

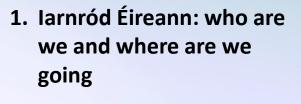
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## **larnród Éireann**















& Historical Context

2. DART Expansion Concept

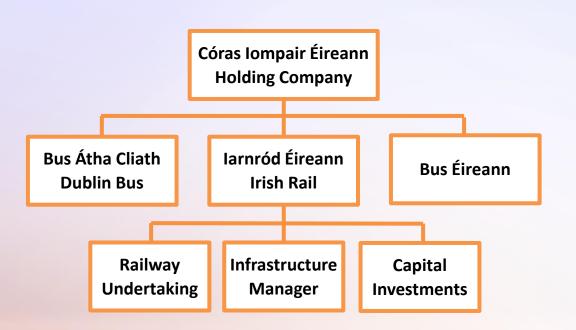






3. DART Expansion National Development Plan 2018-2027

# **Iarnród Éireann Organisation Division**



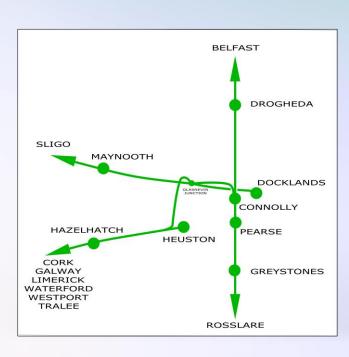
- Commercial semi-state body;
- >3,800 employees;
- Divided into three business divisions:
  - Railway Operator
  - Infrastructure
     Maintenance
  - Delivery of Capital Investment projects



## **Iarnród Éireann's Services & Network**

Asset	Qty
Bridges	5,100
Level Crossings	1,240
Stations	144
Cuttings & Embankments	+4,900
Tunnels	14







# **Iarnród Éireann - Our Network, Our Services**



4,915

923,000

passengers carried

Each week:

carriages in our fleet

stations served countrywide

kilometres in our network

348,000

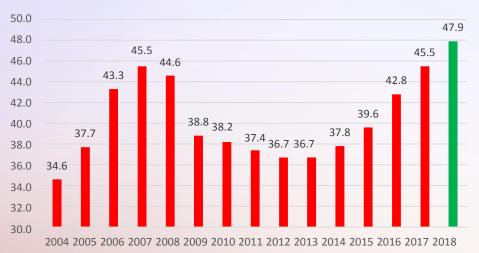
kilometres travelled

>3,800 employees



# Surge in Demand for larnród Éireann Services

#### Passenger journeys (millions)



Journeys (m)	2017	2018
Intercity	11.4m	12.4m
Commuter	14.0m	14.6m
DART	20.1m	20.9m
TOTAL	45.5m	47.9m





#### **DART Expansion Objectives to support Ireland 2040**

#### Current

#### 48m Passengers

Annual Steady-State fleet and infrastructure maintenance & renewal DART 10-minute service Off-peak and weekend Commuter enhancement

#### **NDP 2027**

#### 75m+ Passengers

Additional fleet capacity.

DART Expansion priority phases including 300 additional carriages and depot

Improved station accessibility

Improved customer access (including P&R) interfaces (sales channels & information)

#### Rail Vision 2040

#### 100m+ Passengers

Ongoing annual SteadyState fleet and
infrastructure maintenance
& renewal
Complete DART
Expansion
Expand electrification
Hybrid rail operations on
all non electrified
routes

eann



#### **Dublin's Growth**

"Dublin is no longer a small city. With the current regional population of about 850,000 and a vehicle ownership of 160,000, it has assumed many of the characteristics of concentrated urban living which have made life difficult and have presented long-term serious problems in the urban areas of other countries.....Parking has reached saturation level with present facilities. Existing public transport has been unable to effect significant improvement due to congestion on aerial routes into and out of the city"

The Dublin Transportation Study, 1971

**852,200/1,062,200** 1971 Population of Dublin/GDA (CSO)

#### **Dublin 1971**















#### **Dublin 2019**

Aspect	1971	Current	Difference
Population of Dublin	852,200	1,345,400	+58%
Population of GDA	1,062,200	1,904,800	+79%
Vehicle Ownership in Dublin	160,000	503,000	+214%
Vehicle Ownership in GDA	199,400(*)	736,600	+269%

larnród Éireann Irish Rail

<sup>\*</sup> Vehicle Ownership in GDA estimated by pro-rata relationship to 1971 population of Dublin/GDA.

#### **Early History and Evolution of DART**

- Modernisation & expansion of the rail network was conceived in:
  - 1971 Dublin Transportation Study (Dublin Corporation); and
  - 1975 Dublin Rapid Rail Transit Study (DRRTS) (CIE).
- DRRTS recommended progressive expansion and electrification of the radial lines in Dublin Region, including tunnel to link Heuston environs to Connolly environs
- Funding of DRRTS resulted in:
  - Delivery of Howth to Bray DART in 1984 (Phase 1 of DTTRS);
  - Centralised Traffic Control Centre in Heuston; and
  - Purchase of rolling stock.
- Further expansion halted by 1980's recession
- 1990's investment focused on development of Motorway network

## **Existing DART System**

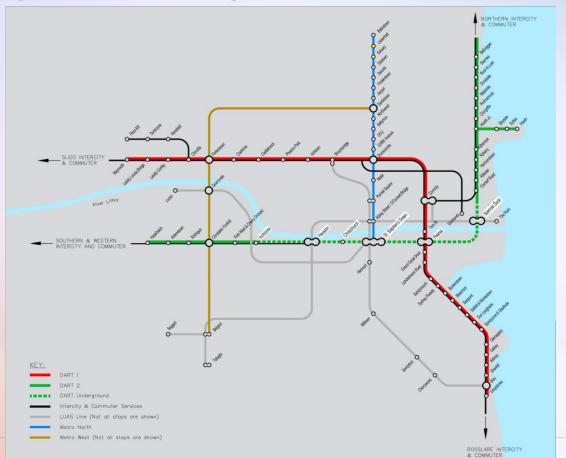
- 1<sup>st</sup> DART train operated on 23 July 1984 from Howth to Bray;
- Construction of DART was subject of severe criticism from politician and economists based on cost and value for money
- Extension of DART to Malahide and Greystones was commissioned in early 2000's



#### **History and Evolution of DART Expansion**

- 2000 Dublin Suburban Rail Strategic Review vision of rail network to 2020
- 2001 A Platform for Change Integrated Transport Strategy for GDA (DTO)
  - —Genesis for DART Expansion Programme;
  - Recommended upgrade and expansion of DART/Commuter Lines, provision of new stations, longer platforms/train, removal of level crossings & resignalling;
  - Rail Interconnector (DART Underground) endorsed
  - Electrification of radial lines.
  - New Traffic Control System
- 2005 Transport 21 Infrastructure Investment Framework
  - Endorsed the creation of an expanded Heavy Rail network within the Greater Dublin Area, including DART Underground tunnel link.

## **Transport 21 Concept**





#### **Delivery of DART Expansion**

#### **Rolling Stock and Radial Route Improvements**

- 2000-2004 DART 8500 Class rolling stock acquired;
- 2006 DART Upgrade completed (lengthening of platforms, upgrading of power supply);
- 2009 Kildare Route Project Phase 1 four tracking & stations completed 2009;
- 2010 M3 Parkway spur completed.
- 2011 DART Underground Railway Order approved by An Bord Pleanála;
- 2016 IE commence examination of lower cost technical solutions
- Ongoing City Centre Resignalling.
- Ongoing New National Train Control Centre

## 2016-2018 DART Expansion Review



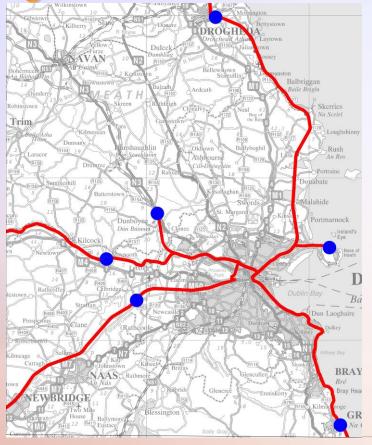
A number of options were examined to seek to deliver a lower cost solution:

- Tunnel study reconfirmed twin bore tunnels for DART Underground;
- Tunnel-Cork Mainline study concluded that some savings could be made by moving tunnel portal out of Inchicore and closer to N4;
- Transport modelling concluded that DART Expansion with DART Underground offered greatest benefits but with highest associated capital cost;
- DART Expansion with DART Underground still unaffordable in medium term;
- Other non-DART Underground scenarios explored, focusing on "sweating the existing assets" and targeted interventions to allow early capacity increases for short to medium term requirements

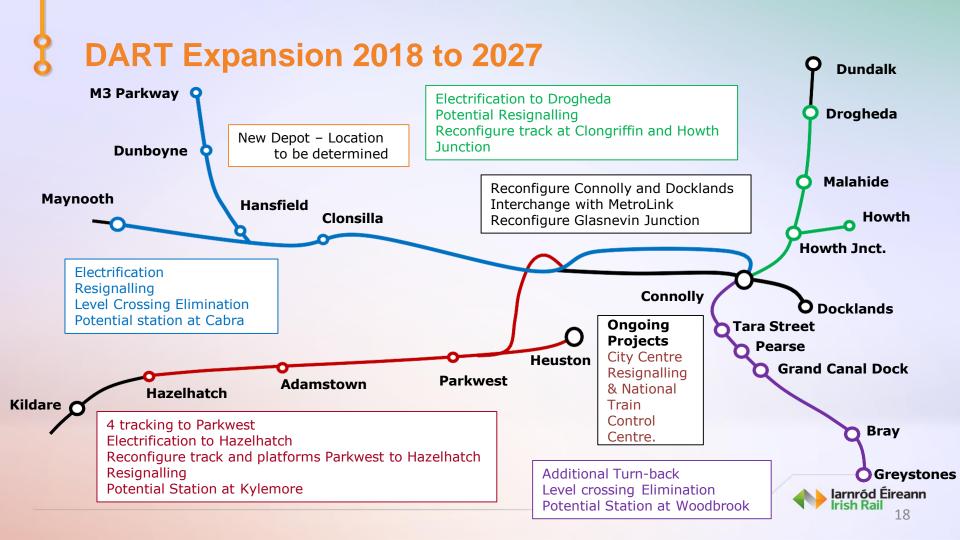
## **DART Expansion and National Development Plan**

- National Development Plan 2018-2027 includes for investing to deliver priority elements of DART Expansion Programme:
  - 35% towards rolling stock and ancillary depot/stabling
  - 65% towards infrastructural improvements
- 1st investment focus early delivery of increased service capacity:
  - Procure additional DART Expansion rolling stock and ancillary depot/stabling infrastructure; and
  - Deliver non-tunnel city centre capacity enhancements at Connolly / Docklands
- 2<sup>nd</sup> investment focus improvements to radial routes
- DART Underground Tunnel alignment will be established and protected for future delivery to meet long term passenger demands.

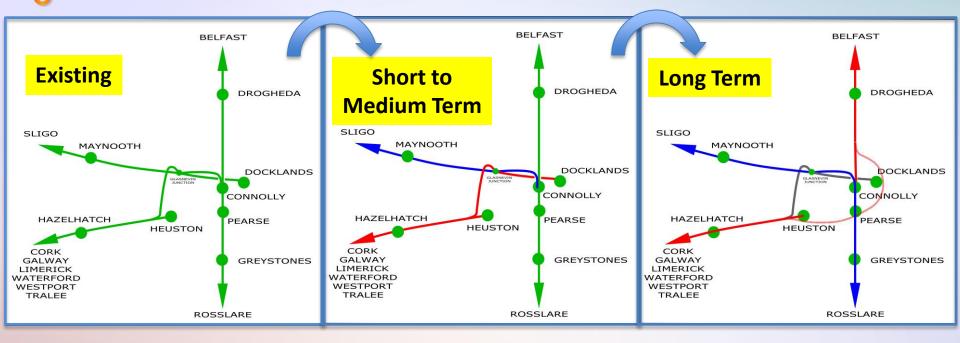
#### **Extent of DART Expansion - NDP**



- Drogheda on Northern Line
- Maynooth on Sligo Line
- Hazelhatch (Celbridge) on Cork Mainline
- Greystones on Southeast Line
- Encompasses approximately 150km of rail corridor
- Electrification of network
- **Expand DART services**
- Phased delivery to meet projected future passenger demands
- Spine of integrated Public Transport Network



# Phased Delivery of full DART Expansion Infrastructure



Capacity 26,000 into the city centre at the peak hour.

Capacity 60,000 into the city centre at the peak hour.

Capacity 80,000 into the city centre at the peak hour.

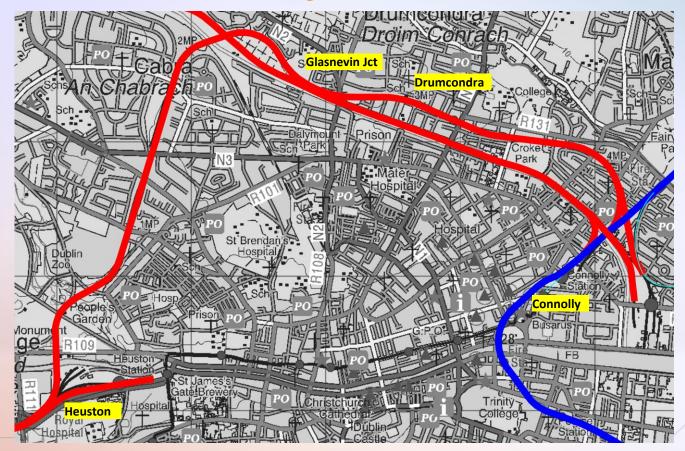


## **DART Expansion Rolling Stock**

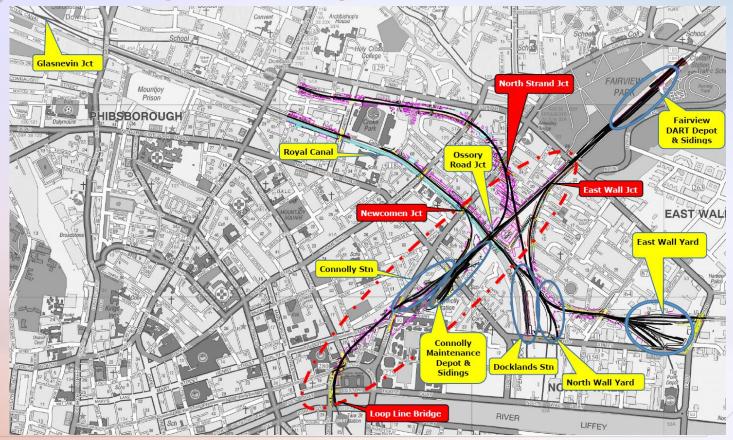
- All available rolling stock is currently being utilised to meet current operational timetable;
- Need to consider phased delivery of new DART Expansion infrastructure
- Fleet strategy addressing short, medium and long term requirements
  - Potentially up to 300 DART Expansion fleet;
  - Take account of implementation of the new train protection system;

Short Term	Medium Term	Long Term
Acquire 2nd hand fleet	New rolling stock Hybrid and/or Full Electric	New electric DART units
Purchase ICR intermediate carriages	, ·	

# **Iarnród Éireann's City Centre Network**



## **DART Expansion City Centre Enhancements**





#### **DART Expansion City Centre Enhancements - Connolly**

- Minimise junction conflicts and optimise timetabled through-running / terminating patterns at Connolly and Docklands;
- Connolly Enhancement Study has recently commenced with objective:
  - > Deliver a practical layout for enhancing the capacity to meet short to medium term service requirements;
  - Minimise the crossover conflict between Western lines and Northern line.
- Concepts to be explored include reserving Platform 5&6 for Northern through-running services, reserve Platform 7&8 (new) for Western services & track remodelling

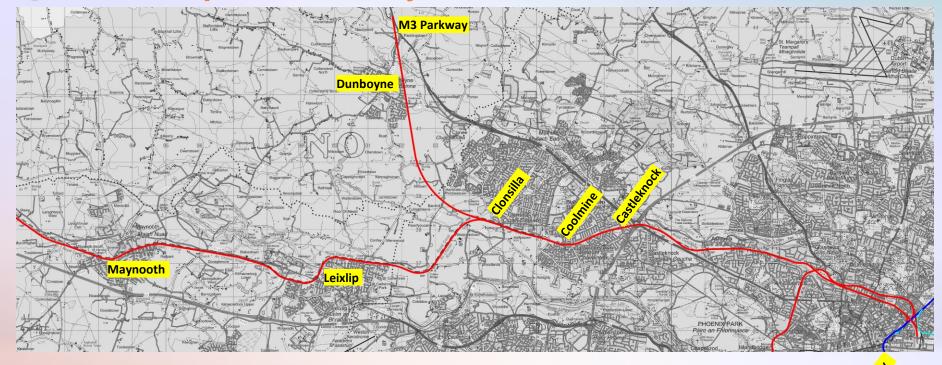


#### **DART Expansion City Centre Enhancements - Docklands**

- Docklands will accommodate overflow from Connolly;
- Docklands Station Study has recently commenced with objective:
  - Identify optional location to best serve North Docklands/IFSC;
  - Deliver a practical layout for optimal access from MGWR, GSWR and Northern Line (if feasible);
- Two options
  - Existing
  - > Spencer Dock



## **DART Expansion – Maynooth Line**



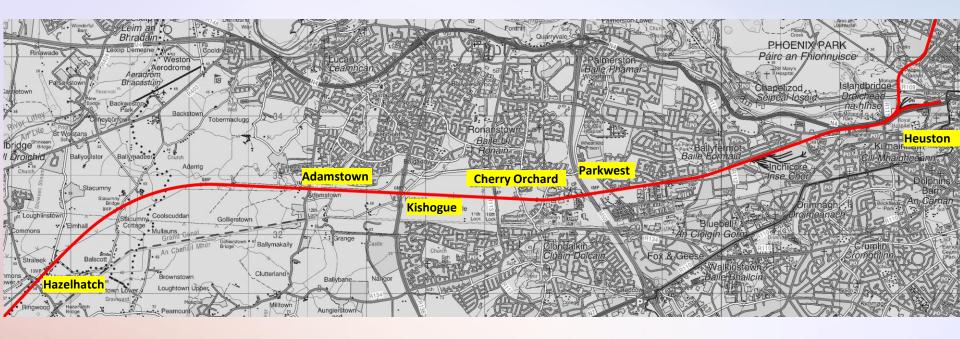


## **DART Expansion – Maynooth Line**

- Improvement of Maynooth/M3 Parkway line required to increase capacity:
  - > Permanently close 6 public road level crossing
  - > Re-signal;
  - > Electrify;
  - ➤ New maintenance and stabling DART Expansion depot;
  - ➤ Interchange station with Metrolink at Glasnevin/Phibbsborough (MGWR & GSWR & Metrolink interchange);
- Transportation study is currently underway to inform the extent of relief bridges required for crossing closure (vehicular bridges or pedestrian/cyclist bridges);
- Liaison with TII and and NTA in relation to Metrolink



## **DART Expansion – Kildare Line**



#### **DART Expansion – Kildare Line**

- Projected demand requires continuation of 4 tracking from Park West in to Heuston.
  - > 4 tracking, Park West to Heuston (approx 4km);
  - > Install retaining walls and civil works (approx 6km);
  - > Bridge alterations at Le-Fanu, Kylemore, Sarsfield, Memorial and N4/SCR
  - > Resignalling;
  - Electrification of DART Expansion lines (Mainline & PPT);
  - New station west of Heuston; and
  - > DART Expansion lines (to north) connecting to Phoenix Park Tunnel & Heuston
- Intercity lines (to south) connecting to Heuston



## **DART Expansion – Northern Line**

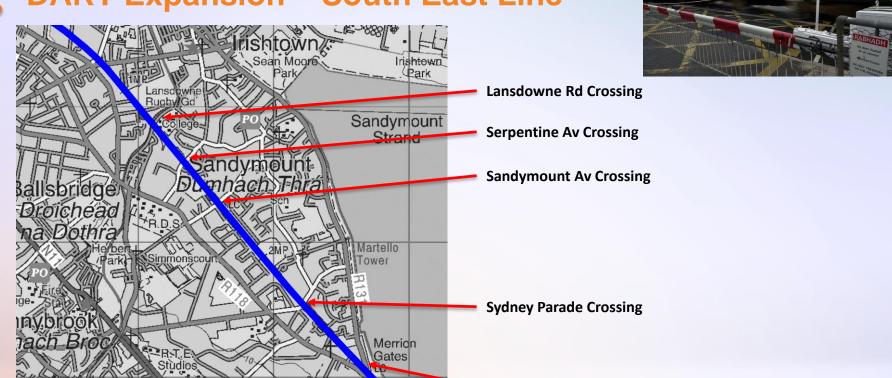
- Extend electrification from Malahide to Drogheda (38km)
- Upgrade Drogheda Depot
- Overbridge alterations
- Resignalling
- Electrification
- Complete Clongriffin Station passing loops



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#### **DART Expansion – South East Line**

St Vincent's Merrio



3MP

**Strand Road/Merrion Gates Crossing** 

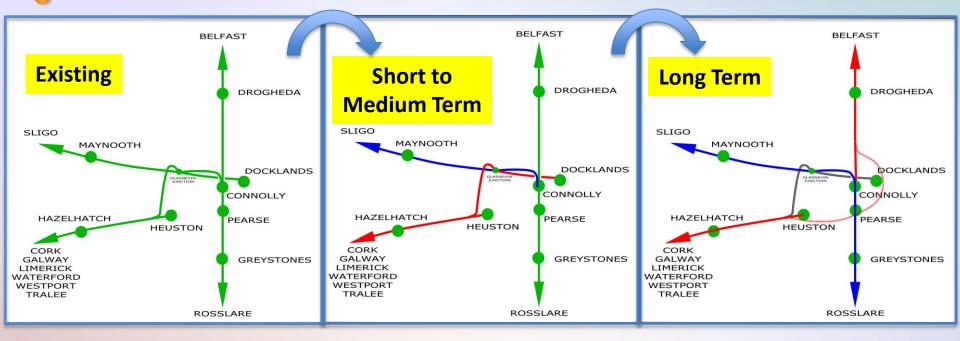




- Provide high capacity turnback;
- Elimination of level crossings between Lansdowne and Merrion subject to review with NTA/Local Authority;
- Review Tara Street Station requirements further to MetroLink interchange (projected large transfer pattern).

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## Phased Delivery of full DART Expansion Infrastructure



Capacity 26,000 into the city centre at the peak hour.

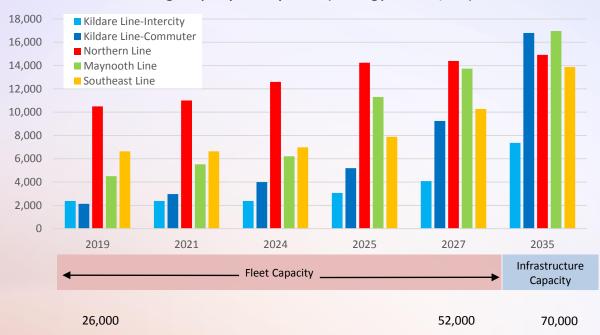
Capacity 60,000 into the city centre at the peak hour.

Capacity 80,000 into the city centre at the peak hour.



#### **Capacity Delivery**

#### Passenger Capacity into City Centre (morning peak hour / line)





## **Decarbonisation of Economy and Transport Sector**



United Nations
Framework Convention on
Climate Change



Number 46 of 2015

Climate Action and Low Carbon Development Act 2015





- Legal Drivers
  - European Commission White Paper on Transport, 2011
  - Paris Climate Agreement (COP21), 2015
  - Climate Action and Low Carbon Development Act, 2015
  - National Policy Framework-Alternative Fuels Infrastructure for Transport in Ireland, May 2017
  - National (Low Carbon) Mitigation Plan, July 2017
- Requirements
  - Migration to predominantly electrical energy source for passenger cars and commuter rail from 2030-2050;
  - Transport and Energy sector to do "heavy lift" in achieving national reduction in GHG emission reduction.

## **DART Expansion - Sustainable Development**





DART Expansion offers benefits to the 3 pillars of sustainability:

- Economy (National & Regional)
  - Permits high density development
  - Access to employers and employees
  - Access to markets and services
- Society
  - Improvements to quality of life in terms of employment choices and lifestyle choice
  - Integrated mass public transport network
- **Environment** 
  - Congestion
  - o Emissions



## **DART Expansion Conclusions**

- Rail has an established infrastructure network from Regions to City Centre that should be a valued national asset;
- Expansion in GDA will be backbone of mass public transport network incl. IE Commuter, DART, Luas, Metro & Bus;
- Operational Benefits;
  - Journey time reliability;
  - Passenger productivity benefits (beneficial time management);
  - Sustainable development incl. reduced emissions and higher density development;
  - Good safety & national cost benefits in rail investment.





# Engineering Career Opportunities in Capital Investments









Email capitalprogrecruitment@irishrail.ie