DART Expansion - National Development Plan (2018-2027)

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1. Iarnród Éireann: who are we and where are we going

2. DART Expansion Concept & Historical Context

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

<table>
<thead>
<tr>
<th>Asset</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridges</td>
<td>5,100</td>
</tr>
<tr>
<td>Level Crossings</td>
<td>1,240</td>
</tr>
<tr>
<td>Stations</td>
<td>144</td>
</tr>
<tr>
<td>Cuttings &amp; Embankments</td>
<td>+4,900</td>
</tr>
<tr>
<td>Tunnels</td>
<td>14</td>
</tr>
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</table>
### Iarnród Éireann - Our Network, Our Services

| Each week: | 
|------------|--------------------------------------------------|
| **4,915**  | train services run                              |
| **629**    | carriages in our fleet                          |
| **2,200**  | kilometres in our network                       |
| **923,000**| passengers carried                               |
| **144**    | stations served countrywide                      |
| **348,000**| kilometres travelled                             |
| **>3,800** | employees                                        |
Surge in Demand for Iarnród Éireann Services

Passenger journeys (millions)

<table>
<thead>
<tr>
<th>Journeys (m)</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercity</td>
<td>11.4m</td>
<td>12.4m</td>
</tr>
<tr>
<td>Commuter</td>
<td>14.0m</td>
<td>14.6m</td>
</tr>
<tr>
<td>DART</td>
<td>20.1m</td>
<td>20.9m</td>
</tr>
<tr>
<td>TOTAL</td>
<td>45.5m</td>
<td>47.9m</td>
</tr>
<tr>
<td>Current</td>
<td>NDP 2027</td>
<td>Rail Vision 2040</td>
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<tr>
<td>---------</td>
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</tr>
<tr>
<td><strong>48m Passengers</strong>&lt;br&gt;Annual Steady-State fleet and infrastructure maintenance &amp; renewal&lt;br&gt;DART 10-minute service&lt;br&gt;Off-peak and weekend Commuter enhancement</td>
<td><strong>75m+ Passengers</strong>&lt;br&gt;Additional fleet capacity.&lt;br&gt;DART Expansion priority phases including 300 additional carriages and depot&lt;br&gt;Improved station accessibility&lt;br&gt;Improved customer access (including P&amp;R) interfaces (sales channels &amp; information)</td>
<td><strong>100m+ Passengers</strong>&lt;br&gt;Ongoing annual Steady-State fleet and infrastructure maintenance &amp; renewal&lt;br&gt;Complete DART Expansion&lt;br&gt;Expand electrification&lt;br&gt;Hybrid rail operations on all non-electrified routes</td>
</tr>
</tbody>
</table>
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 2019

<table>
<thead>
<tr>
<th>Aspect</th>
<th>1971</th>
<th>Current</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population of Dublin</td>
<td>852,200</td>
<td>1,345,400</td>
<td>+58%</td>
</tr>
<tr>
<td>Population of GDA</td>
<td>1,062,200</td>
<td>1,904,800</td>
<td>+79%</td>
</tr>
<tr>
<td>Vehicle Ownership in Dublin</td>
<td>160,000</td>
<td>503,000</td>
<td>+214%</td>
</tr>
<tr>
<td>Vehicle Ownership in GDA</td>
<td>199,400(*)</td>
<td>736,600</td>
<td>+269%</td>
</tr>
</tbody>
</table>

* 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:
  o 1971 Dublin Transportation Study (Dublin Corporation); and
  o 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

- 1st 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
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
- 2nd 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
DART Expansion 2018 to 2027

- Electrification to Drogheda
- Potential Resignalling
- Reconfigure track at Clongriffin and Howth Junction

- Reconfigure Connolly and Docklands Interchange with MetroLink
- Reconfigure Glasnevin Junction

- New Depot – Location to be determined

- Electrification
- Resignalling
- Level Crossing Elimination
- Potential station at Cabra

- 4 tracking to Parkwest
- Electrification to Hazelhatch
- Reconfigure track and platforms Parkwest to Hazelhatch
- Resignalling
- Potential Station at Kylemore

- Ongoing Projects
  - City Centre Resignalling & National Train Control Centre.

- Additional Turn-back
- Level crossing Elimination
- Potential Station at Woodbrook
Phased Delivery of full DART Expansion Infrastructure

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

**Short to Medium Term**
- Capacity 60,000 into the city centre at the peak hour.

**Long Term**
- 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;

<table>
<thead>
<tr>
<th>Short Term</th>
<th>Medium Term</th>
<th>Long Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquire 2nd hand fleet</td>
<td>New rolling stock</td>
<td>New electric DART units</td>
</tr>
<tr>
<td>Purchase ICR intermediate carriages</td>
<td>Hybrid and/or Full Electric</td>
<td></td>
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Iarnród Éireann’s City Centre Network
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.
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 stabilising 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 NTA in relation to Metrolink
DART Expansion – Kildare Line

Hazelhatch → Adamstown → Kishogue → Cherry Orchard → Parkwest → Heuston
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
DART Expansion – South East Line

- Strand Road/Merrion Gates Crossing
- Sydney Parade Crossing
- Sandymount Av Crossing
- Serpentine Av Crossing
- Lansdowne Rd Crossing
DART Expansion – South East Line

- 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).
Phased Delivery of full DART Expansion Infrastructure

Existing

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

Short to Medium Term

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

Long Term

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

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

- Kildare Line-Intercity
- Kildare Line-Commuter
- Northern Line
- Maynooth Line
- Southeast Line

<table>
<thead>
<tr>
<th>Year</th>
<th>2019</th>
<th>2021</th>
<th>2024</th>
<th>2025</th>
<th>2027</th>
<th>2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity Delivery</td>
<td>26,000</td>
<td>52,000</td>
<td>70,000</td>
<td></td>
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</tr>
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Fleet Capacity

Infrastructure Capacity

- Fleet Capacity
- Infrastructure Capacity
Decarbonisation of Economy and Transport Sector

• **Legal Drivers**
  - 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 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
  - Emissions

Completed, 2008
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;
  o Journey time reliability;
  o Passenger productivity benefits (beneficial time management);
  o Sustainable development incl. reduced emissions and higher density development;
  o Good safety & national cost benefits in rail investment.
Engineering Career Opportunities in Capital Investments

Email
capitalprogrecruitment@irishrail.ie