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**Partial Guidance on FS draft Rail Link Prague – Airport – Kladno :**

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# Information received : draft Feasibility Study of rail link Prague Airport Kladno 12.2014, informal meeting on revised approach to demand and economic analysis.

**Ref :** 2013 108 CZ AMT RAL

The project has been largely conceived as an S-bahn type rail service, which is intrinsically a part of the Prague integrated public transport system, between Prague centre branching to Kladno and the Prague Airport. The existing single track lines between Prague Masaryk – Kladno and Prague Smichov – Hostivice are used as a basis for various optional upgrades.

**Introduction and summary assessment of revised FS**

The following comments are referring to the revised draft of Feasibility Study of the Rail Link Prague-Airport-Kladno 12.2014 and are aimed at assessing how the revised draft of the study has addressed the issues previously raised by JASPERS.

Our previous comments are repeated in *italics* in chapters 2 to 3 below*,* our assessment of how they have been addressed with conclusions isin the boxes below them.

THIS IS A PARTIAL ASSESSMENT REFERRING ONLY TO TECHNICAL AND ENVIRONMENTAL ISSUES

**Summary assessment**

TO BE COMPLETED

**Key issues of concept**

*2.1 Low economic viability*

*The outcome of the study currently shows that all options have low viability and that no option crosses the threshold for economic acceptability (R2 is the closest at EIRR 5%). Main causes of this in our view are probably the following :*

* ***High level of cost*** *(between 750 milion and 1 bilion EUR), in particular in new and renovated stations in Prague and the branch to the airport.*
* ***Strong overlap of functionality with the Prague integrated transport system*** *including the parallel metro line A (being extended to Veleslavin), which reduces the potential for significant travel time benefits in Prague.*

*JASPERS recommends to readjust the focus of the study in looking for optimal and viable options :*

1. ***Examine sources of high costs*** *and assess the need for these partial investments on such a scale in the context of the Prague public transport system in terms of demand patterns (main origins and destinations, potential, functionality overlap of stations, passenger needs) and economic justifiability.*

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| **Outcome of revised FS :**   1. Although still containing some tunnel stretches, generally all valid variants are now based on the previous surface options (R1b, R2, J1b, J5b); the term “dvoukolejné tunelové” retained in some tables is misleading so far. Accordingly, all variants carry the remark “not consistent” under “compliance with PD” (ZÚR Hlavní město Praha, ÚP Hlavní město Praha). 2. Investment costs seem considerably reduced contributing to better results of the CBA. However, more than half of this cost reduction (58 – 63% for the R and J options) is due to having excluded investments for Masarykovo station and Negrelliho viaduct from the scope of the study. These sections are now being addressed in a separate economic analysis. 3. According to document A\_2\_vyhod\_2015\_II\_faze, chapter 2, the authors claim having focused on certain locations for finding optimized solutions. But although technical modifications are envisaged for these locations, in the corresponding cost sheets (under “Odhad\_investicnich\_nakladu”) savings have been realized only for some locations. Thus, saving potential seems not fully used; see also Table 2 at the Annex. 4. The still fragmentary and partly contradictory technical documentation (see also Point 19) does not fully allow reconciliation of the investment cost estimate. From the considerable number of inconsistencies as listed at Table 3 of the Annex one may conclude that the entire cost estimate might be not yet stable resulting in the risk of underestimation.   **JASPERS Conclusion :**  Point a) is obviously a significant risk for project feasibility which should be highlighted in the study conclusions.  On point b) please provide information in the study on the approach to assessing Masarykovo station and Negrelliho viaduct section i.e. why and how they are being assessed separately with what confidence of achieving a positive economic result  We recommend to address points c) and d) above, it is possible that there are still significant potential cost savings. |

1. ***Consider other operational concepts (see section 2.2)***
2. ***Examine in more detail the mode shift potential*** *of a faster direct rail option against other PT types for different market segments (see section 3.1)*

*2.2 Options and operational concepts*

*The following issues are considered important :*

1. ***The issue of the Hostivice – Prague Smichov line is interesting*** *but in our view is now a distraction from the main issues for the study, especially as the study so far shows no additional economic benefit of options using this line.* ***JASPERS recommends that it would be better from this point on just to focus on the main line to Masaryk station and provision of a concentrated simple airport service***

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1. ***JASPERS recommends to consider a simpler cheaper option(s) combining rail and other Prague public transport modes*** *(e.g. use of extended Prague tram as airport branch interfacing with the main Kladno line at Ruzyně, more utilization of transfer to the new metro stop at Veleslavin). Such options would clearly need to be developed with the city.*

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1. ***Stations and related timetable concepts built into options (especially for new locations and major renovations) should be examined in terms of demand*** *to ensure the project is providing optimum service improvements for the main passenger flows.*

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| **Outcome of revised FS :**  A number of new options have been developed which examine potential changes related to analysis of potential utilisation. These options focus on leaving out a number of less important stops (R1vyp, R1mod, J5mod) or not stopping at them with every train (R1str).  As far as operational criteria are concerned, the new options have been developed in a conclusive way except for one detail in R1mod: It is not feasible to turn the Kladno Os trains at Dejvice (conflict of directions on track 1 at minutes 18,5 / 20,5 etc.). These trains must turn at Veleslavin (as in R1spes, which is designed for the purpose, see B.3.1.4b and B.5.002), please correct.  **JASPERS Conclusion :** Please make the correction as requested above |

1. ***For project Section 4*** *(Jeneč - Kladno-Ostrovec), only one technical option is presented. In order to reduce investment costs, the possibility of less capital intensive solutions might also be considered, such as a minimum and medium option. This goes also for part of project section 3 i.e. Ruzyně (excl.) – Jeneč. This is however not the main source of cost.*

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| **Outcome of revised FS :**  The update includes two options for Kladno and Kladno-Ostrovec each. But these depend on the different operating programs and differ only slightly in investment costs. Thus the subject remains basically unchanged; the opinion of SZDC is that this is relatively cheap and with an advanced degree of planning, so that it is best not to open it up at this stage for potentially small gain.  **JASPERS Conclusion :**  We generally agree. However the requirement of electrifying tracks 7-13 ( 5-11 respectively) in Kladno used by freight trains only should be critically reviewed because electric traction is most unlikely for these trains. |

1. ***In option R2*** *(and other similar options), where part of the shared Kladno/airport city line to and from the airport remains single track,* ***the operational plan is to run trains from the airport three times per hour******but with irregular frequency resulting in waiting times up to 30 minutes*** *because it is not possible to run more trains on the remaining single line section to the centre. :*
   1. ***This seems an unacceptable service level for an airport line*** *with many „random” arrivals and in fact even according to the transport model, nearly half of the passengers from option R1 will use a bus from the airport to get to the railway line at the point where it has a better interval.*
   2. ***JASPERS recommends that other operational models should be considered such as splitting/merging of Airport/Kladno trains at Ruzyne****, which would allow a 15 minute frequency service (with capacity reserve in the single track capacity) but would slow down the service. Preference should be given to the commuting service to Kladno in the de-coupling and coupling process.*

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| **Outcome of revised FS :**  A new option R2 spoj has been constructed and evaluated resulting in an increase of airport services from three to four times per hour (10 + 20 minutes frequency). This includes splitting / merging trains at Ruzyne but only with Os trains from and to Kladno and giving preference to airport trains.  **JASPERS Conclusion :**  Option R2spoj seems a technically feasible though not optimum solution – neither in terms of service nor under operational aspects (delay sensitivity). |

1. ***In option R1 (and J1)*** *given the potential demand and desire to shift substantial car and bus traffic, it may be worth considering an option for service frequency of Kladno-Masaryk station of 10 minutes in the peak. In particular as strong intervals are a key part of commuting and airport services.*
   1. *This might be tested as an operational option, with the impact of the improved interval reflected in the economic analysis.*
   2. *Operational models involving splitting/merging Airport/Kladno trains at Ruzyne, which would allow a higher peak frequency of 10 minutes and 10 minutes (but would slow down the service) , might be considered for this. See Annex.*

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| **Outcome of revised FS :**  Additional sub-options have been included which increase the frequency of trains from Kladno, with an increase to 6 trains per hour including 4 faster Sp trains to optimize the Kladno-Prague connection but without splitting/merging at Ruzyne (R1spes, R1mod, J5mod)  **JASPERS Conclusion :**  As far as operational criteria are concerned, the new options have been developed in a conclusive way except for one detail in R1mod:  However, it is not feasible to turn the Kladno Os trains at Dejvice (conflict of directions on track 1 at minutes 18,5 / 20,5 etc.). These trains must turn at Veleslavin (as in R1spes), please correct. |

2.*3 Operational and infrastructure assumptions and engagement of the city of Prague and central bohemian region*

*The project has a strong interaction with Prague integrated transport (including many assumptions on network operations) but the city has no real stable plan for infrastructure development. There is no indication that the study assumptions have been consulted or agreed with the City or the region. This is particularly important taking into account on the one side the different planning and mobility management initiatives from the City that are fundamental to assure the project’s success, but also the overall financial sustainability for operation and maintenance of such an increase in supply, which typically imposes a huge burden in terms of subsidies needed on top of fare incomes.*

***JASPERS recommends that all the operations and infrastructure assumptions for the public transport should be consulted with and confirmed by the city and region****. In particular :*

1. *Final plans not to continue the metro to the airport and willingness to include the airport link into the integrated tariff system should be confirmed by the city.*
2. *The passenger functionality of the tram extension parallel to the proposed railway line should be analysed and justified from a transport planning point of view.*
3. *Rolling stock needs in terms of numbers and types of vehicles are considered but there is no obvious roll out plan or commitment beyond natural replacement and additions. The plans and cash flow of rolling stock replacement should be made more explicit in the analysis (currently expressed as higher costs per train hour) and the willingness to fund this confirmed.*
4. *Plans for P+R should be confirmed by the city and region.*
5. *An analysis should be made of the additional operations costs that the city/region will have to fund through subsidy each year and the city/region should directly confirm its willingness and ability to cover these costs.*
6. *Policy initiatives such as on restrictions for private cars, parking tariffs (e.g. with increasing tariffs getting closer to the centre, combined public transport/parking fares for P&R, etc.), provisions for soft mobility in relation to PT, information systems, etc.*

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***Key issues of justification and documentation***

*3.1 Demand and service analysis*

1. ***JASPERS recommends that a detailed analysis of demand should be provided as a basis for evaluation, concept development and option design*** *including the need for different investments and train timetable and stopping concepts along the line. The following should be considered in analysis :“*
   1. *Description of current car and public transport offer „competing” with the train : intervals, travel times, reliability issues*
   2. *Analysis of macro-area ODs by the different modes (segmented by commuters and airport visitor passengers)*
   3. *Comparative perceived travel times on the ODs per mode (for current, without project and for potential PT options)*
   4. *Current traffic on relevant PT lines*
   5. *Peak and off-peak travel and its impact on travel times and mode share*
   6. *Identification of key O-Ds with potential for bus-train shift, car to train shift, metro/tram to train shift*
   7. *Analysis of station/stop usage and potential (current and potential turnover, competing/complementary stations/stops) including analysis of P+R potential (demand as well as potential supply)*
   8. *Analysis of volumes of passengers of different market segments – local business, commuters, others, airport visitors (business, tourist, locals, international) and their mode choice motivators including travel time, service intervals, service reliability/comfort, information/branding, P+R etc.*

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1. ***Mode shift assessment***

*Mode shift from cars to trains is a key source of economic benefits in the study (more breakdown of economic benefits would be required to quantify the effect precisely).*

*Shifted traffic from cars to PT is modelled in the FS through an expert estimate (cross) elasticity model assuming a 1 % shift of the car trip volume on a given OD relation to PT for every 1 % improvement of perceived travel time by PT (there are separate models for car and PT, so they can only interact through manual shifts between the OD matrices). Trips have been manually transferred between the Car matrices and PT matrices on this calculation basis. This is probably at the higher end of elasticities we may expect based on international experience for commuting lines, but airport lines are very specific.*

***JASPERS recommends to develop an improved model of mode shift from car to public transport based on collected evidence including surveys and/or analysis of model data as required***

* + *identifies the sensitivity of mode choice to changes in the transport offer*
  + *considers the impact of the all service package elements including travel time, intervals, transfers, rolling stock, information provision, P+R, better reliability etc.*
  + *separately addresses locals and airport visitors and their sub-segments*
  + *works as a base with an OD matrix of travellers which have access to a car (i.e. can choose car or PT)*
  + *considers differences between peak and off peak travel*

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1. ***Generated transport***

*Generated public transport traffic is considered based on the assumption of demographic growth based on demand + 10 % in municipalities with direct rail connection, + 5% in municipalities near the line). This is derived from land-planning assumptions but stated as an expert estimate. Traffic is reduced in the without project case against the with project induced traffic assumptions which are linked to land use planning assumptions.*

*With the relatively small improvement in travel time, this is nearly an elasticity of 1 between travel time improvement and generated public transport. We know of no evidence of such an impact caused by a project elsewhere.*

***JASPERS recommends that evidence is provided to support the assumptions of generated public transport traffic caused by the project or this assumption reduced to a more typical elasticity of 0.1***

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1. ***Time profiling for traffic loading***

***JASPERS recommends*** *that**the model should distinguish in its current and future O-D demand structure between airport visitors and local commuting and other trips which have different peak profiles during the day (the demand to the airport among the others being spread more evenly during the day, while commuters’ demand is more concentrated during well-identifiable peaks). This should be reflected in vehicle occupancy calculations but mostly when dimensioning infrastructure capacity needs and thereafter operational concepts for the different services and sections.*

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3.2 Economic analysis[[1]](#footnote-1)

1. ***Economic evaluation of routing transfers within the PT model***

*Perceived travel time of PT for export to the EA has been calculated differently to the model used for modal shift calculations : In the EA it is simply in-vehicle travel time + 5 minutes per transfer, while in the demand model, weighted waiting and walking time is included.*

***JASPERS recommends that***

1. ***economic valuation of perceived travel time should follow the same basic perceived travel time model as the transport model****, although arguments may be made for more conservative weightings of waiting/interval benefits and walk time.*
2. ***the impact of intervals should be reflected in the economic (and demand) analysis*** *such that higher intervals include a penalty for inconvenience where trip planning is assumed. Separate models should be made for airport visitors and locals which properly reflects the disbenefit of intervals for different groups.*

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1. ***Evaluating modal shift time savings between the car and public transport model***

*Travel time modelling inputs to the economic analysis include two figures : total travel time for PT (which includes existing PT traffic, traffic transferred from cars and induced PT) and the total travel time for cars which includes reductions due to mode shift. These two values are summed to reach the overall travel time costs.*

*Because the two models are not part of a single calibrated four stage model and mode shift is calculated through an elasticity of PT improvement, adding total travel times of the models may not be representative of reality and may lead to unreliable results.*

***JASPERS recommends that either the 2 models are joined into a calibrated model with the mode choice step using the relative impedance of alternatives based on total perceived travel costs or that travel time savings to shifts from car to PT should be treated using the rule of halves. See also point 12.***

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1. ***Additional benefits : four sources of additional benefits are considered***
2. *Benefits of released land from scrapping overground lines*
   * *This is reasonable, a more detailed analysis would be required however detailing real possible / planned usage of the specific land and the basis of unit value estimates justified*
3. *Reflecting higher GDP and conditions of Prague in unit values of VoT etc.*
   * *For VoT the national HEATCO unit values are already at the high end and any further local increase would be hard to justify*
   * *For environmental benefit unit values based on population density, again the underlying unit research comes from Western Europe, so any increase would again be considered hard to justify (this in any case represents/should represent just a very marginal share of economic benefits)*
4. *Benefits from increased employment*
   * *We consider it unlikely that additional net jobs will be generated in Prague (which has low unemployment and strong labour inward migration barriers) due to the project, more likely it will lead to relocation of business or transfer of jobs to different businesses, for which the benefits are much more subtle and much more likely to be covered already by the quantified project benefits*
5. *Increased value of property in the corridor as result of the project*
   * *We consider this double-counting as value increases are already reflected in the benefits already calculated (time savings etc)*

***JASPERS recommends that only the benefits of released land from scrapping overground lines should be considered acceptable. Other benefits such as the value of rolling stock and station improvements might however also be considered.***

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1. ***Documenting impacts***

*No distinction is made in the documented EA inputs between existing, transferred and induced traffic*

***JASPERS recommends that***

1. *inputs to and impacts on existing rail/PT passengers, mode shifted transport (from car and ideally from bus/tram/metro) should be separated*
2. *the breakdown of main travel time savings over the network should be analysed*
3. *any expected costs and savings on tram/metro operations (if any) should also be calculated and presented in addition to buses*

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3.3 *Technical documentation*

1. ***The depth of the technical documentation does not allow a full assessment*** *of the proposed solutions.*

***In particular JASPERS recommends to provide the following information*** *:*

* 1. *Complete station layouts (1:1000, covering the entire station area) should be attached*
  2. *To unambiguously show the intended solution, a drawing for each option should be attached in cases where options result in different layouts*
  3. *It should be possible to recognise cross-over points between the through tracks and the block arrangement as well*
  4. *Permeability calculations should be presented for critical line sections and for stations with likely conflicts of direction (Masarykovo nádraží, Bubny –Vltavská, Kladno) or to justify grade separation (Ruzyně)*
  5. *Velocity path diagrams for the planned rolling stock should show to which extend the proposed permissible speed can be used*
  6. *Proposed measures that are not directly related to the project objectives should be also described (Masarykovo nádraží track 91; section Bubny – Stromovka; extended length of freight tracks Hostivice; connection to freight sidings in general) and either justified or ignored in the economic evaluation*
  7. *The proposed concept for vehicle treatment and stabling should be more unambiguously described, including related investments as far as included in the economic evaluation*
  8. *Investments should be presented by profession for each object (station or open line section)*

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| **Outcome of revised FS :**   1. 1:1000 layouts are still missing for  * Odb. Výstaviště (Var. R2) * Dejvice, km 2+400 – 3+064 (Var. R2) * Dejvice, km 4+000 – 4+650 * Odb. Sklenik (Var. R2) * Odb. Průhony (2 variants)  1. Except for Ruzyne (where planning seems still in progress), drawings have been modified 2. Schemata 5.001 – 5.006 are provided for the purpose. These are incomplete and largely inconsistent with the 1:1000 layouts (B.3.\*), however. 3. A few permeability data are provided in chapter 4.4 of document A1 but no comprehensive calculation and no data about conflicts of direction. 4. Velocity path diagrams are available as 5.018 … 5.021 5. Not complied with, in particular concerning additional investment Litovice - Jeneč 6. A more comprehensive concept for vehicle treatment and stabling is included, and it seems that investments for mere stabling tracks – but not for treatment units (depots) – have been included in the overall cost estimate. 7. Investments are provided by profession but object-wise classification is only partly done, and the tables contain a considerable number of inconsistencies (see Table 3 of the Annex). Unit prices seem partly on the low side, in particular for the catenary system.   **JASPERS Conclusion :**   1. Please provide as requested. 2. O.K. 3. Please complete and update schemata so that block arrangement and cross-over points can be reviewed. 4. Full permeability calculations are yet to be provided. For section Masarykovo – Bubny, the actual time table requirements for trains from and to Kralupy n.V. (including Sp and other additional trains) must be also considered. 5. O.K. 6. Each proposed measure that is not directly related to the project objectives has to be either economically justified or ignored in cost estimate and economic evaluation 7. The assumption that investments only for stabling tracks are included in the overall cost estimate should be confirmed. 8. The cost estimate requires a comprehensive review and update. |

1. *Description and data concerning Odb. Jeneček are contradictory. According to 3.3.8 of document A2, there will be a stop consisting of a pair of side platforms, with wheelchair access on level, secure signalling, crossing the faces of platforms. Standard amenities include shelter from the weather, benches, electronic information systems, ticket machines, etc. However, except for trains from and to Rudna no stops at Jeneček are proposed in any of the design GVD (B.5.01 … B.5.12), and it is not clear which design is finally proposed and which investments are included in the evaluation.*

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| **Outcome of revised FS :**  Drawing B.3.3.4 has been updated, but description (now 6.3.4 in document A1) is still wrong. In cost sheets “Tab CZ - 3.4” quantity of platform has been reduced to 400 m2 whereas sheets “Tab CZ - 3.1” still contain 2040 m2.  **JASPERS Conclusion :** Item is yet to be fully consolidated, please address |

3.4 *MCA*

1. *Although an interesting and extensive piece of work, JASPERS is not convinced that this exercise adds great value to the option selection process. As previously indicated for other projects, JASPERS prefers such extensive MCA mainly as a tool for pre-selection of options prior to CBA (usually differing in technical details or assessing how they address objectives) with CBA then becoming a much more important element in the final assessment.*

***JASPERS recommends using the work done in the MCA to help create a table describing the contribution of different options to various objectives*** *and criteria including environmental impacts addressed in the MCA – e.g. the DETR approach as used in other cases by SZDC. This may help a final decision considering all factors including ones which are not quantifiable in financial terms.*

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3.5 *Environmental assessment*

1. ***Coverage of EIA :*** *from the text it is understood that the rail component of the R1 alternative is covered by an EIA procedure. However option R1 also includes other interventions like park and ride facilities, stations etc. It is noted that the consideration of environmental impacts should cover all project components.*

***Jaspers recommends to clarify whether all the R1 alternative components are covered by the EIA.***

1. ***Natura 2000 :******JASPERS recommends to provide more details and justification of why the impact is not considered significant*** *(considering the type of construction activities foreseen, the distance from the Natura 2000 area and the conservation objectives).*
2. ***Issues of climate change :*** *increasing importance is placed by the EU on issues of climate change in projects.**Impacts of and on climate change (including both Climate Change Mitigation and Adaptation) should be considered in design and assessment.*
3. ***Environmental analysis of options :*** *any environmental analysis of options in the study should refer to the same options scheme as used in the remainder of the study.*

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| **Outcome of revised FS** : Responses were made to the comments after the meeting in April 2014, but no additions/changes have been made in the FS.  **JASPERS Conclusion :**  Generally the responses made might be included in the FS text.  23: Although some additional information is provided, it is recommended that the conclusion that significant impacts are not likely would be better if supported with reference to the conservation objectives of the Natura 2000 area  24: This is a key issue for the new programming period. Some analysis of the potential need for adaptation of the infrastructure and operational regime with regard to climate risk should really be addressed in the FS |

1. **The** FS makes numerous references to the EC CBA Guide. This Guide has now been updated; the 2014 version has been published recently. It is understood that FS is primarily based on national CBA manual which will have to be updated in due course, future appraisal in the project development cycle of this project will have to be adjusted accordingly, [↑](#footnote-ref-1)