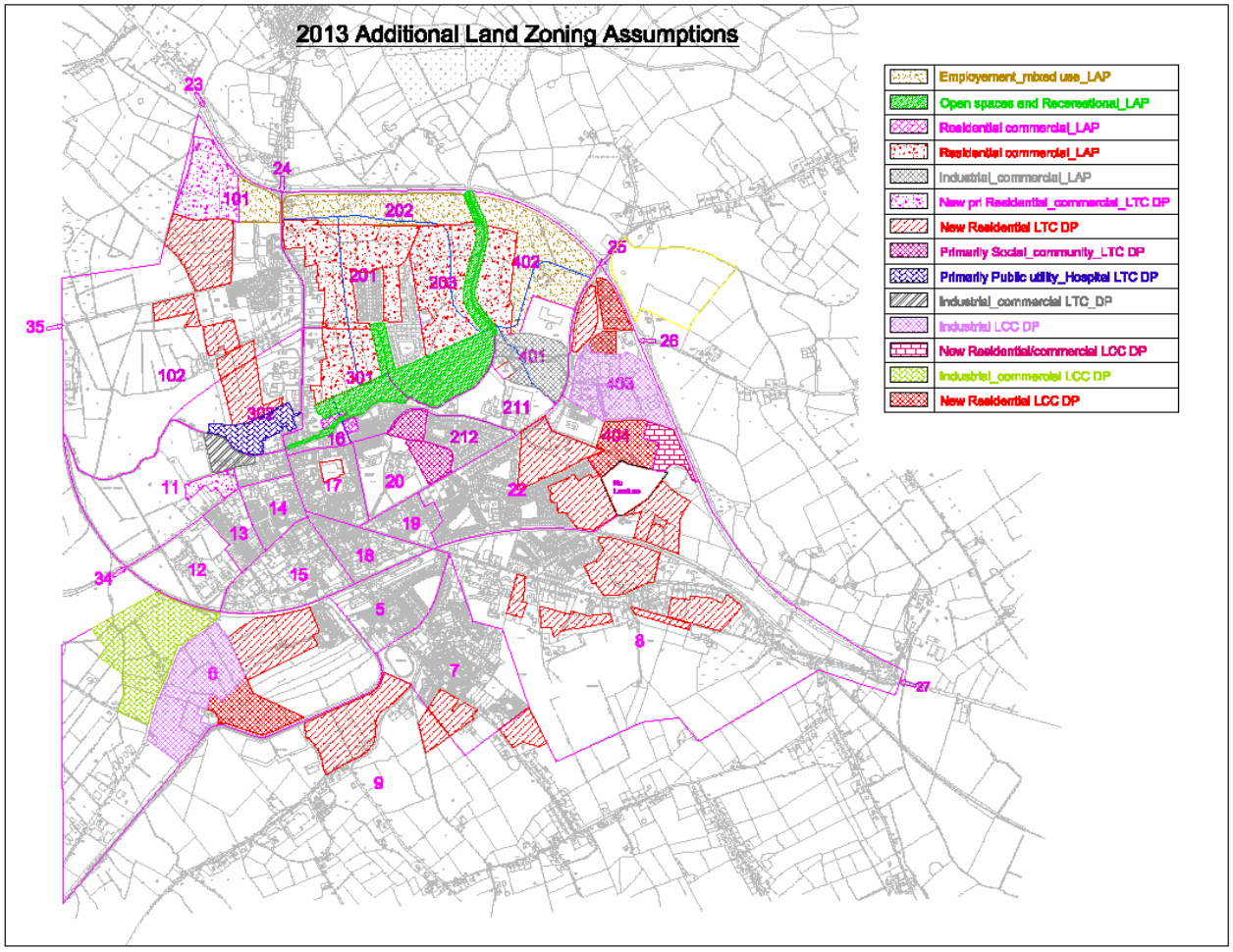
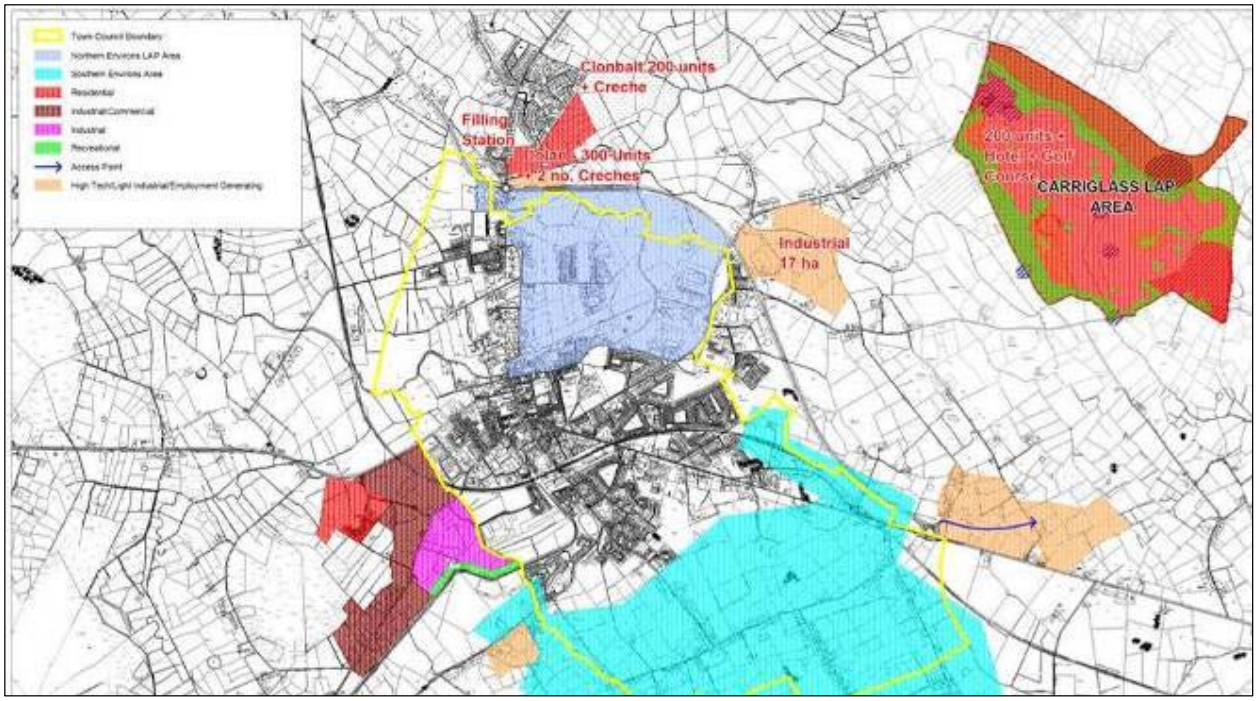


Figure 7: N4 North Bypass Development Sites



Prior to estimating traffic generation, the development site areas were converted to GFA or residential units using densities or plot ratios consistent with the previous Longford traffic studies. These plot ratios and resulting development schedules per land use are presented in the Table 3 below.

Table 3: Additional Development Plot Ratios/Densities and Schedule

Land Use	Plot Ratio or Units per Hectare	Development GFA (sqm) or No. of Units
Residential	25	4,800 residences
Industrial	0.3	206,000 sqm GFA
Employment/Mixed-Use	0.5	128,000 sqm GFA
Commercial	0.5	100,000 sqm GFA

The trips rates adopted for the study were kept mostly consistent with the LTTS study, except for the industrial use trip rates. These rates were reduced following consultation with LCC to make them more representative of the lower trip generation rates for light industrial and warehouse/storage facilities. The previous values were more representative of industrial estates which had an employment component. This trip rates are presented in the Table 4 below.

Table 4: Peak Hour Trip Rates

Land Use	AM Peak		Mid-day Peak		PM Peak	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Residential	0.20	0.80	0.25	0.25	0.80	0.20
Light industrial/warehousing	0.30	0.27	0.31	0.73	0.12	0.36
Employment/Mixed-Use	1.18	0.38	1.21	1.34	0.85	1.58
Commercial	0.83	0.39	2.50	2.48	1.94	2.13

To account for the fact that new residential trips are likely to be local trips destined for the 'other' land uses (e.g., home-based employment trips), the development trips matrix was factored down by 22.5%. This is roughly equivalent to about 80% or new residential trips

having a local destination. No account has been taken of the effect of existing home-based trips switching to local destinations. This could reduce development trips further as current residents working outside of Longford Town may in the future switch to local employment brought about by the increased local employment and commercial opportunities.

Based on the above assumptions the additional development trips between 2006 and 2013 included in the assessment is about 7100, 9200 and 10125 pcus per hour for the AM, Mid-day and PM peak hour.

A comparison of the base and forecast trip matrix totals is presented in Table 5 below. The results show that traffic is anticipated to increase almost fourfold between 2005 and 2013, if full development of the identified lands takes place. As mentioned previously this represents a very conservative worst case scenario for traffic assessment.

Table 5: Summary of Trip Matrix Totals (pcu)

Time Period Land Use	AM Peak	Inter-Peak	PM Peak
2005	5,200	4,700	6,400
2013	13,130	14,500	17,550
2023*	15,800	12,300	17,300

Note: * From LTTS Report, TPI 2003

For comparison, the equivalent 2023 matrix totals quoted in the LTTS study are included. It is notable that due to the significant increase in development sites, the resulting 2013 forecast are actually greater than the previous 2023 LTTS forecast, for the inter-peak and PM peak periods. This represents a significant increase in vehicle traffic in the local road network. There is therefore a need to take a more pragmatic approach to the anticipated development timeline.

As stated in the LAP, it is envisaged that the 100% development build-out assumed above will occur over two LAP terms. The trip generation scenario presented therefore corresponds to a worst case scenario. An alternative "expected" scenario was also generated to represent the most likely level of completed development at the end of this LAP term which also coincides to the period before just before the N4 Bypass Upgrade (i.e., year 2013). This is described below.

4.2.4 Development Growth : Expected Case

The "expected" case scenario which takes a closer view on the level of completed development of the designated lands by 2013 was developed in consultation with LCC planners. Details of the assumed percentage completion are presented in Appendix A. A summary comparison of the "Worst" and "Expected" case development schedule is presented in the table below.

Table 6: Comparison of Development Schedules (sqm. GFA or units)

Land Use	Worst Case Scenario	Expected Case Scenario
Residential	4,800 residences	2,240 residences
Industrial	206,000 sqm GFA	117,000 sqm GFA
Employment/Mixed-Use	128,000 sqm GFA	55,000 sqm GFA
Commercial	100,000 sqm GFA	62,400 sqm GFA

The same trips rates were applied resulting in reduced trip generation as presented below.

Table 7: Comparison of 2013 Trip Matrix Totals (pcu)

Scenario	AM Peak	Inter-Peak	PM Peak
Worst Case	13,130	14,500	17,550

Expected Case	9,780	10,000	12,750

Compared to Table 5, the trips for the “expected” scenario still equate to at least a doubling of the 2005 trips indicating that even this scenario represents a very robust increase in development and the resulting traffic levels.

The traffic impact assessment results of the two scenarios are presented in the following section.

5 SATURN Model Assignment Results

This section focuses on the SATURN model traffic assignment results for major link roads which include; the N4 Bypass, Battery Road, Ballinalee Rd and the New N5 Bypass. Where appropriate, the results are presented in a similar format and criteria as those used in the N4 Longford Bypass Upgrade Feasibility Study (N4 LBU FS) for ease of comparison. The "Worst" and "Expected" Case scenarios are presented separately.

5.1 Worst Case Scenario: Link Capacity Results

The forecast flows for the different peak periods are presented in the following table.

Table 8: 2013 Forecast Two-way Link Flows (pcu/hr)

Link	AM Peak	Inter-Peak	PM Peak
N4 Bypass	1,303	1,209	1,770
N4 West to Planned N4/N5 Jctn	1,517	1,540	1,331
Planned N4/N5 Jctn to N4/R198 Jctn	1,850	2,178	2,213
N4/R 198 Jctn to N4/194 Jctn	2,108	2,234	2,258
N4/R 194 Jctn to N4/R 393 Jctn	1,844	2,049	2,123
N4/R 393 Jctn to N4 East			
R194	916	630	1,184
R194 to Carriglass	1,778	1,447	1,222
R194 (old N5) to Longford			
R198	1,660	1,246	1,828
R198 to Clonbalt	1,369	1,496	1,281
R198 (Battery Road to Longford			
N5 Bypass	729	725	1,711
N4 to Ballyminion	1,303	1,209	1,770

The above flows were converted to Annual Average Daily Traffic (AADT) values based on the following factors derived from the 2007 data for NRA Automatic Traffic Count (ATC) site "Longford N04-21".

- AM Peak to 0700 – 1000 = 3.15
- Inter Peak to 1000 – 1600 = 6.11
- PM Peak to 1600 – 1900 = 2.67
- 12 hour to 24 hour AADT = 1.27

Similarly, design hour link and turn flows (for junction assessment) were also derived based on the 30th Highest Hour (30HH) factors from the same ATC site.

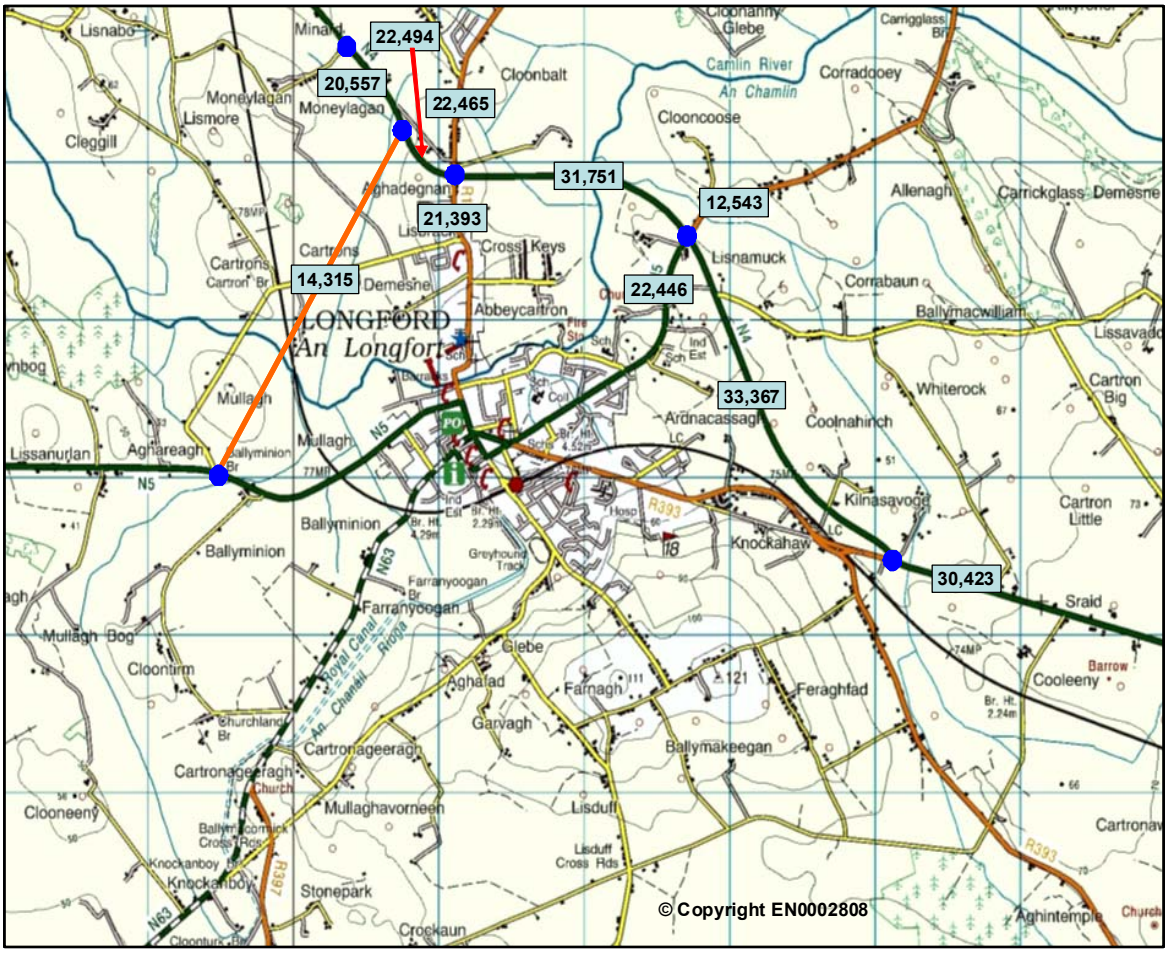
- AADT to 30HH Design Link Flow = 0.11
- PM Peak to 30HH Design Turn Flow = 1.22

The resulting AADTs are presented and compared with the N4 Bypass upgrade forecasts in the table below. The forecast AADT is also presented graphically in Figure 7.

Table 9: Forecast 2013 AADT Comparison (Veh/day)

Link flows along N4	N4 LBU FS Realistic Case	N4 LBU FS Realistic Case	LAP Worst Case
	2025	2035	2013
N4 West to Proposed N4/N5 Intersection	22,700	25,856	20,557
Proposed N4/N5 Intersection to N4/R198 Intersection	25,515	29,063	22,494
N4/R 198 Intersection to N4/194 Intersection	30,530	34,775	31,751
N4/R 194 Intersection to N4/R 393 Intersection	26,944	30,690	33,367
N4/R 393 Intersection to N4 East	24,393	27,785	30,423

Figure 7: Forecast 2013 Worst Case Scenario AADT



To assess the capability of the existing road links to accommodate the forecast traffic, the calculated flows can be compared against the congestion threshold and congestion reference flows (CRF), discussed in section 3.7 of TA 46/97. The TA defines them as;

"The congestion threshold is a measure of the maximum achievable hourly throughput of a link which should be considered as part of the scheme operational appraisal. …The threshold may be expressed in terms of annual average daily traffic (AADT) by identifying the likely ratio of peak to daily flow and applying this to the threshold hourly value. The resulting AADT is known as the Congestion Reference Flow (CRF)."

The calculated congestion threshold, which is given as capacity per lane in vehicles per hour, and CRF are tabulated below. The formula and local factors adopted are;

CRF = CAPACITY * NL * Wf * 100/PkF * 100/PkD * AADT/AAWT

- where, CAPACITY (Congestion Threshold) is the maximum hourly lane throughput
  - CAPACITY = [1380 - 15 * 7.5] = 1267 vph
  - where, 8 is the percentage of 'Heavy Vehicles' in the peak hour.
- NL is the Number of Lanes per direction (= 1);
- Wf is a Width Factor (=1.46);
- PkF is the proportion (percentage) of the total daily flow (2-way) that occurs in the peak hour (= 9.25)%;
- PkD is the directional split (percentage) of the peak hour flow (= 53%); and
- AADT/AAWT (= 1.0)

Table 10 N4 Congestion Threshold and Congestion Reference Flows

Carriageway Standard	Minimum
Congestion Threshold (Veh/hour)	1,267
Congestion Reference Flow (AADT)	37,675

When compared to the forecast 2013 worst case AADT link flows, it is noted that none of them exceed the CRF. Based on the above parameters, it can therefore be concluded that the existing single carriageway wide-single configuration of the N4 would not be operating over capacity in 2013.

The remainder of the report focuses on details of the "expected" case scenario which is the more relevant representation of development extent and traffic conditions for 2013.

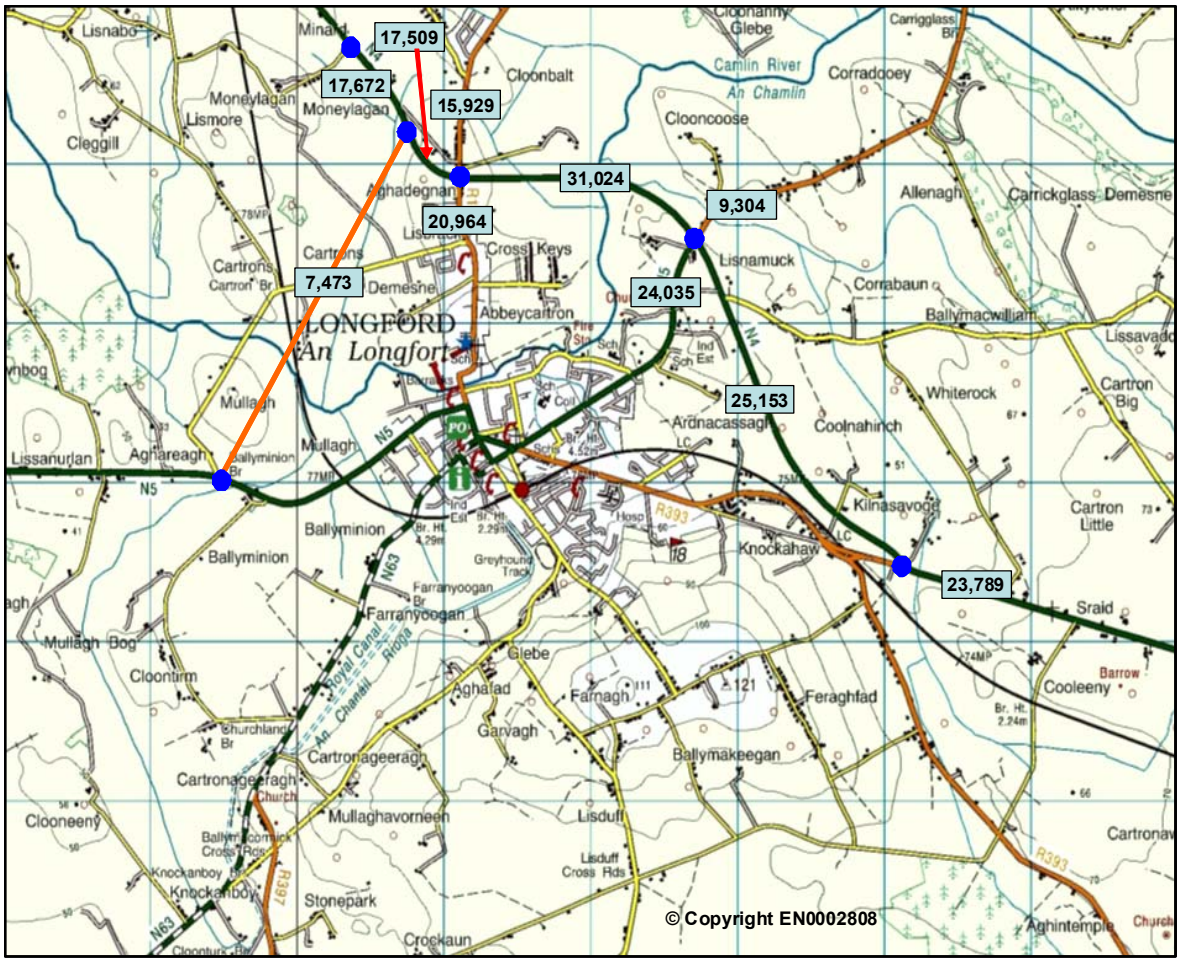
5.2 Expected Case Scenario: Link Capacity Results

The corresponding link flows and AADTs for the Expected case scenario are presented below. The forecast AADTs are also presented graphically in Figure 8.

Table 11: 2013 Forecast Two-way Link Flows (pcu/hr or Veh/day)

Link	AM Peak	Inter-Peak	PM Peak	AADT (veh/day)
N4 Bypass				
N4 West to Planned N4/N5 Jctn	1,185	1,011	1,510	17,672
Planned N4/N5 Jctn to N4/R198 Jctn	1,100	940	1,725	17,509
N4/R 198 Jctn to N4/194 Jctn	1,906	2,089	2,136	31,024
N4/R 194 Jctn to N4/R 393 Jctn	1,607	1,596	1,883	25,153
N4/R 393 Jctn to N4 East	1,485	1,536	1,761	23,789
R194				
R194 to Carriglass	689	446	916	9,304
R194 (old N5) to Longford	1,686	1,603	1,443	24,035
R198				
R198 to Clonbalt	1,137	868	1,379	15,929
R198 (Battery Road to Longford)	1,308	1,575	1,045	20,964
N5 Bypass				
N4 to Ballyminion	446	334	918	7,473

Figure 8: Forecast 2013 Expected Case Scenario AADT



When the above values are compared to the CRF in Table 10, it is noted that none of them exceed the CRF. Based on the above parameters, it can therefore be similarly concluded that the existing single carriageway wide-single configuration of the N4 would not be operating over capacity in 2013. As expected the differences between the CRF and the forecasts are greater indicating larger spare capacity.

5.3 LAP Distributor Road Phasing

The LAP will have two major distributor roads crossing the Camlin River. The LAP proposal is for a phased construction of these river crossings. It is proposed to construct the Spine Road first as it offers immediate relief to Town Centre circulation and linkage to the Ballinalee Road can be facilitated by the Longford business Park Development (LBP). The "Parallel Distributor" (to the N4) will be constructed as the west bank is developed.

This section presents the analysis of the proposed phasing option. It illustrates the anticipated impact of the Parallel Distributor on the N4 in relation to the routing of vehicles to/from the LAP lands.

The options assessed are both under the "expected" case development scenario:

- LAP Phase 1 Network - With Spine Road crossing to Mall (base scenario presented above)
- LAP Phase 2 Network - With Spine Road and Parallel Distributor river crossing

The sequence of modelling analysis was Phase 1 first followed by Phase 2. The AM and PM peak phase 1 models were modified to include the Parallel Distributor and results were

compared with the original runs to demonstrate the phasing benefits. The individual traffic model period results are discussed in detail below.

5.3.1 Phase 1 and Phase 2 PM Peak Hour Flows

Figures 9 and 10 show the assigned flows for the Phase 1 (Spine Road only) and Phase 2 (with Parallel Distributor river crossing) scenarios. The figures show that the flows on the critical link of the N4, between the R194 and Battery Road, remain almost the same in both runs. It changes by less than 10 pcu per hour in each direction (958 vs. 964 southbound and 1164 vs. 1176 northbound). As anticipated the Parallel Distributor Link will reduce flow on the parallel N4 section.

Figure 9: PM Peak Link Flows- Phase 1 Network (Band scale 1:400)

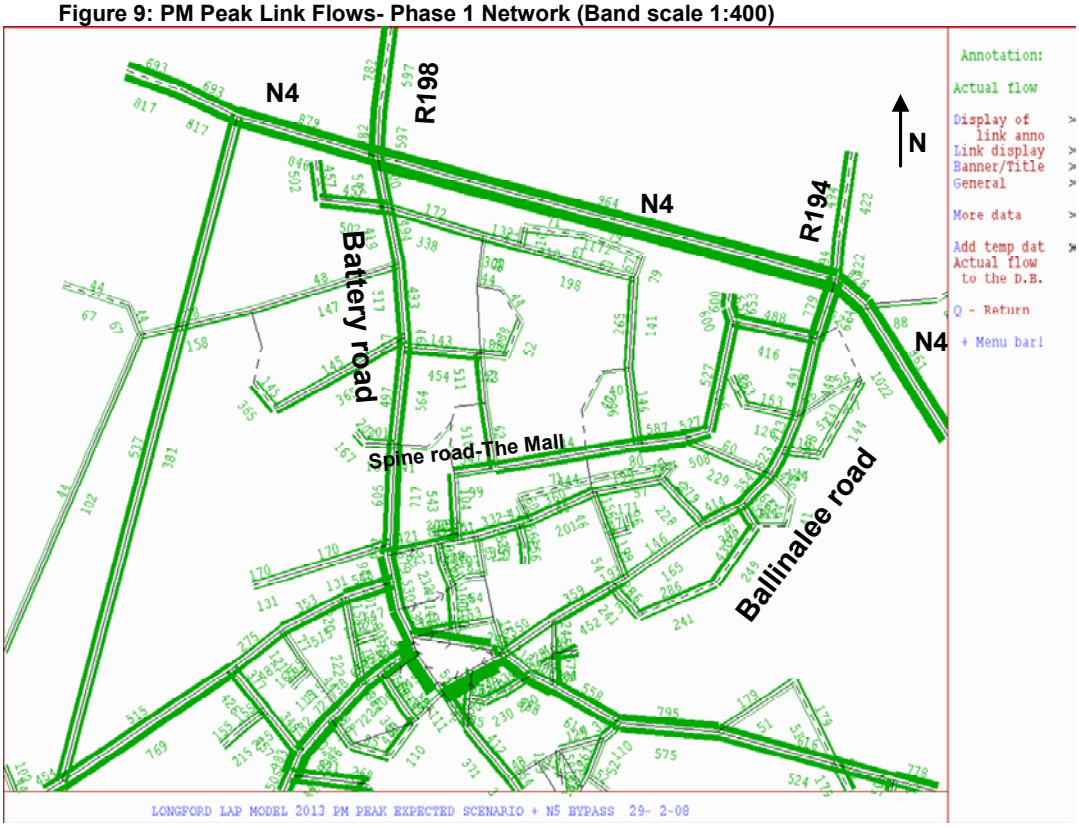
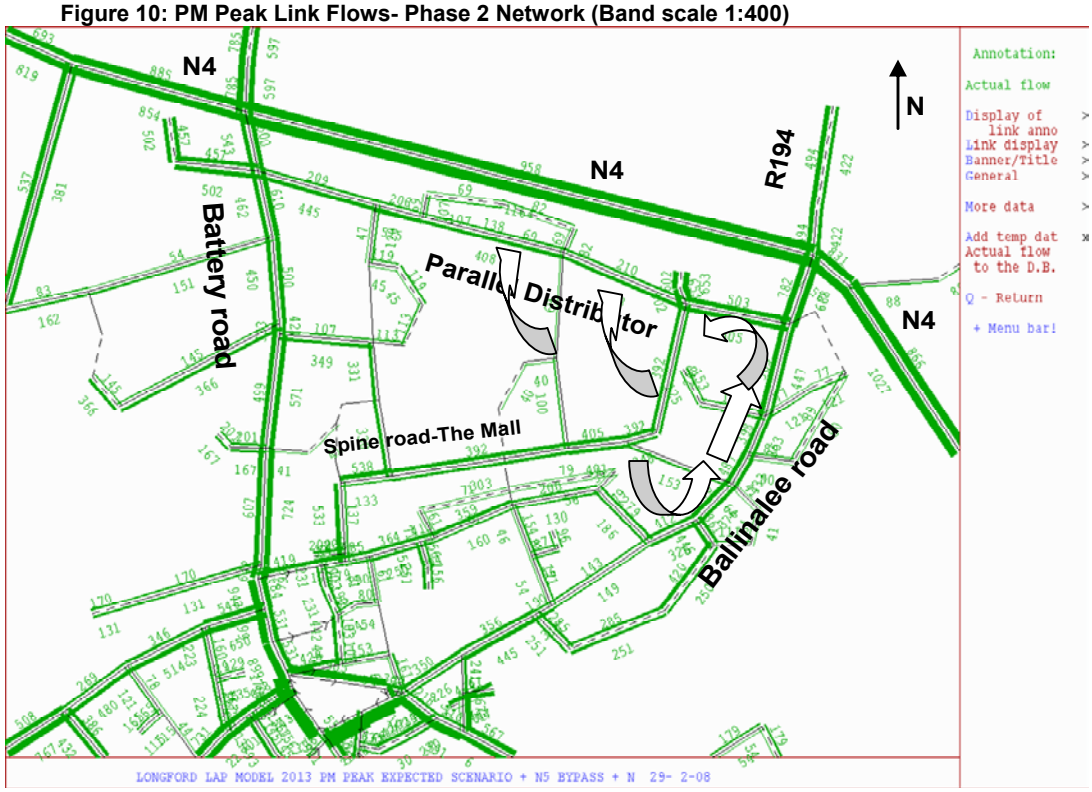


Figure 10: PM Peak Link Flows- Phase 2 Network (Band scale 1:400)



The results indicate that the "expected" LAP development scenario will not result in any capacity constraint on the N4. Therefore during this phase, the Parallel Distributor Road only causes a minimal reduction in traffic on N4 traffic.

It is therefore proposed to phase the implementation of the Camlin River crossings by constructing the Spine Road first and linking it to the LBP internal road network as it gives an alternative direct access to the existing town centre developments. It will also provide an interim alternative east-west route for local traffic. The delivery of the Spine Road will begin from the LBP and Camlin Village developments (which link to Ballinalee Road) and progress towards the town centre as development is established in the area.

The Parallel Distributor link will perform a more important east-west distributor role and will be realised in tandem with the granting of planning permissions for development along the route of the link. Part of the link has already been constructed from the Battery Road and as further developments commence will proceed eastward before crossing the River Camlin. It will initially connect the Spine Road at the Mall as part of Phase 1. Further LAP development will coincide with the completion of its bridge crossing to link to the Longford Business Park access road. This Parallel Distributor Link is designed to facilitate circulation within the Northern Environs LAP area and until the complete development of the adjacent lands, does not impact on the RFCs for the national route and junctions. This is point is detailed further in Chapter 8 of this document.

The benefit of having the Parallel Distributor Road is more apparent in the AM peak which shows that traffic is reduced by 120 vehicles per hour two-way. It is however important to note that the critical period for design remains to be the PM peak which has around 10% more traffic than AM peak. Any investment on road infrastructure is therefore more appropriately justified in terms of the PM peak benefits. The junction capacity assessment presented in Section 6, will therefore focus on the Phase 1 PM peak design flows, as it results in the highest traffic flows through the junctions.

5.4 Link Cruise Speeds

Another useful parameter to measure the performance of the N4 is the reported link cruise speeds from the SATURN simulation. The figures below indicate that the forecast speeds along the N4 range from 70-80 kph for various modelled peak period indicating little delay in link travel times.

Figure 11: Forecast 2013 Expected Case Scenario link cruise speed >65 Km/h: PM Peak

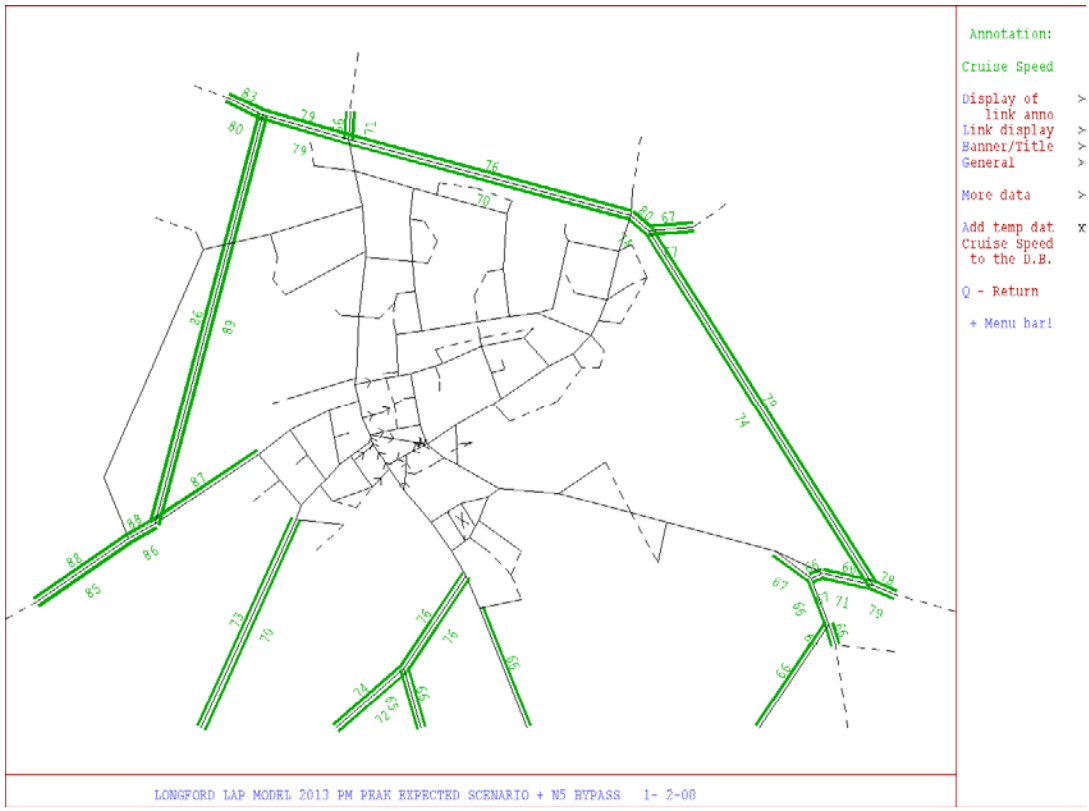


Figure 12: Forecast 2013 Expected Case Scenario link cruise speed >65 Km/h: IP Peak

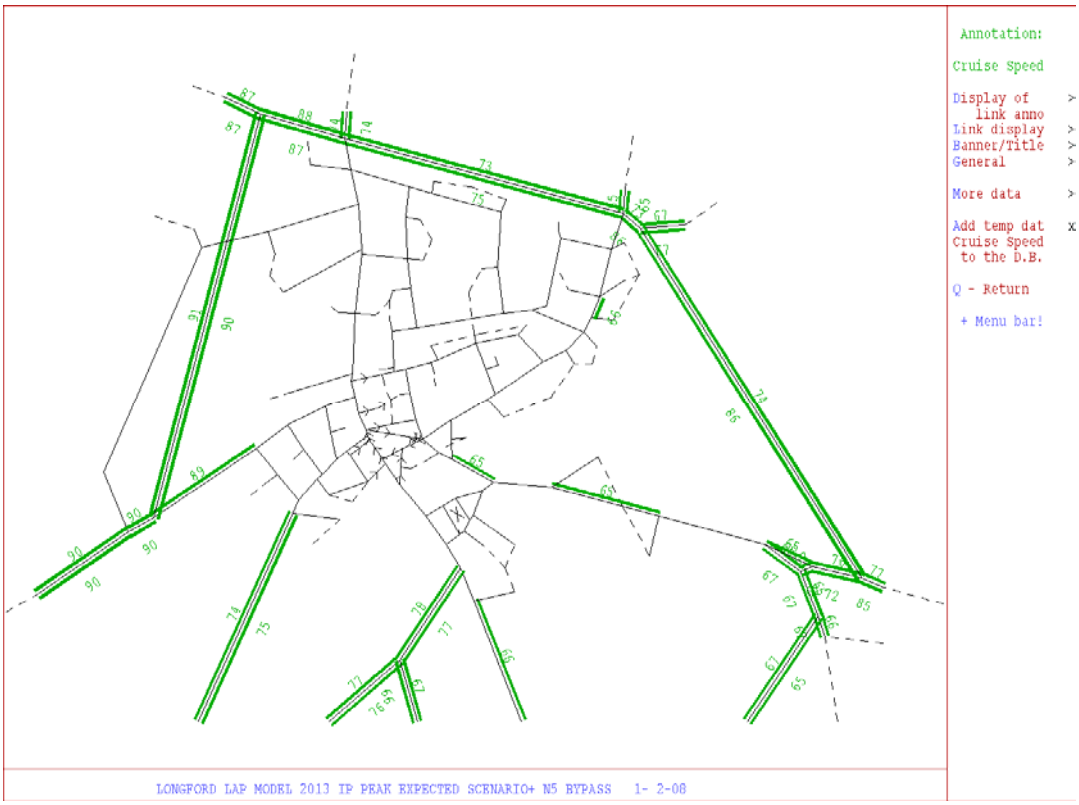
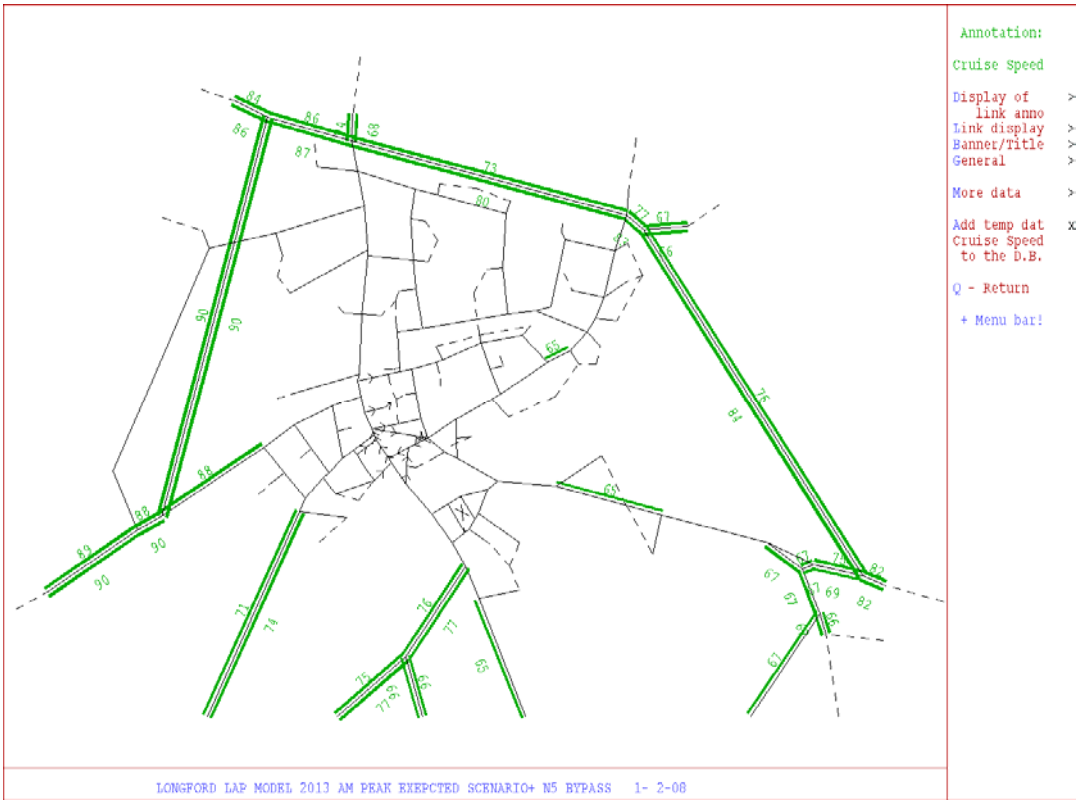


Figure 13: Forecast 2013 Expected Case Scenario link cruise speed >65 Km/h: AM Peak

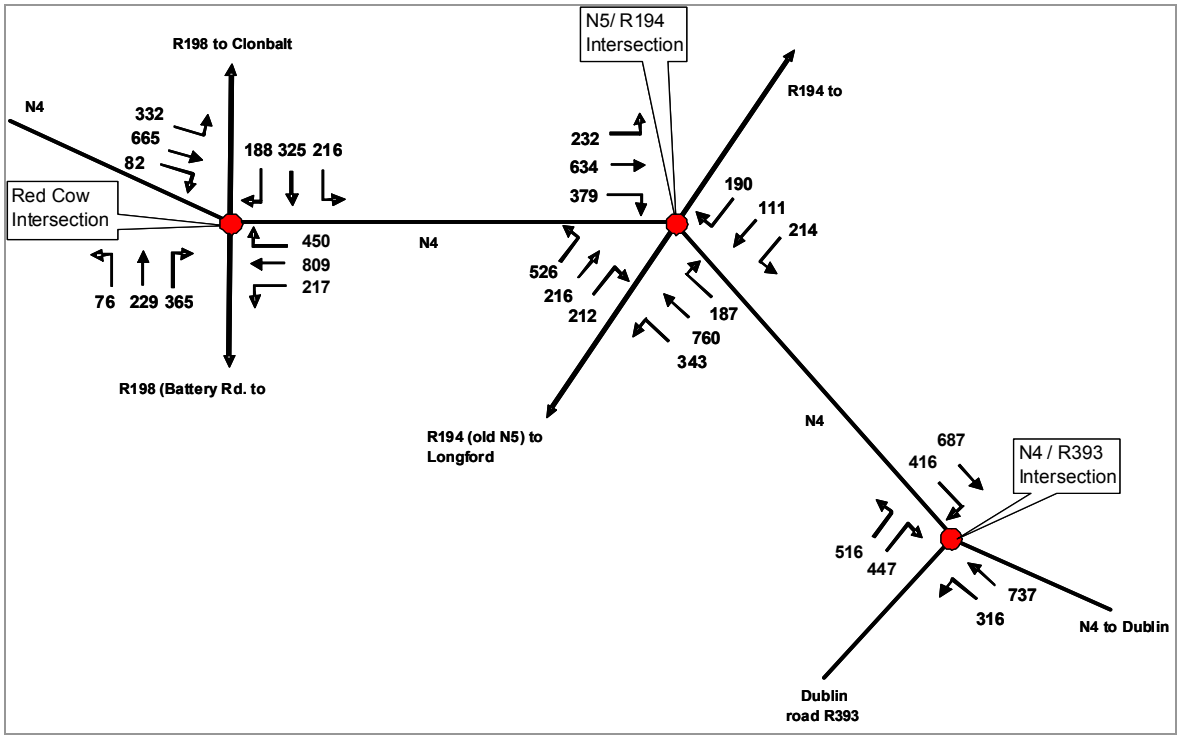


6 N4 Bypass Junction Assessment Results

This section presents the junction capacity assessment of the N4 Bypass junctions under the "expected" growth scenario.

As stated earlier, the analysis and presentation of results are in a similar format and criteria as those used in the N4 LBU FS for ease of comparison. The three bypass junctions were assessed in ARCADY to establish the LOS prior to any bypass upgrade. The scenario assessed corresponds to the Phase 1 road network (i.e., No Parallel Distributor) as this directs more traffic through the N4 roundabouts. The forecast 2013 design hour flows are presented in the following figure. These were derived using the PM peak hour assigned flows and the 30HH design factors discussed in Section 5.1.

Figure 14: Forecast 2013 Expected Case Scenario Design Turn Movements (Veh/hr)



6.1 Do Nothing Scenario

This scenario tests the existing junction layouts against the forecast flows. The resulting key ARCADY parameter results are tabulated below and the printouts are presented in Appendix B.

Table12: Junction ARCADY Analysis Results: 2013 Expected Case Scenario

Junction	Demand (veh/hr)	Delay (sec/veh)
N4/R198 Intersection	3,615	11
N4/194 Intersection	3,660	11
N4/R 393 Intersection	2,855	5

Applying the same LOS D threshold for delay per vehicle of 35 seconds as in the N4 LBU FS study, the above analysis results show that the junctions would operate satisfactorily under the expected case scenario.

It is noted however that a closer investigation of the results (see Appendix B) show that some of the junction arms were operating at close to saturation with ratio of flow to capacity (RFCs) at about 0.95. This is true for both the N4/R198 (Red Cow) and N4/N5/R194

(Ballinalee) roundabouts. The Dublin Road roundabout has RFCs less than 0.85, and therefore not considered further.

6.2 With Improvements Scenario

Junction improvements were investigated to limit the RFC's to the standard design value of 0.85. This is relevant for both the N4/R198 (Red Cow) and N4/N5/R194 (Ballinalee) roundabouts. The proposed improvements and assessment results are presented below.

6.2.1 N4-R198 (Red Cow) Roundabout

The following improvements are suggested:

- Widening Battery Road entry/exit to 2 lanes in each direction between Red Cow and LAP Connector Road roundabouts.
- Widening of N4 south roundabout entry (i.e., northbound direction) to 9.2m to provide three entry lanes.
- Widening of circulatory carriageway to width of 9.2 m by making changes on road markings.
- Provision of a local flaring to provide an entry lane to the petrol filling station along Drumlish Road. This will have no impact on the roundabout geometry. This will accommodate traffic slowing down or queuing to get into the petrol station and allow traffic on Drumlish Road to bypass stopped vehicles.
- Minor relocation of existing footpaths and drop kerbs.

A preliminary drawing of the proposed junction layout is presented as Drawing number TSK 0001.P4. All improvements will require minor works and land take to widen Battery Road.

The Red-Cow roundabout with proposed improvements was analysed in ARCADY and results are presented in Table 13. The maximum RFC is shown per ARM and is reported to be comfortably under 0.85.

Table 13: Year 2013 Improved Red Cow Roundabout ARCADY Results

Arm	Maximum Demand/ Capacity RFC	Maximum Demand (veh/min)	Average Delay Per Arriving Vehicle (min)
N4 South	0.78	27	0.14
Battery Road	0.67	12	0.17
N4 North	0.81	20	0.22
R198-Drumlish Road	0.77	13	0.25

6.2.2 N4-N5-R194 (Ballinalee Road) Roundabout

The following improvements are suggested:

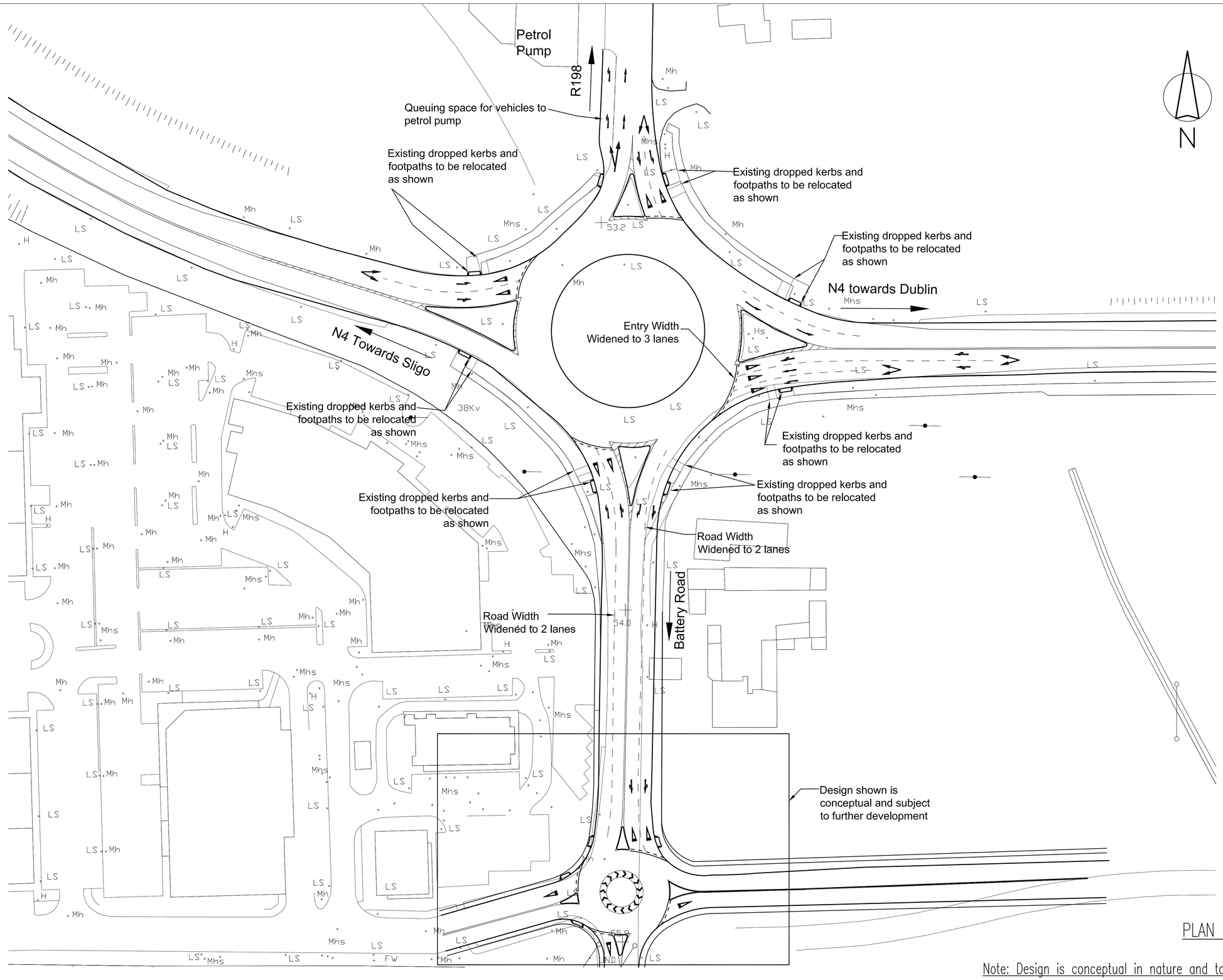
- Widening on both the entry/exit approach road portions of N5 Ballinalee Road to 2 lanes in each direction between N4 and LBP development access roundabouts.
- Widening of N4 south roundabout entry (i.e., northbound direction) to 9.2m to provide three entry lanes.
- Widening of circulatory carriageway to width of 9.2 m by making changes on road markings.
- Minor relocation of existing footpaths and drop kerbs.
- In addition, as part of the long-term strategy, LCC will earmark land adjacent to the Abbot site for a potential grade-separated pedestrian crossing. The need for it will be monitored as nearby development is completed.

A preliminary drawing of the proposed junction layout is presented as Drawing number TSK 0002.P4. All improvements will require minor works.

A1

10cm – SCALE WITH CAUTION AS DISTORTION CAN OCCUR

10cm



PLAN – REDCOW ROUNDABOUT

SCALE: 1:500

Note: Design is conceptual in nature and to be subject to detailed design

Rev.	Date	By	Description	Chd By

Job Title	LONGFORD NORTHERN ENVIRONS LAP Strategic Transport Impact Assesments
Drawing Title	PROPOSED N4 JUNCTION IMPROVEMENTS N4–R198 JUNCTION
Drawing Status	PRELIMINARY

ARUP
10 Wellington Road Dublin 4
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EMail dublin@arup.com
DUBLIN CORK LIMERICK

Scales 1:500 @ A1		Originator GMcT	
Checked	Approved	Date 21/04/08	
Job No. D4650.24	Drawing No. TSK0001	Rev. P4	

6.2.3 Ballinalee Road (N5)-Longford Business Park- Laurel Avenue- Roundabout

Although this junction will not be part of the national road network following the opening of the N5 Bypass, this has also been assessed because of its proximity to the N4/Ballinalee roundabout.

Full design details of this roundabout/junction will be determined as part of the development management process and an adequate traffic management plan shall be prepared to mitigate against queuing at the junction during peak times.

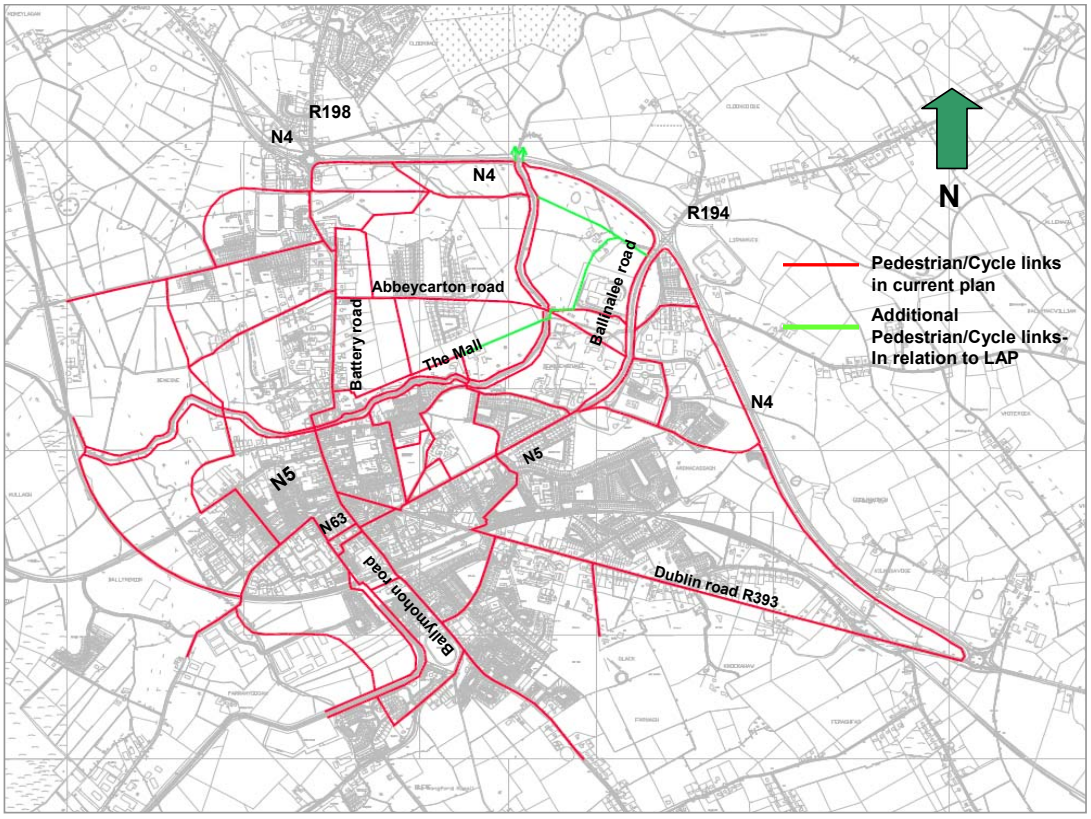
7 Pedestrian and Cycle Facilities

NRA accepted that the level of pedestrian and cycle activity across the existing N4 bypass and its current role as a national route does not suit the aggressive provision of pedestrian crossing facilities.

It is reiterated that pedestrian crossing movements were incorporated into the junction capacity assessment only to assess potential delays to traffic movements. It is not intended to introduce zebra crossings on any of the arms of the N4 roundabouts. The existing crossing type, which is uncontrolled and informal would be retained. A review of the pedestrian proposals has been undertaken to suit the current pedestrian desire lines and minimise potential pedestrian-vehicle conflict. Figure 15 shows the proposed pedestrian links and location of the pedestrian crossings across Ballinalee Road (N5) and N4. Further details of the pedestrian and cycle facilities are presented in the junction layout drawings TSK 001 and 002.

As part of the long-term strategy, LCC will set aside land within the LAP for a potential grade-separated pedestrian crossing. This will be reflected in the updated LAP maps.

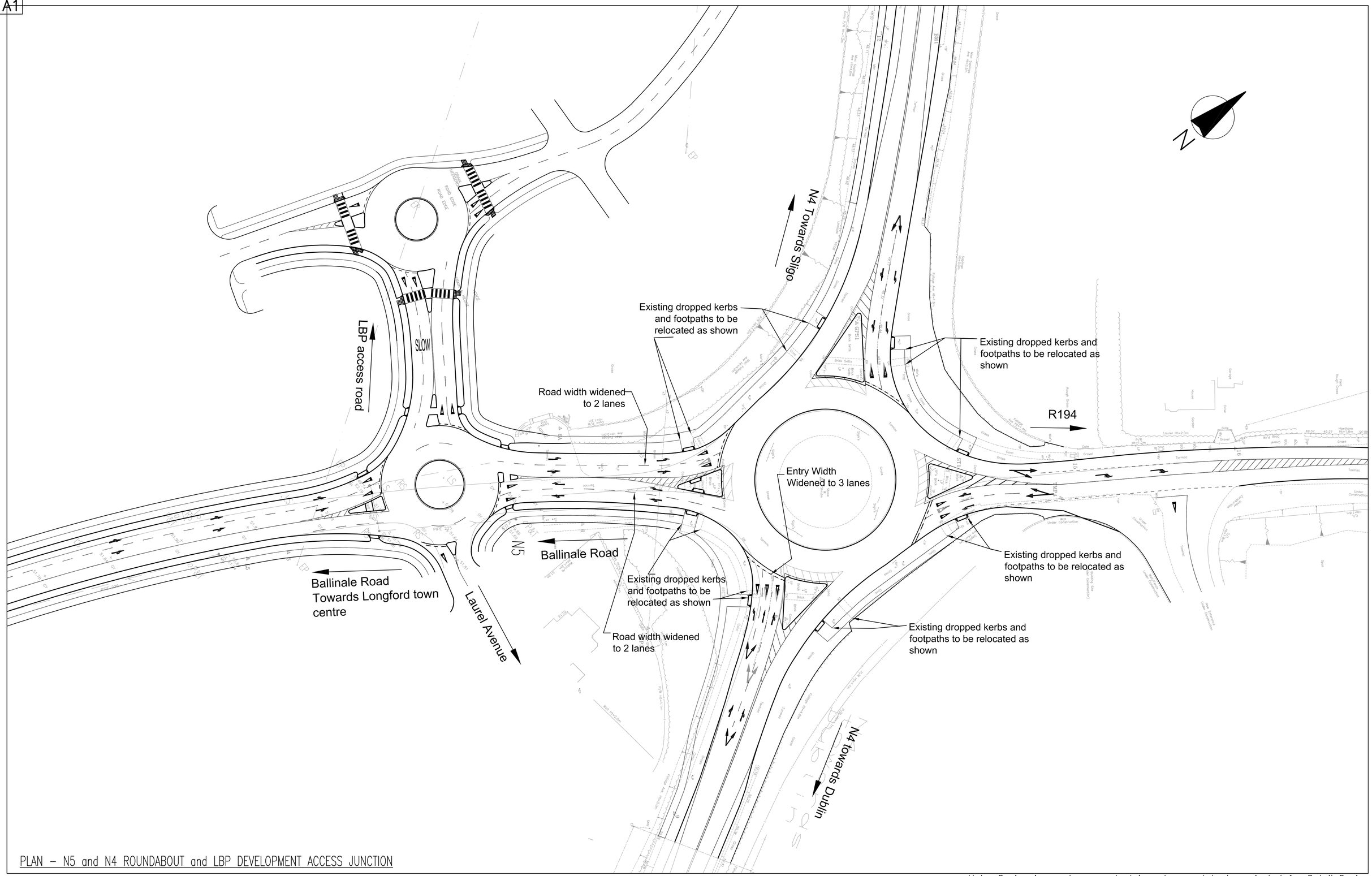
Figure 15: Strategic Longford Pedestrian/Cycle Links



A1

10cm – SCALE WITH CAUTION AS DISTORTION CAN OCCUR

10cm



PLAN – N5 and N4 ROUNDABOUT and LBP DEVELOPMENT ACCESS JUNCTION

SCALE: 1:500

Note: Design in purely conceptual in nature and to be sujected for Detail Design

Rev.	Date	By	Description	Chd By

J:\D4600-D4699\D4650\3) Drawings\(d) Traffic\24\TSK0002_D4650Z0_P4.dwg 28 Apr 2008 12:32:33

Job Title
LONGFORD NORTHERN ENVIRONS LAP
Strategic Transport Impact Assesments

Drawing Title
PROPOSED N4 JUNCTION IMPROVEMENTS–
N4–N5–R194 JUNCTION

Drawing Status
PRELIMINARY

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Scales	Originator	Job No.	Drawing No.	Rev.
1:500 @ A1	GMcT	D4650.24	TSK0002	P4

Checked Approved Date 21/04/08

8 Infrastructure Phasing and Monitoring

Based on the preceding assessment, the following infrastructure and development phasing is recommended. The additional development threshold for the LAP (i.e., increase from existing situation) is tabulated in Table 16 below. These have been extracted from Appendix A Table 3 to highlight the LAP development that could have a potential direct impact on the N4 Bypass. As very little development has occurred in these zones between 2005 (model base year) and 2008, these developments are equivalent to the new development proposed for the LAP up to 2013.

Table 16: LAP Lands Additional Development: Expected Scenario (2013)

LAP Zone Number	Development Land Use	Plot Area (hectares)	% Buildout	Development Schedule (Units or sqm GFA)
101	Employment/Mixed Use	3.6	50%	9,100
	Residential	4.7	50%	59
	Commercial	4.7	50%	11,800
201	Residential	20.8	40%	208
202	Employment/Mixed Use	14.0	20%	14,000
203	Residential	16.2	10%	41
301	Residential	0.3	100%	6
	Commercial	0.3	100%	1,300
302	Primarily Residential	5.3	50%	66
	Commercial (cinema and parking)	0.7	100%	3,600
402	Employment/Mixed Use/Large Scale Convenience Retail	18.0	100%	39,500
	Residential (Camlin Village)	7.8	100%	195

To accommodate the above additional developments, the following LAP infrastructure improvements would be required:

- N4/Ballinalee Road Roundabout Improvements –
    - Widening on both the entry/exit approach road portions of N5 Ballinalee Road to 2 lanes in each direction between N4 and LBP development access roundabouts.
    - Widening of N4 south roundabout entry (i.e., northbound direction) to 9.2m to provide three entry lanes.
    - Widening of circulatory carriageway to width of 9.2 m by making changes on road markings.
    - Minor relocation of existing footpaths and drop kerbs.
    - In addition, as part of the long-term strategy, LCC will earmark land adjacent to the Abbot site for a potential grade-separated pedestrian crossing. The need for it will be monitored as nearby development is completed.
- N4 Red Cow Roundabout Improvements –
    - Widening Battery Road entry/exit to 2 lanes in each direction between Red Cow and LAP Connector Road roundabouts.
    - Widening of N4 south roundabout entry (i.e., northbound direction) to 9.2m to provide three entry lanes.
    - Widening of circulatory carriageway to width of 9.2 m by making changes on road markings.

- Provision of a local flaring to provide an entry lane to the petrol filling station along Drumlish Road. This will have no impact on the roundabout geometry. This will accommodate traffic slowing down or queuing to get into the petrol station and allow traffic on Drumlish Road to bypass stopped vehicles.
- Minor relocation of existing footpaths and drop kerbs.

- Ballinalee Road/Longford Business Park/Laurel Avenue Roundabout – This will be a new roundabout serving as the major access to the LAP Lands from the east. Full design details of this junction shall be finalised as part of the development management process.

As development of the LAP lands move towards the latter end of the expected growth scenario, the following provisions will come into play

- LAP Spine Road – This road spans the length of the Mall and includes two river crossings (see Figure 1). The northern end will be a bridge linking to the Longford Business Park and trough to Ballinalee Road. The southern end links to the Town Centre and Battery Road via a new road at Abbeycartron. The Spine Road is to be provided by the Local Authority through the application of a Special Contribution Scheme that will apply levies to all planning permissions on relevant developments throughout the Plan area.
- Parallel Distributor Road (Partial) – Link from Battery Road at the existing Red Cow Retail Park roundabout to the Spine Road at the Mall. The first stage of the parallel distributor road has been provided from the roundabout to the south of the Red Cow through the White Linen Woods development. The remaining sections of the PDR shall be provided by developers at their own expense as each relevant parcel of land within the LAP area is developed, to facilitate internal circulation to the LAP lands. This will be achieved by way of conditions of planning permission, in which the provision of the road shall be prioritised as part of the phasing of the development. The required bridge (phase 2) across the River Camlin shall be provided by way of development contribution under a special scheme to be drawn up covering the local area plan areas that will benefit from its construction. The phasing and delivery of this road shall be required by condition of any relevant planning permissions in the area and its provision shall be continually monitored by the Planning Authority and enforced if necessary

As LAP development exceeds the schedule quoted in Table 16, it is anticipated that the Parallel Distributor Road would need to be constructed in its entirety. This phase will primarily consist of the second LAP lands river crossing linking the Parallel Distributor to the Longford Business Park lands. This will provide a direct alternative route for local traffic using the N4 bypass.

In order to ensure acceptable traffic conditions along the existing bypass and the surrounding local areas, periodic monitoring of the vehicular flows generated by the LAP lands and the resulting traffic conditions would be undertaken. This will be part of the normal development planning application process for the various sites within the LAP lands and the surrounding areas. This is in line with the LAP strategy to implement the LAP road infrastructure in tandem with the granting of planning permissions for developments along the primary distributor roads. This is demonstrated by the fact that parts of these links are already in place or will shortly be built as part of current approved developments permitted by the Local Authority.

9 Summary and Conclusions

This report presents an assessment of the transport impacts of the proposed Draft LAP for the Longford Northern Environs. The area primarily relates to a section of the town bounded by the N4 bypass to the north and east, the Ballinalee Road/Templemichael Terrace/Great Water Street to the south and Bridge Street/Chapel Street/ Battery Road to the West. The area comprises some 166 hectares.

The preceding traffic analysis presented a strategic review of the Longford Town road network taking into consideration all potential development between now and 2013. As part of this assessment two development scenarios were considered; worst case and expected case. The “worst case” scenario allowed for full development of the LAP as well as undeveloped zoned lands from the Longford Town Council Development Plan 2004- 2010 and Longford County Council Development Plan 2003-2009. Furthermore, earmarked development lands North of the N4 Bypass were also added.

An alternative development scenario was also assessed as it is envisioned that LAP and other developments allowed for in the worst case scenario would only be partially completed by 2013. The “expected” scenario therefore takes a more realistic view of the level of completed development on each designated lands by 2013. The highest development trip generation occurs in the PM peak with about 10,000 pcu per hour for the “worst” case development scenario. This is reduced to about 5,000 pcu per hour for the “expected” development scenario.

Based on the preceding analysis, it is estimated that the LAP and associated background developments and traffic growth would result in a tripling of the current traffic levels in some sections of the N4 between 2005 and 2013 (i.e., up to 33,000 vpd). This is generally true for both the “worst case” and the “expected” case development scenarios, except that there are fewer links reaching this level in the “expected” case development scenario.

Based on the preceding assessment, the forecast AADTs for both scenarios will not exceed the calculated congestion reference flows (CRF), defined in DMRB Section 3.7 (TA 46/97). It can therefore be concluded that the existing single carriageway wide-single configuration of the N4 would not be operating over capacity in 2013 under the development scenarios assumed.

A comprehensive analysis of the modelled SATURN speed and junction conditions for the “expected” case scenario for 2013 was undertaken. The reported link cruise speeds from the SATURN simulation indicate that the forecast speeds along the N4 would range from 70-80 kph for various modelled peak periods indicating little delay in link travel times.

The three bypass junctions were also simulated in ARCADY and shown to be operating within the target LOS D. It was noted however that some of the junction arms were operating at close to saturation. It was therefore necessary to investigate junction improvements to reduce the RFCs to the standard design value of 0.85. Junction improvement proposals in the form of additional entry lanes and other associated measures were investigate for the N4 Red Cow and the Ballinalee roundabouts. An assessment of the adjacent proposed Ballinalee Road/Longford Business Park/Laurel Avenue roundabout was also undertaken. The resulting ARCADY assessments indicated that the 0.85 RFC criteria can be met for the “expected case” development scenario.

Improvements to the N4 Bypass junctions will be required to accommodate the proposed LAP. These will include introducing two circulating lanes and minor widening of the westbound N4 approaches at the Ballinalee and Red Cow roundabouts to introduce a third lane. It will also include the dualling of the northbound approach sections of Battery Road and Ballinalee Road.

The LAP will have two major distributor roads crossing the Camlin River, the Spine Road and the Parallel Distributor Road. Both will be constructed in phases as development within

the LAP is realised. It is proposed to construct the Spine Road first as it offers immediate relief to Town Centre circulation and linkage to the Ballinalee Road can be facilitated by the Longford business Park Development (LBP).

The complete length of the "Parallel Distributor Road" (to the N4) will likely be required as LAP development exceeds the "expected" development scenario. This is necessary in order to keep development impact on the improved N4 bypass junctions below the 0.85 RFC threshold. This will be realised in tandem with the granting of planning permissions for developments along the route of the link. Part of the link has already been constructed from the Battery Road and as further developments commence will proceed eastward before crossing the River Camlin. It will initially connect the Spine Road at the Mall as part of Phase 1. Phase 2 of the LAP implementation will coincide with the completion of its bridge crossing to link to the Longford Business Park access road. This Parallel Distributor Link is designed to facilitate circulation within the Northern Environs LAP area and until the complete development of the adjacent lands, does not impact on the RFCs for the national route and junctions.

In order to ensure acceptable traffic conditions along the existing bypass and the surrounding local areas, periodic monitoring of the vehicular flows generated by the LAP lands and the resulting traffic conditions would be undertaken. This will be part of the normal development planning application process for the various sites within the LAP lands and the surrounding areas. This is in line with the LAP strategy to implement the LAP road infrastructure in tandem with the granting of planning permissions for development along the primary distributor roads. This is demonstrated by the fact that parts of these links are already in place or will shortly be built as part of current approved developments permitted by the Local Authority.

It can therefore be concluded that the proposed LAP developments together with the mitigation measures will not result in any sustained congestion on the existing N4 Bypass under the "expected" development scenario. It is anticipated that the improved junctions could operate satisfactorily with no sustained queues or delays and that the current wide single 2-lane bypass link configuration will be sufficient to accommodate the projected peak hour and AADT flows.

Arup Consulting Engineers

Appendix A

Development Schedules and Trips

A1 Development schedules and Trips table

Appendix A-Table 1-Development Schedule assumptions for worst case scenario

New Development after 2005 to 2013

Zone No		Additional Development (2005-2013) Land Use	Plot Area (hectares)	Redistribution (Plot Area, hectares)	Plot Ratio/House Density (units or sqm GFA/hectare)	% of area developed in between 2005-13	Development Schedule (Units Hectare)	Comment
LTTS Model	Rev. LAP Model							
1	101	Employment/Mixed use (LAP)	3.6	3.6	0.5	100%	1.8	Replace resd/commercial designation
		Residential/	9.5	4.7	25	100%	118.3	Unchanged remainder from LTC DP
		Commercial		4.7	0.5	100%	2.4	
	102	Primarily Residential	15.8	15.8	25	100%	395	Unchanged from LTC DP
2	201	Residential (new)	20.8	20.8	25	100%	519	Unchanged from LTC DP
		Recreational/Open space	1.0	1.0		100%	0.0	Unchanged from LTC DP
	202	Employment/Mixed use	14.0	14.0	0.5	100%	7.0	Replace resd/commercial designation
		Recreational/Open space	0.5	0.5		100%	0.0	Unchanged from LTC DP
	203	Residential (new)	16.2	16.2	25	100%	405.3	Unchanged from LTC DP
		Recreational/Open space	13.8	13.8		100%	0.0	Unchanged from LTC DP
3	301	Residential (new)	8.7	8.7	25	100%	217.6	Unchanged from LTC DP
		Residential/	0.5	0.3	25	100%	6.3	
		Commercial		0.3	0.5	100%	0.1	Unchanged from LTC DP
		Recreational/Open space	6.3	6.3		100%	0.0	Unchanged from LTC DP
	302	Primarily Residential	5.3	5.3	25	100%	131.3	Unchanged from LTC DP
		Commercial (cinema and parking)	0.7	0.7	0.5	100%	0.4	
4	401	Industrial/	8.4	4.2	0.5	100%	2.1	Unchanged from LTC DP
		Commercial		4.2	0.5	100%	2.1	
	402	Employment/Mixed use/Large Scale Convenience Retail	18.0	18.0	0.22	100%	3.9	Replace industrial/commercial designation, Provision for large scale convenience retail
		Recreational/Open space	1.5	1.5		100%	0.0	Unchanged from LTC DP
		Residential (Camlin Village)	7.8	7.8	25	100%	195.2	Replace industrial/commercial designation
	403	Primarily Residential	2.6	2.6	25	100%	66.1	Unchanged from LCC DP
		Industrial Estate_New	7.6	7.6	0.3	100%	2.3	Unchanged from LCC DP
		Residential/	3.2	1.6	25	100%	40.0	
		Commercial		1.6	0.5	100%	0.8	Unchanged from LCC DP
	404	Residential	6.4	6.4	25	100%	160.2	Unchanged from LTC DP
6	6	Primarily Residential	9.7	9.7	25	100%	243.7	Unchanged from LTC DP
		Residential	6.6	6.6	25	100%	165.1	Unchanged from LCC DP
		Industrial	16.9	16.9	0.5	100%	8.4	Unchanged from LCC DP
		Industrial/	19.1	9.6	0.5	100%	4.8	Unchanged from LCC DP
		Commercial		9.6	0.5	100%	4.8	
7	7	Residential	2.9	2.9	25	100%	72.1	Unchanged from LTC DP
8	8	Primarily Residential	22.5	22.5	25	100%	562.8	Unchanged from LTC DP
9	9	Primarily Residential	15.3	15.3	25	100%	382.2	Unchanged from LTC DP
11	11	Industrial/	2.70	1.3	0.3	100%	0.4	Unchanged from LTC DP
		Commercial		1.3	0.5	100%	0.7	
		Residential/	2.08	1.0	25	100%	26.0	Unchanged from LTC DP
		Commercial		1.0	0.5	100%	0.5	
17	17	Town centre Re-development		0.0		100%	0.0	Obtained From Tyrona
20	20	Primarily Social/community	3.1	3.1	0.1	100%	0.3	Unchanged from LTC DP
21	211	Residential/	0.4	0.2	25	100%	5.4	Unchanged from LTC DP
		Commercial		0.2	0.5	100%	0.1	
	212	Primarily Social/community	2.1	2.1	0.1	100%	0.2	Unchanged from LTC DP
22	22	Primarily Residential	13.9	13.9	25	100%	346.3	Unchanged from LTC DP
24	24	New Residential area-Dolan		0.0		100%	300.0	North N4 Bypass Dev
		New Residential area-Clonbalt		0.0		100%	200.0	North N4 Bypass Dev
25	25	Abbot site (Industrial Estate)	7.0	7.0	0.3	100%	2.1	North N4 Bypass Dev
		Primarily Residential+Golf Course (CARRRIGLASS LAP AREA)		0.0		100%	200.0	North N4 Bypass Dev
27	27	Industrial estate (on the Northern side of Dublin road roundabout)	32	32	0.3	30%	2.8	North N4 Bypass Dev

Source	
	Local Area Plan (LAP) Element
	Longford Town Council (LTC) DP
	Longford County Council (LCC) DP

Appendix A-Table 2-Development Trips for worst case scenario

For New Development after 2005 to 2013

Zone No		Additional Development (2005-2013) Land Use	AM PEAK Cars		AM PEAK HGV's		IP PEAK Cars		IP PEAK HGV's		PM PEAK Cars		PM PEAK HGV's	
LTTS Model	Rev. LAP Model		Arrival	Departures	Arrival	Departures	Arrival	Departures	Arrival	Departures	Arrival	Departures	Arrival	Departures
1	101	Employment/Mixed use (LAP)	189	61	26	9	188	208	32	36	144	267	10	19
		Residential/	21	83	3	12	25	25	4	4	88	22	6	2
		Commercial	172	81	24	11	505	501	87	86	428	470	31	34
	102	Primarily Residential	69	277	10	39	84	84	14	14	294	74	21	5
2	201	Residential (new)	91	365	13	51	111	111	19	19	387	97	28	7
		Recreational/Open space	0	0	0	0	0	0	0	0	0	0	0	0
	202	Employment/Mixed use	726	236	101	33	725	801	124	137	554	1,028	40	75
		Recreational/Open space	0	0	0	0	0	0	0	0	0	0	0	0
	203	Residential (new)	71	284	10	40	86	86	15	15	302	76	22	5
		Recreational/Open space	0	0	0	0	0	0	0	0	0	0	0	0
3	301	Residential (new)	38	153	5	21	46	46	8	8	162	41	12	3
		Residential/	1	4	0	1	1	1	0	0	5	1	0	0
		Commercial	9	4	1	1	27	26	5	5	23	25	2	2
		Recreational/Open space	0	0	0	0	0	0	0	0	0	0	0	0
	302	Primarily Residential	23	92	3	13	28	28	5	5	98	24	7	2
		Commercial (cinema and parking)	27	12	4	2	78	77	13	13	66	72	5	5
4	401	Industrial/	55	37	8	5	49	56	8	10	23	70	2	5
		Commercial	152	72	21	10	446	443	77	76	378	415	28	30
	402	Employment/Mixed use/Large Scale Convenience Retail	432	290	60	41	385	411	66	71	446	568	32	41
		Recreational/Open space	0	0	0	0	0	0	0	0	0	0	0	0
		Residential (Camlin Village)	27	110	4	15	33	33	6	6	116	29	8	2
	403	Primarily Residential	12	46	2	6	14	14	2	2	49	12	4	1
		Industrial Estate_New	59	41	8	6	53	60	9	10	25	75	2	5
		Residential/	7	28	1	4	9	9	1	1	30	7	2	1
		Commercial	58	27	8	4	171	169	29	29	145	159	11	12
	404	Residential	28	112	4	16	34	34	6	6	119	30	9	2
6	6	Primarily Residential	32	128	4	18	39	39	7	7	136	34	10	2
		Residential	22	87	3	12	26	26	5	5	92	23	7	2
		Industrial	165	113	23	16	147	168	25	29	70	210	5	15
		Industrial/	93	64	13	9	83	95	14	16	39	119	3	9
		Commercial	261	123	36	17	764	758	131	130	648	711	47	52
7	7	Residential	13	51	2	7	15	15	3	3	54	13	4	1
8	8	Primarily Residential	99	395	14	55	120	120	21	21	420	105	31	8
9	9	Primarily Residential	67	268	9	37	82	82	14	14	285	71	21	5
11	11	Industrial/	11	7	1	1	9	11	2	2	4	13	0	1
		Commercial	49	23	7	3	144	143	25	24	122	134	9	10
		Residential/	5	18	1	3	6	6	1	1	19	5	1	0
		Commercial	14	9	2	1	12	14	2	2	6	17	0	1
17	17	Town centre Re-development	0	0	0	0	0	0	0	0	0	0	0	0
20	20	Primarily Social/community	0	0	0	0	0	0	0	0	0	0	0	0
21	211	Residential/	1	4	0	1	1	1	0	0	4	1	0	0
		Commercial	8	4	1	1	23	23	4	4	19	21	1	2
	212	Primarily Social/community	0	0	0	0	0	0	0	0	0	0	0	0
22	22	Primarily Residential	61	243	8	34	74	74	13	13	258	65	19	5
24	24	New Residential area-Dolan	47	190	7	26	58	58	10	10	201	50	15	4
		New Residential area-Clonbalt	32	126	4	18	38	38	7	7	134	34	10	2
25	25	Abbot site (Industrial Estate)	49	34	7	5	44	50	8	9	21	63	2	5
		Primarily Residential+Golf Course (CARRRIGLASS LAP AREA)	25	98	3	14	30	30	5	5	104	26	8	2
27	27	Industrial estate (on the Northern side of Dublin road roundabout)	52	36	7	5	46	53	8	9	22	66	2	5

Appendix A-Table 3-Development Schedule assumptions for expected case scenario

New Development after 2005 to 2013

Zone No		Additional Development (2005-2013) Land Use	Plot Area (hectares)	Redistribution (Plot Area, hectares)	Plot Ratio/House Density (units or sqm	% of area developed in between 2005-13	Development Schedule (Units Hectare)	Comment
LTTS Model	Rev. LAP Model							
1	101	Employment/Mixed use (LAP)	3.6	3.6	0.5	50%	0.9	Replace resd/commercial designation
		Residential/	9.5	4.7	25	50%	59.2	Unchanged remainder from LTC DP
		Commercial		4.7	0.5	50%	1.2	
	102	Primarily Residential	15.8	15.8	25	100%	395	Unchanged from LTC DP
2	201	Residential (new)	20.8	20.8	25	40%	208	Unchanged from LTC DP
		Recreational/Open space	1.0	1.0		0%	0.0	Unchanged from LTC DP
	202	Employment/Mixed use	14.0	14.0	0.5	20%	1.4	Replace resd/commercial designation
		Recreational/Open space	0.5	0.5		0%	0.0	Unchanged from LTC DP
	203	Residential (new)	16.2	16.2	25	10%	40.5	Unchanged from LTC DP
		Recreational/Open space	13.8	13.8		0%	0.0	Unchanged from LTC DP
3	301	Residential (new)	8.7	8.7	25	0%	0.0	Unchanged from LTC DP
		Residential/	0.5	0.3	25	100%	6.3	
		Commercial		0.3	0.5	100%	0.1	Unchanged from LTC DP
		Recreational/Open space	6.3	6.3		0%	0.0	Unchanged from LTC DP
	302	Primarily Residential	5.3	5.3	25	50%	65.7	Unchanged from LTC DP
		Commercial (cinema and parking)	0.7	0.7	0.5	100%	0.4	
4	401	Industrial/	8.4	4.2	0.5	30%	0.6	Unchanged from LTC DP
		Commercial		4.2	0.5	30%	0.6	
	402	Employment/Mixed use/Large Scale Convenience Retail	18.0	18.0	0.22	100%	3.9	Replace industrial/commercial designation, Provision for large scale convenience retail
		Recreational/Open space	1.5	1.5		0%	0.0	Unchanged from LTC DP
		Residential (Camlin Village)	7.8	7.8	25	100%	195.2	Replace industrial/commercial designation
	403	Primarily Residential	2.6	2.6	25	50%	33.0	Unchanged from LCC DP
		Industrial Estate_New	7.6	7.6	0.3	100%	2.3	Unchanged from LCC DP
		Residential/	3.2	1.6	25	50%	20.0	
		Commercial		1.6	0.5	50%	0.4	Unchanged from LCC DP
	404	Residential	6.4	6.4	25	100%	160.2	Unchanged from LTC DP
6	6	Primarily Residential	9.7	9.7	25	100%	243.7	Unchanged from LTC DP
		Residential	6.6	6.6	25	0%	0.0	Unchanged from LCC DP
		Industrial	16.9	16.9	0.5	50%	4.2	Unchanged from LCC DP
		Industrial/	19.1	9.6	0.5	60%	2.9	Unchanged from LCC DP
		Commercial		9.6	0.5	60%	2.9	
7	7	Residential	2.9	2.9	25	50%	36.0	Unchanged from LTC DP
8	8	Primarily Residential	22.5	22.5	25	30%	168.9	Unchanged from LTC DP
9	9	Primarily Residential	15.3	15.3	25	100%	382.2	Unchanged from LTC DP
11	11	Industrial/	2.70	1.3	0.3	100%	0.4	Unchanged from LTC DP
		Commercial		1.3	0.5	100%	0.7	
		Residential/	2.08	1.0	25	0%	0.0	Unchanged from LTC DP
		Commercial		1.0	0.5	0%	0.0	
17	17	Town centre Re-development		0.0		0%	0.0	Obtained From Tyrona
20	20	Primarily Social/community	3.1	3.1	0.1	0%	0.0	Unchanged from LTC DP
21	211	Residential/	0.4	0.2	25	0%	0.0	Unchanged from LTC DP
		Commercial		0.2	0.5	0%	0.0	
	212	Primarily Social/community	2.1	2.1	0.1	0%	0.0	Unchanged from LTC DP
22	22	Primarily Residential	13.9	13.9	25	100%	346.3	Unchanged from LTC DP
24	24	New Residential area-Dolan		0.0		0%	0.0	North N4 Bypass Dev
		New Residential area-Clonbalt		0.0		0%	0.0	North N4 Bypass Dev
25	25	Abbot site (Industrial Estate)	7.0	7.0	0.3	20%	0.4	North N4 Bypass Dev
		Primarily Residential+Golf Course (CARRRIGLASS LAP AREA)		0.0		30%	60.0	North N4 Bypass Dev
27	27	Industrial estate (on the Northern side of Dublin road roundabout)	32	32	0.3	10%	0.9	North N4 Bypass Dev

Source	
	Local Area Plan (LAP) Element
	Longford Town Council (LTC) DP
	Longford County Council (LCC) DP

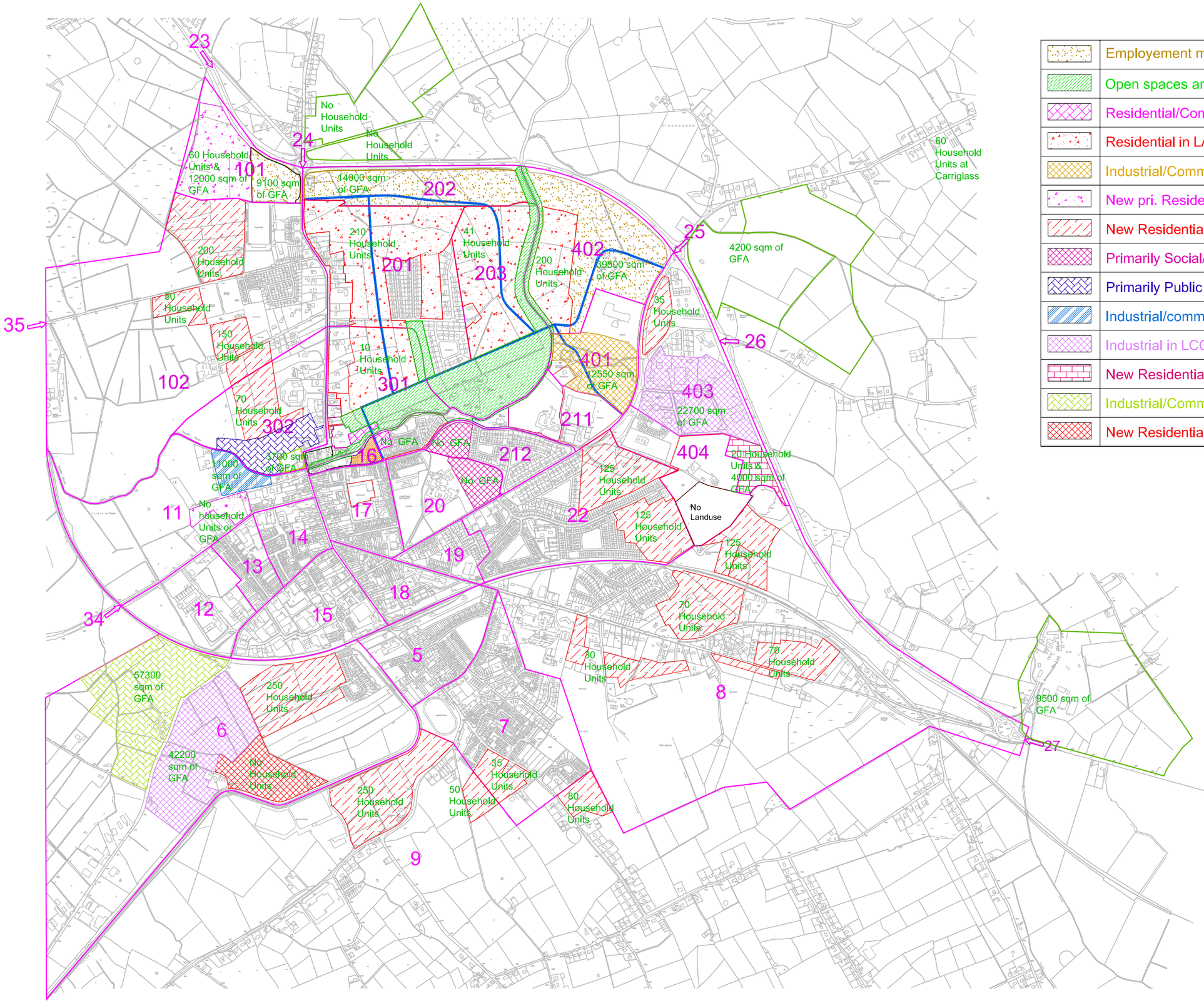
Appendix A-Table 4-Development Trips for expected case scenario

New Development after 2005 to 2013

Zone No		Additional Development (2005-2013) Land Use	AM PEAK Cars		AM PEAK HGV's		IP PEAK Cars		IP PEAK HGV's		PM PEAK Cars		PM PEAK HGV's	
LTTS Model	Rev. LAP Model		Arrival	Departures	Arrival	Departures	Arrival	Departures	Arrival	Departures	Arrival	Departures	Arrival	Departures
1	101	Employment/Mixed use (LAP)	94	31	13	4	94	104	16	18	72	134	5	10
		Residential/	10	42	1	6	13	13	2	2	44	11	3	1
		Commercial	86	40	12	6	253	250	43	43	214	235	16	17
	102	Primarily Residential	69	277	10	39	84	84	14	14	294	74	21	5
2	201	Residential (new)	36	146	5	20	44	44	8	8	155	39	11	3
		Recreational/Open space	0	0	0	0	0	0	0	0	0	0	0	0
	202	Employment/Mixed use	145	47	20	7	145	160	25	27	111	206	8	15
		Recreational/Open space	0	0	0	0	0	0	0	0	0	0	0	0
	203	Residential (new)	7	28	1	4	9	9	1	1	30	8	2	1
		Recreational/Open space	0	0	0	0	0	0	0	0	0	0	0	0
3	301	Residential (new)	0	0	0	0	0	0	0	0	0	0	0	0
		Residential/	1	4	0	1	1	1	0	0	5	1	0	0
		Commercial	9	4	1	1	27	26	5	5	23	25	2	2
		Recreational/Open space	0	0	0	0	0	0	0	0	0	0	0	0
	302	Primarily Residential	12	46	2	6	14	14	2	2	49	12	4	1
		Commercial (cinema and parking)	27	12	4	2	78	77	13	13	66	72	5	5
4	401	Industrial/	16	11	2	2	15	17	3	3	7	21	1	2
		Commercial	46	21	6	3	134	133	23	23	113	125	8	9
	402	Employment/Mixed use/Large Scale Convenience Retail	432	290	60	41	385	411	66	71	446	568	32	41
		Recreational/Open space	0	0	0	0	0	0	0	0	0	0	0	0
		Residential (Camlin Village)	27	110	4	15	33	33	6	6	116	29	8	2
	403	Primarily Residential	6	23	1	3	7	7	1	1	25	6	2	0
		Industrial Estate_New	59	41	8	6	53	60	9	10	25	75	2	5
		Residential/	4	14	0	2	4	4	1	1	15	4	1	0
		Commercial	29	14	4	2	85	85	15	15	72	79	5	6
	404	Residential	28	112	4	16	34	34	6	6	119	30	9	2
6	6	Primarily Residential	32	128	4	18	39	39	7	7	136	34	10	2
		Residential	0	0	0	0	0	0	0	0	0	0	0	0
		Industrial	82	57	12	8	73	84	13	14	35	105	3	8
		Industrial/	56	38	8	5	50	57	9	10	24	71	2	5
		Commercial	157	74	22	10	459	455	79	78	389	427	28	31
7	7	Residential	6	25	1	4	8	8	1	1	27	7	2	0
8	8	Primarily Residential	30	119	4	17	36	36	6	6	126	31	9	2
9	9	Primarily Residential	67	268	9	37	82	82	14	14	285	71	21	5
11	11	Industrial/	11	7	1	1	9	11	2	2	4	13	0	1
		Commercial	49	23	7	3	144	143	25	24	122	134	9	10
		Residential/	0	0	0	0	0	0	0	0	0	0	0	0
		Commercial	0	0	0	0	0	0	0	0	0	0	0	0
17	17	Town centre Re-development	0	0	0	0	0	0	0	0	0	0	0	0
20	20	Primarily Social/community	0	0	0	0	0	0	0	0	0	0	0	0
21	211	Residential/	0	0	0	0	0	0	0	0	0	0	0	0
		Commercial	0	0	0	0	0	0	0	0	0	0	0	0
	212	Primarily Social/community	0	0	0	0	0	0	0	0	0	0	0	0
22	22	Primarily Residential	61	243	8	34	74	74	13	13	258	65	19	5
24	24	New Residential area-Dolan	0	0	0	0	0	0	0	0	0	0	0	0
		New Residential area-Clonbalt	0	0	0	0	0	0	0	0	0	0	0	0
25	25	Abbot site (Industrial Estate)	10	7	1	1	9	10	2	2	4	13	0	1
		Primarily Residential+Golf Course (CARRRIGLASS LAP AREA)	7	29	1	4	9	9	2	2	31	8	2	1
27	27	Industrial estate (on the Northern side of Dublin road roundabout)	17	12	2	2	15	18	3	3	7	22	1	2

A2 Figure Showing Land use assumptions under Expected case development scenario between 2005-2013

Figure 1: Land Use development schedule assumptions in expected case scenario in between 2005-2013



Arup Consulting Engineers

Appendix B

ARCADY run results

B1 ARCADY run results- Do Nothing Scenario

B1.1 N4-R198 Red-cow roundabout-Do Nothing scenario

ARCADY 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 3.0 (JUNE 2005)

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Run with file:-
"C:\Longford ARCADY runs\Draft 2 runs\Red-cow roundabout\expected scenario\N4R198 2013 PM DH.vai"
(drive-on-the-left) at 14:56:00 on Friday, 1 February 2008

FILE PROPERTIES

RUN TITLE: N4/R198 Red Cow 2013 PM expected
LOCATION: Longford
DATE: 16/01/2008
CLIENT: LCC
ENUMERATOR:
JOB NUMBER: 4650.24
STATUS: On-going
DESCRIPTION:

INPUT DATA

ARM A - N4 South
ARM B - Battery road
ARM C - N4 North
ARM D - R198

GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	5.50	8.20	30.00	27.00	60.00	30.0	0.670	38.848
ARM B	4.60	7.50	22.00	35.00	60.00	33.0	0.618	33.884
ARM C	5.50	8.20	25.00	34.00	60.00	37.0	0.654	37.751
ARM D	4.00	7.50	16.00	35.00	60.00	38.0	0.577	30.389

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

TRAFFIC DEMAND DATA

(Only sets included in the current run are shown)

ARM	FLOW SCALE(%)
A	100
B	100
C	100
D	100

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

DEMAND SET TITLE: N4/Battery road/R198 2013 PM expected 2 L

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	18.45	27.68	18.45
ARM B	15.00	45.00	75.00	8.38	12.56	8.38
ARM C	15.00	45.00	75.00	13.49	20.23	13.49
ARM D	15.00	45.00	75.00	9.11	13.67	9.11

DEMAND SET TITLE: N4/Battery road/R198 2013 PM expected 2 L

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
16.45 - 18.15					
	ARM A	0.000	0.147	0.548	0.305
		0.0	217.0	809.0	450.0
		(7.8)	(7.8)	(7.8)	(7.8)
	ARM B	0.545	0.000	0.113	0.342
		365.0	0.0	76.0	229.0
		(7.8)	(7.8)	(7.8)	(7.8)
	ARM C	0.616	0.076	0.000	0.308
		665.0	82.0	0.0	332.0
		(4.2)	(4.2)	(4.2)	(4.2)
	ARM D	0.296	0.446	0.258	0.000
		216.0	325.0	188.0	0.0
		(7.0)	(7.0)	(7.0)	(7.0)

TURNING PROPORTIONS
TURNING COUNTS (VEH/HR)
(PERCENTAGE OF H.V.S)

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00									
ARM A	18.45	31.14	0.593		0.0	1.4	20.7		0.08
ARM B	8.38	20.33	0.412		0.0	0.7	10.1		0.08
ARM C	13.49	27.45	0.491		0.0	1.0	13.9		0.07
ARM D	9.11	20.55	0.444		0.0	0.8	11.4		0.09

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
ARM A	22.03	30.17	0.730		1.4	2.6	37.2		0.12
ARM B	10.00	18.16	0.551		0.7	1.2	17.3		0.12
ARM C	16.11	25.73	0.626		1.0	1.6	23.7		0.10
ARM D	10.88	19.00	0.573		0.8	1.3	18.9		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
ARM A	26.98	28.91	0.933		2.6	10.2	121.1		0.35
ARM B	12.25	15.40	0.795		1.2	3.6	46.9		0.29
ARM C	19.73	23.52	0.839		1.6	4.7	62.4		0.24
ARM D	13.33	16.98	0.785		1.3	3.4	45.3		0.26

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
ARM A	26.98	28.84	0.936		10.2	11.8	166.4		0.47
ARM B	12.25	15.17	0.807		3.6	3.9	56.7		0.33
ARM C	19.73	23.35	0.845		4.7	5.1	74.5		0.27
ARM D	13.33	16.87	0.790		3.4	3.6	52.6		0.28

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
ARM A	22.03	30.08	0.733		11.8	2.8	51.5		0.14
ARM B	10.00	17.77	0.563		3.9	1.3	21.3		0.13
ARM C	16.11	25.46	0.633		5.1	1.8	28.5		0.11
ARM D	10.88	18.83	0.578		3.6	1.4	22.4		0.13

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
ARM A	18.45	31.09	0.593		2.8	1.5	23.0		0.08
ARM B	8.38	20.22	0.414		1.3	0.7	11.0		0.08
ARM C	13.49	27.36	0.493		1.8	1.0	15.2		0.07
ARM D	9.11	20.47	0.445		1.4	0.8	12.6		0.09

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.4	*
17.15	2.6	***
17.30	10.2	**********
17.45	11.8	**********
18.00	2.8	***
18.15	1.5	*

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.7	*
17.15	1.2	*
17.30	3.6	****
17.45	3.9	****
18.00	1.3	*
18.15	0.7	*

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.0	*
17.15	1.6	**
17.30	4.7	*****
17.45	5.1	*****
18.00	1.8	**
18.15	1.0	*

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.8	*
17.15	1.3	*
17.30	3.4	***
17.45	3.6	****
18.00	1.4	*
18.15	0.8	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	2023.9	1349.3	419.9	0.21	420.0	0.21
B	918.7	612.5	163.4	0.18	163.4	0.18
C	1479.5	986.4	218.0	0.15	218.1	0.15
D	999.6	666.4	163.2	0.16	163.2	0.16
ALL	5421.8	3614.5	964.6	0.18	964.6	0.18

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

========== end of file ==========

[Printed at 14:56:35 on 01/02/2008]

B1.2 N4-N5-R194 Ballinalie roundabout-Do Nothing scenario

ARCADY 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 3.0 (JUNE 2005)

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Run with file:-
"C:\Longford ARCADY runs\Draft 2 runs\N4-N5-R194 roundabout\Expected scenario\N4N5R194 2013 PM old.vai"
(drive-on-the-left) at 14:57:09 on Friday, 1 February 2008

FILE PROPERTIES

RUN TITLE: N4/N5/R194 2013 PM 1
LOCATION: LONGFORD
DATE: 16/01/2008
CLIENT: LCC
ENUMERATOR:
JOB NUMBER: D4650.24
STATUS: On-going
DESCRIPTION:

INPUT DATA

ARM A - N4 South
ARM B - N5
ARM C - N4 North
ARM D - R194

GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	6.90	7.50	30.00	23.00	60.00	35.0	0.647	37.279
ARM B	4.40	7.40	15.00	90.00	60.00	24.0	0.624	33.309
ARM C	6.50	8.20	5.00	33.20	57.00	32.0	0.674	37.398
ARM D	7.50	7.70	8.50	95.00	60.00	8.0	0.743	43.276

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

TRAFFIC DEMAND DATA

(Only sets included in the current run are shown)

ARM	FLOW SCALE(%)
A	100
B	100
C	100
D	100

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

DEMAND SET TITLE: N4/N5/R194 2013 PM Ex 2 L

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	16.13	24.19	16.13
ARM B	15.00	45.00	75.00	11.93	17.89	11.93
ARM C	15.00	45.00	75.00	15.56	23.34	15.56
ARM D	15.00	45.00	75.00	6.44	9.66	6.44

DEMAND SET TITLE: N4/N5/R194 2013 PM Ex 2 L

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
16.45 - 18.15					
	ARM A	0.000	0.266	0.589	0.145
		0.0	343.0	760.0	187.0
		(10.2)	(10.2)	(10.2)	(10.2)
	ARM B	0.222	0.000	0.551	0.226
		212.0	0.0	526.0	216.0
		(5.4)	(5.4)	(5.4)	(5.4)
	ARM C	0.509	0.304	0.000	0.186
		634.0	379.0	0.0	232.0
		(6.2)	(6.2)	(6.2)	(6.2)
	ARM D	0.416	0.216	0.369	0.000
		214.0	111.0	190.0	0.0
		(7.6)	(7.6)	(7.6)	(7.6)

TURNING PROPORTIONS
TURNING COUNTS (VEH/HR)
(PERCENTAGE OF H.V.S)

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00									
ARM A	16.13	28.52	0.565		0.0	1.3	18.5		0.08
ARM B	11.93	22.41	0.532		0.0	1.1	16.1		0.09
ARM C	15.56	30.03	0.518		0.0	1.1	15.5		0.07
ARM D	6.44	29.07	0.221		0.0	0.3	4.2		0.04

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
ARM A	19.25	27.47	0.701		1.3	2.3	32.5		0.12
ARM B	14.24	20.60	0.691		1.1	2.2	30.5		0.15
ARM C	18.58	29.02	0.640		1.1	1.8	25.2		0.09
ARM D	7.69	26.87	0.286		0.3	0.4	5.9		0.05

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
ARM A	23.58	26.07	0.905		2.3	7.7	95.7		0.32
ARM B	17.44	18.27	0.955		2.2	10.9	120.9		0.56
ARM C	22.76	27.80	0.819		1.8	4.2	57.3		0.19
ARM D	9.41	24.02	0.392		0.4	0.6	9.4		0.07

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
ARM A	23.58	26.03	0.906		7.7	8.5	122.8		0.38
ARM B	17.44	18.12	0.963		10.9	14.3	191.6		0.86
ARM C	22.76	27.66	0.823		4.2	4.5	65.5		0.20
ARM D	9.41	23.87	0.394		0.6	0.6	9.7		0.07

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
ARM A	19.25	27.42	0.702		8.5	2.4	41.6		0.14
ARM B	14.24	20.37	0.699		14.3	2.4	52.8		0.21
ARM C	18.58	28.71	0.647		4.5	1.9	29.8		0.10
ARM D	7.69	26.61	0.289		0.6	0.4	6.2		0.05

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
ARM A	16.13	28.48	0.566		2.4	1.3	20.6		0.08
ARM B	11.93	22.33	0.534		2.4	1.2	18.2		0.10
ARM C	15.56	29.97	0.519		1.9	1.1	16.9		0.07
ARM D	6.44	28.97	0.222		0.4	0.3	4.4		0.04

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.3	*
17.15	2.3	**
17.30	7.7	********
17.45	8.5	*********
18.00	2.4	**
18.15	1.3	*

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.1	*
17.15	2.2	**
17.30	10.9	**********
17.45	14.3	**************
18.00	2.4	**
18.15	1.2	*

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.1	*
17.15	1.8	**
17.30	4.2	****
17.45	4.5	****
18.00	1.9	**
18.15	1.1	*

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.3	
17.15	0.4	
17.30	0.6	*
17.45	0.6	*
18.00	0.4	
18.15	0.3	

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
A	1768.9	1179.2	331.6	0.19	331.6	0.19
B	1308.1	872.1	430.1	0.33	430.1	0.33
C	1707.2	1138.1	210.1	0.12	210.1	0.12
D	706.2	470.8	39.7	0.06	39.7	0.06
ALL	5490.3	3660.2	1011.5	0.18	1011.6	0.18

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

========== end of file ==========

[Printed at 14:57:48 on 01/02/2008]

B1.3 N4-R393 Dublin road roundabout-Do Nothing scenario

ARCADY 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 3.0 (JUNE 2005)

For sales and distribution information,
program advice and maintenance, contact:

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Web: www.trlsoftware.co.uk

Run with file:-
"C:\Longford ARCADY runs\Draft 2 runs\Dublin road roundabout\Expected scenario\N4R393 2013 PM ex.vai"
(drive-on-the-left) at 14:58:26 on Friday, 1 February 2008

FILE PROPERTIES

RUN TITLE: N4-R393 Dublin road 2013 PM 1
LOCATION: LONGFORD
DATE: 16/01/2008
CLIENT: LCC
ENUMERATOR:
JOB NUMBER: D4650.24
STATUS: On-going
DESCRIPTION:

INPUT DATA

ARM A - N4 South
ARM B - R393 dublin road
ARM C - N4 North

GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	4.60	8.20	25.00	35.20	80.00	31.0	0.546	36.305
ARM B	4.40	8.20	29.00	21.10	80.00	41.0	0.518	34.468
ARM C	7.60	7.80	10.00	63.20	80.00	25.0	0.598	41.326

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

TRAFFIC DEMAND DATA

(Only sets included in the current run are shown)

ARM	FLOW SCALE(%)
A	100
B	100
C	100

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

DEMAND SET TITLE: N4/R393 2013 PM Ex 2 L

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS IFALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
ARM A	15.00	45.00	75.00	13.16	19.74	13.16
ARM B	15.00	45.00	75.00	12.04	18.06	12.04
ARM C	15.00	45.00	75.00	13.79	20.68	13.79

DEMAND SET TITLE: N4/R393 2013 PM Ex 2 L

TIME	FROM/TO	TURNING PROPORTIONS / TURNING COUNTS (VEH/HR) / (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000 0.0 (12.7)%	0.300 316.0 (12.7)%	0.700 737.0 (12.7)%
	ARM B	0.464 447.0 (7.3)%	0.000 0.0 (7.3)%	0.536 516.0 (7.3)%
	ARM C	0.623 687.0 (7.5)%	0.377 416.0 (7.5)%	0.000 0.0 (7.5)%

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00									
ARM A	13.16	29.51	0.446		0.0	0.8	11.7		0.06
ARM B	12.04	27.13	0.444		0.0	0.8	11.5		0.07
ARM C	13.79	35.12	0.393		0.0	0.6	9.4		0.05

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
ARM A	15.72	28.98	0.542		0.8	1.2	17.1		0.08
ARM B	14.37	26.14	0.550		0.8	1.2	17.6		0.08
ARM C	16.46	34.47	0.478		0.6	0.9	13.4		0.06

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
ARM A	19.25	28.26	0.681		1.2	2.1	29.9		0.11
ARM B	17.60	24.81	0.710		1.2	2.4	33.4		0.14
ARM C	20.16	33.59	0.600		0.9	1.5	21.6		0.07

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
ARM A	19.25	28.25	0.681		2.1	2.1	31.6		0.11
ARM B	17.60	24.79	0.710		2.4	2.4	35.9		0.14
ARM C	20.16	33.57	0.601		1.5	1.5	22.4		0.07

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
ARM A	15.72	28.97	0.543		2.1	1.2	18.6		0.08
ARM B	14.37	26.11	0.551		2.4	1.2	19.3		0.09
ARM C	16.46	34.44	0.478		1.5	0.9	14.2		0.06

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
ARM A	13.16	29.50	0.446		1.2	0.8	12.5		0.06
ARM B	12.04	27.10	0.444		1.2	0.8	12.4		0.07
ARM C	13.79	35.10	0.393		0.9	0.7	9.9		0.05

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.8	*
17.15	1.2	*
17.30	2.1	**
17.45	2.1	**
18.00	1.2	*
18.15	0.8	*

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.8	*
17.15	1.2	*
17.30	2.4	**
17.45	2.4	**
18.00	1.2	*
18.15	0.8	*

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.6	*
17.15	0.9	*
17.30	1.5	*
17.45	1.5	*
18.00	0.9	*
18.15	0.7	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND	* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH) (VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	1443.9 962.6	121.2	0.08	121.3	0.08
B	1320.5 880.3	130.2	0.10	130.2	0.10
C	1512.4 1008.3	90.8	0.06	90.8	0.06
ALL	4276.8 2851.2	342.2	0.08	342.2	0.08

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

========== end of file ==========

[Printed at 14:58:45 on 01/02/2008]

B2 ARCADY run results- With improvements scenario

B2.1 N4-R198 Red-cow roundabout - With Improvements scenario

ARCADY 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 3.0 (JUNE 2005)

For sales and distribution information,
program advice and maintenance, contact:

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Web: www.trlsoftware.co.uk

Run with file:-
"C:\Longford ARCADY runs\Draft 3 runs-After NRA meeting\Red-cow roundabout\expected scenario\N4R198 2013 PM DH.vai"
(drive-on-the-left) at 15:49:55 on Tuesday, 19 February 2008

FILE PROPERTIES

RUN TITLE: N4/R198 Red Cow 2013 PM expected after NRA meeting
LOCATION: Longford
DATE: 16/01/2008
CLIENT: LCC
ENUMERATOR:
JOB NUMBER: 4650.24
STATUS: On-going
DESCRIPTION:

INPUT DATA

ARM A - N4 South
ARM B - Battery road
ARM C - N4 North
ARM D - R198

GEOMETRIC DATA

ARM A HAS A ZEBRA CROSSING

ARM B HAS A ZEBRA CROSSING

ARM C HAS A ZEBRA CROSSING

ARM D HAS A ZEBRA CROSSING

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	7.16	9.20	30.00	40.00	60.00	24.5	0.758	46.561
ARM B	6.80	7.50	20.00	35.00	60.00	16.5	0.697	40.063
ARM C	6.80	8.10	30.00	34.00	60.00	19.0	0.719	42.444
ARM D	4.40	7.70	16.00	35.00	60.00	18.5	0.634	34.223

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

TRAFFIC DEMAND DATA

(Only sets included in the current run are shown)

ARM	FLOW SCALE(%)
A	100
B	100
C	100
D	100

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

DEMAND SET TITLE: N4/Battery road/R198 2013 PM expected 2 L

ARM	FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	FLOW STOPS IFALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	18.45	27.68	18.45
ARM B	15.00	45.00	75.00	8.38	12.56	8.38
ARM C	15.00	45.00	75.00	13.49	20.23	13.49
ARM D	15.00	45.00	75.00	9.11	13.67	9.11

DEMAND SET TITLE: N4/Battery road/R198 2013 PM expected 2 L

TURNING PROPORTIONS
TURNING COUNTS (VEH/HR)
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
16.45 - 18.15	ARM A	0.000	0.147	0.548	0.305
		0.0	217.0	809.0	450.0
		(7.8)	(7.8)	(7.8)	(7.8)
	ARM B	0.545	0.000	0.113	0.342
		365.0	0.0	76.0	229.0
		(7.8)	(7.8)	(7.8)	(7.8)
	ARM C	0.616	0.076	0.000	0.308
		665.0	82.0	0.0	332.0
		(4.2)	(4.2)	(4.2)	(4.2)
	ARM D	0.296	0.446	0.258	0.000
		216.0	325.0	188.0	0.0
		(7.0)	(7.0)	(7.0)	(7.0)

PEDESTRIAN CROSSING DATA

PEDESTRIAN CROSSING FLOW:

ARM A: PEDESTRIAN FLOWS ARE INPUT DIRECTLY.
ARM B: PEDESTRIAN FLOWS ARE INPUT DIRECTLY.
ARM C: PEDESTRIAN FLOWS ARE INPUT DIRECTLY.
ARM D: PEDESTRIAN FLOWS ARE INPUT DIRECTLY.

ZEBRA CROSSINGS

ARM	LENGTH OF CROSSING (M) (ENTRY)	(EXIT)	QUEUEING SPACE BETWEEN CROSSING AND JUNCTION ENTRY (VEHS)	QUEUEING SPACE WITHOUT BLOCKING BACK INTO JUNCTION (VEHS)
A	9.20		3.0	4.0
B	7.50		2.0	4.0
C	8.10		2.0	4.0
D	7.70		2.0	4.0

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME		DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00										
	ARM A	18.45	36.76	0.502	6.0	0.0	1.0	14.6		0.05
	ARM B	8.38	24.20	0.346	6.0	0.0	0.5	7.7		0.06
	ARM C	13.49	30.08	0.448	6.0	0.0	0.8	11.8		0.06
	ARM D	9.11	22.48	0.405	4.0	0.0	0.7	9.8		0.07

TIME		DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15										
	ARM A	22.03	35.76	0.616	6.0	1.0	1.6	23.0		0.07
	ARM B	10.00	21.75	0.460	6.0	0.5	0.8	12.3		0.08
	ARM C	16.11	27.99	0.575	6.0	0.8	1.3	19.4		0.08
	ARM D	10.88	20.53	0.530	4.0	0.7	1.1	16.1		0.10

TIME		DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30										
	ARM A	26.98	34.41	0.784	6.0	1.6	3.5	48.7		0.13
	ARM B	12.25	18.29	0.670	6.0	0.8	2.0	27.5		0.16
	ARM C	19.73	24.41	0.808	6.0	1.3	3.9	53.0		0.20
	ARM D	13.33	17.61	0.757	4.0	1.1	2.9	39.9		0.22

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
ARM A	26.98	34.35	0.786	6.0	3.5	3.6	53.2		0.14
ARM B	12.25	18.19	0.673	6.0	2.0	2.0	30.0		0.17
ARM C	19.73	24.28	0.813	6.0	3.9	4.2	61.1		0.22
ARM D	13.33	17.48	0.763	4.0	2.9	3.1	45.5		0.24

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
ARM A	22.03	35.67	0.618	6.0	3.6	1.6	25.6		0.07
ARM B	10.00	21.62	0.463	6.0	2.0	0.9	13.6		0.09
ARM C	16.11	27.87	0.578	6.0	4.2	1.4	22.1		0.09
ARM D	10.88	20.37	0.534	4.0	3.1	1.2	18.5		0.11

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
ARM A	18.45	36.72	0.502	6.0	1.6	1.0	15.6		0.05
ARM B	8.38	24.13	0.347	6.0	0.9	0.5	8.2		0.06
ARM C	13.49	30.01	0.449	6.0	1.4	0.8	12.6		0.06
ARM D	9.11	22.42	0.407	4.0	1.2	0.7	10.7		0.08

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.0	*
17.15	1.6	**
17.30	3.5	***
17.45	3.6	****
18.00	1.6	**
18.15	1.0	*

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.5	*
17.15	0.8	*
17.30	2.0	**
17.45	2.0	**
18.00	0.9	*
18.15	0.5	*

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.8	*
17.15	1.3	*
17.30	3.9	****
17.45	4.2	****
18.00	1.4	*
18.15	0.8	*

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.7	*
17.15	1.1	*
17.30	2.9	***
17.45	3.1	***
18.00	1.2	*
18.15	0.7	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	2023.9	1349.3	180.8	0.09	180.8	0.09
B	918.7	612.5	99.3	0.11	99.3	0.11
C	1479.5	986.4	180.0	0.12	180.0	0.12
D	999.6	666.4	140.5	0.14	140.5	0.14
ALL	5421.8	3614.5	600.6	0.11	600.6	0.11

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

========== end of file ==========

[Printed at 15:51:06 on 19/02/2008]

B2.2 N4-N5-R194 Ballinalie roundabout - With Improvements scenario

ARCADY 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 3.0 (JUNE 2005)

For sales and distribution information,
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Run with file:-
"C:\Longford ARCADY runs\Draft 3 runs-After NRA meeting\N4-N5-R194 roundabout\Expected scenario\N4N5R194 2013 PM old.vai"
(drive-on-the-left) at 15:42:09 on Tuesday, 19 February 2008

FILE PROPERTIES

RUN TITLE: N4/N5/R194 2013 PM 1 after NRA Meeting
LOCATION: LONGFORD
DATE: 16/01/2008
CLIENT: LCC
ENUMERATOR:
JOB NUMBER: D4650.24
STATUS: On-going
DESCRIPTION:

INPUT DATA

ARM A - N4 South
ARM B - N5
ARM C - N4 North
ARM D - R194

GEOMETRIC DATA

ARM A HAS A ZEBRA CROSSING

ARM B HAS A ZEBRA CROSSING

ARM C HAS A ZEBRA CROSSING

ARM D HAS A ZEBRA CROSSING

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	6.70	9.10	30.00	20.40	60.00	35.0	0.703	42.772
ARM B	6.86	7.40	25.00	27.10	60.00	14.0	0.694	39.735
ARM C	6.50	8.20	30.00	30.00	60.00	24.5	0.703	41.511
ARM D	4.50	7.80	20.00	45.00	60.00	6.0	0.680	37.346

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

TRAFFIC DEMAND DATA

(Only sets included in the current run are shown)

ARM	FLOW SCALE(%)
A	100
B	100
C	100
D	100

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

DEMAND SET TITLE: N4/N5/R194 2013 PM Ex 2 L

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	16.13	24.19	16.13
ARM B	15.00	45.00	75.00	11.93	17.89	11.93
ARM C	15.00	45.00	75.00	15.56	23.34	15.56
ARM D	15.00	45.00	75.00	6.44	9.66	6.44

DEMAND SET TITLE: N4/N5/R194 2013 PM Ex 2 L

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
16.45 - 18.15		TURNING PROPORTIONS / TURNING COUNTS (VEH/HR) / (PERCENTAGE OF H.V.S)			
	ARM A	0.000 0.0 (10.2)	0.266 343.0 (10.2)	0.589 760.0 (10.2)	0.145 187.0 (10.2)
	ARM B	0.222 212.0 (5.4)	0.000 0.0 (5.4)	0.551 526.0 (5.4)	0.226 216.0 (5.4)
	ARM C	0.509 634.0 (6.2)	0.304 379.0 (6.2)	0.000 0.0 (6.2)	0.186 232.0 (6.2)
	ARM D	0.416 214.0 (7.6)	0.216 111.0 (7.6)	0.369 190.0 (7.6)	0.000 0.0 (7.6)

PEDESTRIAN CROSSING DATA

PEDESTRIAN CROSSING FLOW:

ARM A: PEDESTRIAN FLOWS ARE INPUT DIRECTLY.
ARM B: PEDESTRIAN FLOWS ARE INPUT DIRECTLY.
ARM C: PEDESTRIAN FLOWS ARE INPUT DIRECTLY.
ARM D: PEDESTRIAN FLOWS ARE INPUT DIRECTLY.

ZEBRA CROSSINGS

ARM	LENGTH OF CROSSING (M) (ENTRY)	(EXIT)	QUEUEING SPACE BETWEEN CROSSING AND JUNCTION ENTRY (VEHS)	QUEUEING SPACE WITHOUT BLOCKING BACK INTO JUNCTION (VEHS)
A	9.10		3.0	4.0
B	7.40		2.0	4.0
C	8.20		2.0	4.0
D	7.80		2.0	4.0

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME		DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00										
	ARM A	16.13	32.84	0.491	4.0	0.0	1.0	13.9		0.06
	ARM B	11.93	26.94	0.443	4.0	0.0	0.8	11.5		0.07
	ARM C	15.56	33.16	0.469	4.0	0.0	0.9	12.8		0.06
	ARM D	6.44	23.77	0.271	4.0	0.0	0.4	5.4		0.06
17.00-17.15										
	ARM A	19.25	31.71	0.607	4.0	1.0	1.5	22.1		0.08
	ARM B	14.24	24.48	0.582	4.0	0.8	1.4	19.8		0.10
	ARM C	18.58	32.13	0.578	4.0	0.9	1.4	19.8		0.07
	ARM D	7.69	21.73	0.354	4.0	0.4	0.5	8.0		0.07
17.15-17.30										
	ARM A	23.58	30.14	0.783	4.0	1.5	3.4	47.7		0.15
	ARM B	17.44	20.54	0.849	4.0	1.4	5.0	64.3		0.28
	ARM C	22.76	30.74	0.740	4.0	1.4	2.8	39.0		0.12
	ARM D	9.41	18.82	0.500	4.0	0.5	1.0	14.3		0.11

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
ARM A	23.58	30.11	0.783	4.0	3.4	3.5	52.5		0.15
ARM B	17.44	20.39	0.855	4.0	5.0	5.5	79.2		0.33
ARM C	22.76	30.66	0.742	4.0	2.8	2.8	42.1		0.13
ARM D	9.41	18.73	0.503	4.0	1.0	1.0	15.0		0.11

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
ARM A	19.25	31.67	0.608	4.0	3.5	1.6	24.7		0.08
ARM B	14.24	24.32	0.585	4.0	5.5	1.4	23.6		0.10
ARM C	18.58	32.02	0.580	4.0	2.8	1.4	21.8		0.08
ARM D	7.69	21.61	0.356	4.0	1.0	0.6	8.6		0.07

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
ARM A	16.13	32.81	0.491	4.0	1.6	1.0	15.0		0.06
ARM B	11.93	26.86	0.444	4.0	1.4	0.8	12.4		0.07
ARM C	15.56	33.12	0.470	4.0	1.4	0.9	13.7		0.06
ARM D	6.44	23.71	0.272	4.0	0.6	0.4	5.7		0.06

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.0	*
17.15	1.5	**
17.30	3.4	***
17.45	3.5	****
18.00	1.6	**
18.15	1.0	*

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.8	*
17.15	1.4	*
17.30	5.0	*****
17.45	5.5	*****
18.00	1.4	*
18.15	0.8	*

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.9	*
17.15	1.4	*
17.30	2.8	***
17.45	2.8	***
18.00	1.4	*
18.15	0.9	*

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.4	
17.15	0.5	*
17.30	1.0	*
17.45	1.0	*
18.00	0.6	*
18.15	0.4	

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	1768.9	1179.2	175.9	0.10	175.9	0.10
B	1308.1	872.1	210.8	0.16	210.8	0.16
C	1707.2	1138.1	149.1	0.09	149.1	0.09
D	706.2	470.8	56.9	0.08	56.9	0.08
ALL	5490.3	3660.2	592.8	0.11	592.8	0.11

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

========== end of file ==========

[Printed at 15:42:57 on 19/02/2008]

B2.3 N4-R393 Dublin road roundabout - With Improvements scenario

ARCADY 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 3.0 (JUNE 2005)

For sales and distribution information,
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Run with file:-
"C:\Longford ARCADY runs\Draft 3 runs-After NRA meeting\Dublin road roundabout\Expected scenario\N4R393 2013 PM ex.vai"
(drive-on-the-left) at 16:32:12 on Tuesday, 19 February 2008

FILE PROPERTIES

RUN TITLE: N4-R393 Dublin road 2013 PM after NRA meeting
LOCATION: LONGFORD
DATE: 16/01/2008
CLIENT: LCC
ENUMERATOR:
JOB NUMBER: D4650.24
STATUS: On-going
DESCRIPTION:

INPUT DATA

ARM A - N4 South
ARM B - R393 dublin road
ARM C - N4 North

GEOMETRIC DATA

ARM A HAS A ZEBRA CROSSING

ARM B HAS A ZEBRA CROSSING

ARM C HAS A ZEBRA CROSSING

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	7.40	7.90	25.00	43.70	44.00	35.0	0.772	40.108
ARM B	4.40	7.50	29.00	21.10	80.00	33.0	0.517	33.618
ARM C	5.50	7.90	30.00	63.20	80.00	15.5	0.599	40.559

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

TRAFFIC DEMAND DATA

(Only sets included in the current run are shown)

ARM	FLOW SCALE(%)
A	100
B	100
C	100

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

DEMAND SET TITLE: N4/R393 2013 PM Ex 2 L

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS IFALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	13.16	19.74	13.16
ARM B	15.00	45.00	75.00	12.04	18.06	12.04
ARM C	15.00	45.00	75.00	13.79	20.68	13.79

DEMAND SET TITLE: N4/R393 2013 PM Ex 2 L

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.300	0.700
		0.0	316.0	737.0
		(12.7)%	(12.7)%	(12.7)%
	ARM B	0.464	0.000	0.536
		447.0	0.0	516.0
		(7.3)%	(7.3)%	(7.3)%
	ARM C	0.623	0.377	0.000
		687.0	416.0	0.0
		(7.5)%	(7.5)%	(7.5)%

PEDESTRIAN CROSSING DATA

PEDESTRIAN CROSSING FLOW:

ARM A: PEDESTRIAN FLOWS ARE INPUT DIRECTLY.
ARM B: PEDESTRIAN FLOWS ARE INPUT DIRECTLY.
ARM C: PEDESTRIAN FLOWS ARE INPUT DIRECTLY.

ZEBRA CROSSINGS

ARM	LENGTH OF CROSSING (M) (ENTRY)	(EXIT)	QUEUEING SPACE BETWEEN CROSSING AND JUNCTION ENTRY (VEHS)	QUEUEING SPACE WITHOUT BLOCKING BACK INTO JUNCTION (VEHS)
A	7.90		2.0	4.0
B	7.50		2.0	4.0
C	7.90		2.0	4.0

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME		DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00										
	ARM A	13.16	31.44	0.419	4.0	0.0	0.7	10.5		0.05
	ARM B	12.04	25.41	0.474	4.0	0.0	0.9	12.9		0.07
	ARM C	13.79	33.37	0.413	4.0	0.0	0.7	10.3		0.05
17.00-17.15										
	ARM A	15.72	30.65	0.513	4.0	0.7	1.0	15.3		0.07
	ARM B	14.37	24.07	0.597	4.0	0.9	1.5	21.0		0.10
	ARM C	16.46	32.54	0.506	4.0	0.7	1.0	14.9		0.06
17.15-17.30										
	ARM A	19.25	29.45	0.654	4.0	1.0	1.9	26.6		0.10
	ARM B	17.60	21.54	0.817	4.0	1.5	4.1	54.8		0.23
	ARM C	20.16	31.22	0.646	4.0	1.0	1.8	25.8		0.09
17.30-17.45										
	ARM A	19.25	29.43	0.654	4.0	1.9	1.9	28.0		0.10
	ARM B	17.60	21.46	0.820	4.0	4.1	4.3	63.8		0.26
	ARM C	20.16	31.16	0.647	4.0	1.8	1.8	27.1		0.09

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
ARM A	15.72	30.63	0.513	4.0	1.9	1.1	16.4		0.07
ARM B	14.37	24.01	0.599	4.0	4.3	1.5	24.4		0.11
ARM C	16.46	32.47	0.507	4.0	1.8	1.0	16.0		0.06

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
ARM A	13.16	31.42	0.419	4.0	1.1	0.7	11.1		0.05
ARM B	12.04	25.37	0.474	4.0	1.5	0.9	14.1		0.08
ARM C	13.79	33.34	0.414	4.0	1.0	0.7	10.8		0.05

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.7	*
17.15	1.0	*
17.30	1.9	**
17.45	1.9	**
18.00	1.1	*
18.15	0.7	*

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.9	*
17.15	1.5	*
17.30	4.1	****
17.45	4.3	****
18.00	1.5	**
18.15	0.9	*

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.7	*
17.15	1.0	*
17.30	1.8	**
17.45	1.8	**
18.00	1.0	*
18.15	0.7	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	1443.9	962.6	107.9	0.07	107.9	0.07
B	1320.5	880.3	191.1	0.14	191.1	0.14
C	1512.4	1008.3	105.0	0.07	105.0	0.07
ALL	4276.8	2851.2	403.9	0.09	404.0	0.09

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

========== end of file ==========

[Printed at 16:32:40 on 19/02/2008]

B2.4 Ballinalee Road (N5)-Longford Business Park- Laurel Avenue-Roundabout- With Improvements scenario

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 3.0 (JUNE 2005)

_____

For sales and distribution information,
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Run with file:-
"c:\Longford ARCADY runs\Development access junction\2_Development access junction_2013 DH_with pedestrian .vai"
(drive-on-the-left) at 17:31:25 on Tuesday, 15 April 2008

FILE PROPERTIES
****

RUN TITLE: New Development access junction 2013 DH
LOCATION: Longford
DATE: 26/09/2006
CLIENT: LCC
ENUMERATOR:
JOB NUMBER: D4650.24
STATUS: On-going
DESCRIPTION:

INPUT DATA
****
ARM A - N5 South
ARM B - Development Access
ARM C - N5 North

GEOMETRIC DATA

ARM B HAS A ZEBRA CROSSING

ARM C HAS A ZEBRA CROSSING

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	7.00	7.00	0.00	21.00	34.00	36.0	0.725	34.696
ARM B	6.00	6.00	0.00	10.00	34.00	35.0	0.632	28.293
ARM C	7.00	7.00	0.00	15.00	34.00	34.0	0.716	34.283

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

TRAFFIC DEMAND DATA

(Only sets included in the current run are shown)

ARM	FLOW SCALE(%)
A	100
B	100
C	100

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

DEMAND SET TITLE: New Development access 2013 DH expected L

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	TOP OF PEAK IS REACHED	FLOW STOPS IFALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
	TO RISE					
ARM A	15.00	45.00	75.00	7.50	11.25	7.50
ARM B	15.00	45.00	75.00	7.46	11.19	7.46
ARM C	15.00	45.00	75.00	10.40	15.60	10.40

DEMAND SET TITLE: New Development access 2013 DH expected L

TIME	FROM/TO	ARM A	ARM B	ARM C
16.45 - 18.15		TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S)		
	ARM A	0.000 0.0 (5.7)	0.188 113.0 (5.7)	0.812 487.0 (5.7)
	ARM B	0.219 131.0 (6.1)	0.000 0.0 (6.1)	0.781 466.0 (6.1)
	ARM C	0.513 427.0 (7.5)	0.487 405.0 (7.5)	0.000 0.0 (7.5)

PEDESTRIAN CROSSING DATA

PEDESTRIAN CROSSING FLOW:

ARM B: PEDESTRIAN FLOWS ARE INPUT DIRECTLY.
ARM C: PEDESTRIAN FLOWS ARE INPUT DIRECTLY.

ZEBRA CROSSINGS

ARM	LENGTH OF CROSSING (M) (ENTRY)	(EXIT)	QUEUEING SPACE BETWEEN CROSSING AND JUNCTION ENTRY (VEHS)	QUEUEING SPACE WITHOUT BLOCKING BACK INTO JUNCTION (VEHS)
B	7.00	7.00	2.0	4.0
C	7.00	7.00	2.0	4.0

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00									
ARM A	7.50	28.91	0.259		0.0	0.3	5.1		0.05
ARM B	7.46	20.61	0.362	6.0	0.0	0.6	8.2		0.08
ARM C	10.40	28.47	0.365	6.0	0.0	0.6	8.4		0.06

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)		PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15										
ARM A	8.96	28.02	0.320			0.3	0.5	6.9		0.05
ARM B	8.91	19.39	0.459		6.0	0.6	0.8	12.2		0.10
ARM C	12.42	28.29	0.439		6.0	0.6	0.8	11.4		0.06

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)		PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30										
ARM A	10.97	26.73	0.410			0.5	0.7	10.2		0.06
ARM B	10.91	17.44	0.626	BB	6.0	0.8	1.6	23.1		0.15
ARM C	15.21	28.04	0.542		6.0	0.8	1.2	17.1		0.08

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)		PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45										
ARM A	10.97	26.71	0.411			0.7	0.7	10.4		0.06
ARM B	10.91	17.41	0.627	BB	6.0	1.6	1.7	24.7		0.15
ARM C	15.21	28.04	0.543		6.0	1.2	1.2	17.6		0.08

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)		PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00										
ARM A	8.96	28.01	0.320			0.7	0.5	7.2		0.05
ARM B	8.91	19.36	0.460		6.0	1.7	0.9	13.4		0.10
ARM C	12.42	28.28	0.439		6.0	1.2	0.8	12.1		0.06

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)		PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15										
ARM A	7.50	28.88	0.260			0.5	0.4	5.4		0.05
ARM B	7.46	20.58	0.363		6.0	0.9	0.6	8.8		0.08
ARM C	10.40	28.46	0.365		6.0	0.8	0.6	8.8		0.06

WARNING Entry capacities in certain time segments
(flagged BB in Queue and Delay Table) are restricted due
to traffic queueing to leave the junction on an adjacent arm

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.3	
17.15	0.5	
17.30	0.7	*
17.45	0.7	*
18.00	0.5	
18.15	0.4	

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.6	*
17.15	0.8	*
17.30	1.6	**
17.45	1.7	**
18.00	0.9	*
18.15	0.6	*

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.6	*
17.15	0.8	*
17.30	1.2	*
17.45	1.2	*
18.00	0.8	*
18.15	0.6	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	822.7	548.5	45.2	0.05	45.2	0.05
B	818.6	545.7	90.5	0.11	90.5	0.11
C	1140.8	760.6	75.5	0.07	75.5	0.07
ALL	2782.2	1854.8	211.1	0.08	211.2	0.08

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

========== end of file ==========

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