



**MetroLink**

Transport Infrastructure Ireland

**Technical Note – OCS/OCR Benefits over Third Rail**

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## MetroLink

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## Document history and status

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## 1. Introduction

MetroLink project represents a significant advancement in urban transit, aiming to offer a safe, efficient, and sustainable transportation solution for the Dublin area.

The choice of the electrification contact system is crucial in achieving these goals. After thorough analysis, the Overhead Contact System (OCS) and Overhead Contact Rail (OCR) was identified as the optimal choice over the Third Rail system, based on several key considerations.

This Technical Note sets out to An Bord Pleanála the technical reasons and benefits of OCS/OCR in comparison to third rail.

## 2. Advantages and Benefits of OCS / OCR versus Third Rail

### 2.1 Operational Efficiency

- Metro systems at **higher voltages are more energy-efficient**. An OCS/OCR system **supports higher voltage** levels (1500V DC for MetroLink) than the Third Rail (maximum 750V DC), facilitating better energy transmission over longer distances and enabling higher-speed operations due to lower currents.
- The use of OCS/OCR **allows MetroLink to have a traction power system at 1500V DC**. Operating at 1500V DC, OCS/OCR facilitates more efficient power transmission over longer distances **with less energy losses**.
- This efficiency reduces **potential voltage drop issues**, allowing for **wider spacing between substations**. Such spacing is advantageous in terms of **space utilisation and cost**, impacting the overall design and placement of stations and related infrastructure positively.

### 2.2 Safety and Design Philosophy

- The MetroLink **project prioritises clear track beds for passenger safety**, particularly **during evacuations and interventions**. OCS/OCR does not intrude into the track bed, unlike the Third Rail, **which could pose tripping hazards**.
- The **OCS/OCR is away from the ground level**, which makes it a **safer system for staff** and people against **the risk of electrocution** due to the electrified or live elements being kept away from direct contact.

### 2.3 Infrastructure and Spatial Considerations

- The bored tunnel diameter has **more space provision in the vertical dimension** to accommodate OCS than in the horizontal dimension to accommodate third rail and allows MetroLink to accommodate the OCS/OCR **with minimal spatial constraints**. In contrast, the Third Rail system would face challenges due to horizontal clearance within the tunnel section due to the additional rail on each side, potentially requiring a larger tunnel diameter, which impacts the efficient use of space and could complicate emergency access and passenger flow.

### **3. Conclusion**

Having evaluated both systems, the Overhead Contact System (OCS) and Overhead Conductor Rail (OCR) significantly outweighs the Third Rail option for the MetroLink project. OCS/OCR better aligns with the project's safety, evacuation, efficiency, and sustainability goals.