

# JASPERS

## Guidance Note

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Date:	<b>02 May 2022</b>
JASPERS assignment code:	2019/155/IE/TRA/URT
Project title:	<b>Dublin Metrolink.</b>
Subject:	<i>Project Review: Phase 3(Preliminary Business Case) incorporating Independent External Review</i>
Country(s)	<b>Ireland</b>
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## **A.1. Purpose and Alignment**

### *A.1.1. What is the purpose of the project?*

Metrolink will connect Swords to Charlemont, linking Dublin Airport, Irish Rail, DART, Dublin Bus and Luas services, creating fully integrated public transport in the Greater Dublin Area. As well as linking major transport hubs, Metrolink will connect key destinations including Ballymun, the Mater Hospital, the Rotunda Hospital, Dublin City University and Trinity College Dublin

### *A.1.2. Is the problem the intervention is trying to solve clear?*

Yes, in the context that the project is part of a broader strategy to reduce the impact of transport in the Greater Dublin Area, according to the GDA Transport Strategy.

### *A.1.3. Does this align with PI 2040 and Climate Action Plan?*

Yes, subject to a demonstration of the CO<sub>2</sub> impact of the project. The project likely falls within the EU Taxonomy on Climate Investments. The project is included as an objective in Project Ireland 2040 and in the Climate Action Plan, 2019.

### *A.1.4. Have the policy and delivery assumptions been captured, challenged and agreed with all key stakeholders?*

There appears to be relatively strong consensus on the project concept amongst key stakeholders, apart from isolated issues such as those impacting on the finalization of the design for St Stephens Green. It is noted that the revised design for St Stephens Green arose following the objective to provide a connection to Charlemont/Ranelagh, which is no longer considered a priority by the independent review team.

### *A.1.5. Is the projects needs/demand analysis robust?*

Our review highlights a strong underlying potential for substantial passenger demand on the Metrolink corridor, given the high baseline levels of private car use in the Dublin Area. Nevertheless, this outcome might only be achieved with the introduction of strong supporting measures (either now or during the lifetime of the project), such as an integrated ticketing solution, the reorganization of other public transport to complement the service provided by metro (e.g. in Swords), consolidating the role of metro and avoiding competitive bus services, as well as strong car restraint measures in the City Centre and at Dublin Airport. Whilst the high demand forecasts reported by the ERM might be achieved or exceeded with the introduction of such measures, we note that these have not been explicitly included in the scenario testing.

Even so, there remain a number of uncertainties regarding the demand forecasting. The long term response to COVID, the impacts of DART+ and BusConnects, optimistic airport demand forecasts with overestimated peak loadings, in addition to the ambitious long term population and demographic forecasting beyond 2040 all suggest some limited overestimation of the demand forecasts.

The relevance of the peak hour demand is especially relevant on the critical section of the line where the passenger flow of 15,000 passengers per hour in 2060 defines the system capacity (i.e. the delivery of a full specification metro solution). As such, a reduction in the peak flow (either through a reduction in overall demand or a flattening of the peak profiles) on this critical section is related to the question of overall system specification. A light rail type solution has been examined and can

deliver a cost reduction of 20%, although MetroLink would operate on the upper limits of the passenger capacity of such a system.

*A.1.6. How stable is the scope of the project?*

The project has a well defined scope, with only minor design issues remaining to be addressed. Nevertheless, there is scope for exploration of the design solution, as well as appropriate phasing and start/end points, in the case of affordability constraints..

## **A.2. Feasibility, Capability and Enabling Projects**

*A.2.1. Have reasonable alternatives been considered? Is there a clear best option? If there are several options that would meet the need, how was the robustness tested?*

On the basis of the information provided, and supported by supplementary analysis, we conclude that there are a number of aspects of the investment that require deeper understanding. One critical aspect relates to the technical design of the system, where a target directional capacity of 20,000pph has been set. This target capacity drives the technical solution for MetroLink.

A comparative cost analysis of MetroLink with the lower specification LR7 system shows that MetroLink delivers a capacity increase of 30% to 50% with a cost increase of approximately 20%. The MetroLink solution has been selected through the incremental optimization of LR7 through the Preliminary Business Case stage.

Interchange between Luas/Metro services is available at St Stephens Green and O'Connell Street, and the proposal to deliver through-services between Swords and Sandyford has been postponed for the foreseeable future. The justification for the connection from St Stephens Green to Charlemont/Ranelagh is based on the perceived difficulty of adding this as a separate project at a later date.

The section of the route between Dublin Airport and Swords remains expensive given the objective of full segregation, with the additional cost of delivering full segregation being to the order of €300m. The dynamics of passenger movements through Swords, particularly for those outside the metro catchment, are not fully evident, and require a comprehensive plan for local passenger transport services connecting with metro. The lower volumes through Swords suggest that full segregation may not be needed here due to the possibility of slightly lower service frequencies between the Airport and Swords, with a turnback close to Dublin Airport to facilitate higher frequencies into the City Centre – this would require the system to be redesigned in its entirety as a manually operated system (GoA0 or GoA1), which would have additional opex implications, although the extent of this is not presented.

In relation to the complementing bus network, there is duplication of services with BusConnects through Ballymun, whilst the Metrolink is seen to lead to a reduction in demand of 20% to 30% on Luas Green Line Services between Broombridge and the City Centre, due to duplication of aspects of this corridor.

*A.2.2. Does the preferred option represent value for money and a sufficient solution to the problem identified?*

The proposed project does offer value for money according to the economic analysis, bearing in mind the above comments relating to the demand forecasting.

*A.2.3. Have the constraints been assessed including legislation, policy issues, regulatory issues, environmental issues, and impact on the physical and technical environment?*

From our review of the material in the Business Case, there are no evident gaps in the assessment of physical constraints.

*A.2.4. Is the delivery strategy feasible? Have the conditions and constraints within which this strategy is feasible been identified? Does the body have the skills and expertise to deliver the project?*

From our review of the material in the Business Case, there are no evident feasibility issues in the delivery strategy, although we do consider that given the cost issues that there should be some consideration of phasing of the alignment as well as phasing incremental increases in capacity as the passenger demand increases across the evaluation period.

There is a recognition that TII/NTA have limited expertise in the delivery of a project of this scale or technology, and this is influencing the procurement model which foresees a Project Delivery Partner as well as a series of governance structures.

*A.2.5. Has there been an initial assessment of the market appetite, particularly for risk?*

This has not been assessed as part of the JASPERS Review

*A.2.6. Does the Sponsoring Agency have the capacity and capability to undertake the intervention proposed?*

There is a recognition that TII/NTA have limited expertise in the delivery of a project of this scale or technology, and this is influencing the procurement model which foresees a Project Delivery Partner as well as a series of governance structures.

*A.2.7. Are there complementary or enabler projects identified to deliver the benefits of this project?*

The project is a stand-alone investment that interacts with other operational systems such as DART and Luas.

The benefits of the project are driven by passenger demand. Whilst the high demand forecasts might be achieved or exceeded with the introduction of very strong demand management measures for the Dublin Area, we note that these have not been explicitly included in the scenario testing and are not included in any concrete way within the project. The need for a complementary local area transport strategy in Swords has also been highlighted in this review.

*A.2.8. Has the project's funding priority as part of the Approving Authority's capital allocation been agreed?*

This has not been assessed as part of the JASPERS Review

*A.2.9. Has due account been taken of lessons learned from similar projects?*

There are no comparable projects in Ireland within the transport sector. Nonetheless, the record of delivery of transport projects has been good, with TII/NTA bringing good experience in the delivery of urban LRT and major road infrastructure (including the Dublin Port Tunnel), demonstrating that the establishment of specific delivery entities with technical delivery teams can provide effective project implementation.

**A.3. Costs and Benefits**

*A.3.1. Are project costs including contingencies and benefits realistic?*

Costs and contingencies are appropriately calculated. Regarding the project's scope and design several technical aspects appear to make the project expensive: in particular the inclusion of full segregation along the 7 km section beyond the airport, the inclusion of the connection to Ranelagh/Charlemont, the use of relatively short distances between city centre stations, and very high station costs.

*A.3.2. Have cost ranges been identified for different performance scenarios? Have these been benchmarked?*

The Project's Unit Costs at 2017 prices (including civil works, equipment, rolling stock and contingencies) are equal to an equivalent of EUR 322m per kilometre or EUR 260m per metro-set, which exceed costs for systems serving a similar passenger demand across Europe (EUR 122m or EUR 60m respectively).

Using a separate database, the comparable unit cost for a subset of projects in Germany, Belgium and Denmark suggests a unit rate in the region of €280m/km, although this assumes full construction in tunnel, and would likely be €220m/km to €240m/km when using the same split between above/below ground as Metrolink.

*A.3.3. Has a funding model and/or expenditure trajectory been mapped out? Is the envisaged spend affordable?*

This has not been assessed as part of the JASPERS Review

*A.3.4. What drives the cost, schedule, benefits, productivity and performance of the project?*

The main cost driver is the Civil Works Unit Cost (which only includes the base cost components without any contingencies), where the EU's average is around EUR 86m, while Metrolink costs EUR 181m per kilometre (more than double). The objective of connecting to a future upgraded Luas Green Line, providing full segregation through Swords, and the provision of large station boxes is likely to be driving this high unit cost.

*A.3.5. Has a benefits realisation strategy been considered?*

The draft Monitoring and Evaluation Plan is presented as elaborating the first activity (monitoring) but in fact deals with many of the issues covered under the second activity (benefit realisation), which is presented in the main document as being more closely related to the Cost Benefit Analysis.

The monitoring itself is, however, quite focused on the operational stage of the project, and with a clear focus on the quality of service provided by the operator. Benefit Realisation therefore has the risk of becoming an academic activity with limited relevance to actual socio-economic impacts, whilst the evaluation examines observed outcomes over a long period beyond the immediate horizon of the project.

#### **A.4. Stakeholders and Risk**

##### *A.4.1. How will the key stakeholders impact on the project?*

This has not been assessed as part of the JASPERS Review

##### *A.4.2. Is a stakeholder management and communications plan in place? Has significant consultation taken place?*

This has not been assessed as part of the JASPERS Review

##### *A.4.3. Have the risks for each option been evaluated and the risks for the preferred option been fully assessed?*

Yes. The preparation of the Metrolink project has included the maintenance of a Risk Register that is subject to an ongoing review, and that we understand will be maintained through the full lifecycle of the project. The Risk Assessment provided with the Preliminary Business Case follows the requirements of the Public Spending Code and sets out a total of 345 current risks which have the potential to impact on cost and schedule, as well as a change in the receiving economic environment.

##### *A.4.4. Are the cost and time implications of managing the risks included in the cost and time estimate or treated as a separate risk allocation?*

Yes. The risk assessment methodology includes procedures for identification, assessment, treatment with control measures, and continuous review (monthly). The identification and assessment uses a probabilistic method for calculating the Risk Event Allowance, which is calculated at €1.67b (or approximately 30% of the project Base Cost) for the P50 risk. A higher Risk Event Allowance of €3.03bn is calculated for P80, and this higher value has been applied in the Economic Analysis. Nevertheless, the detailed design activities should look to reduce this risk premium.

##### *A.4.5. Has a risk identification and management strategy been developed including assignment of responsibility for individual risks?*

Yes. A programme specific governance framework has been established, clearly identifying the roles and responsibilities of each stakeholder.

##### *A.4.6. Has the project been stress tested? Have the 'worst case' implications been assessed?*

Sensitivity Testing has been undertaken in relation to the demand forecasting, applying different growth scenarios, in addition to a COVID scenario that assumes further reductions in passenger demand through to the long term. A further sensitivity test has accounted for the impacts of BusConnects and DART+. These

sensitivity tests indicate viability of the project, albeit showing a reduction in performance due to the overlapping of the project with other investments. A combined scenario examining the long term impacts of covid along with the implementation of Bus Connects/DART+ has also been undertaken.

In relation to the works, the risk premium (P50/P80) has been used to account for cost escalation as a result of a weighted risk analysis. The economic analysis has included this risk premium in the cost for all scenarios, and reports that the project is economically viable at the P80 cost level.

*A.4.7. Is the project breaking new ground?*

Yes, the project is a greenfield development with significant tunnelling, and is an inherently risky investment.

*A.4.8. Should the project be broken down into smaller steps?*

There remains scope for phasing the project both physically and technically, and this may be more critical given the uncertainties regarding the long-term impacts of covid on peak hour travel demand.

Physical phasing delivers those elements of the project that deliver the most substantial short-term benefits and can facilitate early operation. The connection to Ranelagh could feasibly be deferred until there is clarity on the future of the Luas Green Line (subject to an improved understanding of how this could physically be delivered in a scenario with metro operational). The onward section to Swords could be delivered following the completion and operating of the City-Airport section. Nevertheless, it is important to understand how the residents of Swords would be facilitated by the arrival of metro, and its competitiveness with existing express bus services, and hence the incremental benefit that will be delivered through the continuation of the project from Dublin Airport north as far as Estuary. The Business Case did not elaborate on this issue.

Technical phasing represents the passenger carrying capacity of the system. Technical phasing can deliver increases in capacity as the passenger demand increases across the evaluation period. This should also identify any opportunity costs of not delivering the full system from the outset, which might be as a result of redundant infrastructure or systems, or significant retrofitting works. Where a long-term demand dictates, consideration would be needed at this early stage to how such capacity increases on a lower capacity system can be delivered without significant disruption to live services, as well as recognizing that capacity upgrades may only be required on part of the line (i.e. between Dublin Airport and the City Centre). This facility can therefore be partially designed in from the outset.