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ConnecTA

Technical Assistance to Connectivity in the Western Balkans

Preparation of the Road Maintenance Plans

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Purpose and Objectives (1)

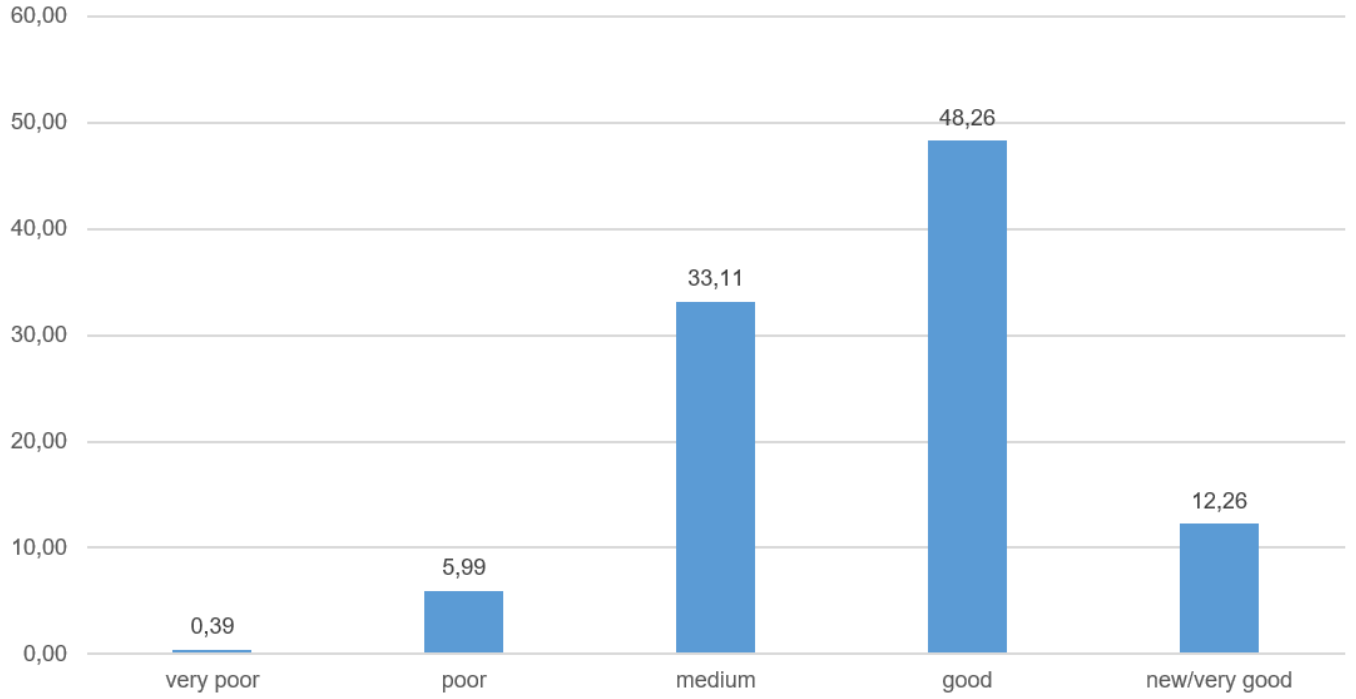
- ***Review and analysis of the current maintenance practices and needs***
  - establish current maintenance practice and network condition
  - compare network condition and relevant indicator values
  - resolve identified issues (condition data may be significantly outdated)
- ***Support to regional participants in preparing maintenance plans 2019-2023***
  - establish maintenance standards (trigger values)
  - conduct strategic analysis and establish “standard” activities in relation to main network characteristics (target IRI approach)
  - develop a five-year maintenance program, including analysis within different budget scenarios

Purpose and Objectives (2)

- ***Development of common maintenance guidelines***
  - enable a unified approach and establish a maintenance management routine
  - elements: road network and traffic data, data collection, road maintenance planning and programming, RAMS, operationalization
- ***Analysis and recommendations for setting up PBMCs***
  - analyze past and current experience, including identification of challenges and recommendation of solutions that would enable successful PBMC implementation
  - elements: description of PBMC key concepts, identification of enabling conditions, typical stages of PBMC program, instructions for eventual PBMC piloting, recommendations for the way forward after the pilot stage, instructions in performance monitoring

Review and analysis of the current maintenance practices and needs (1)

- road sections in good and medium condition prevail (about 72%), while only some 6.4% of the overall Extension of TEN-T Core/Comprehensive to WB can be treated as “non-maintainable roads” (being in poor and very poor condition)



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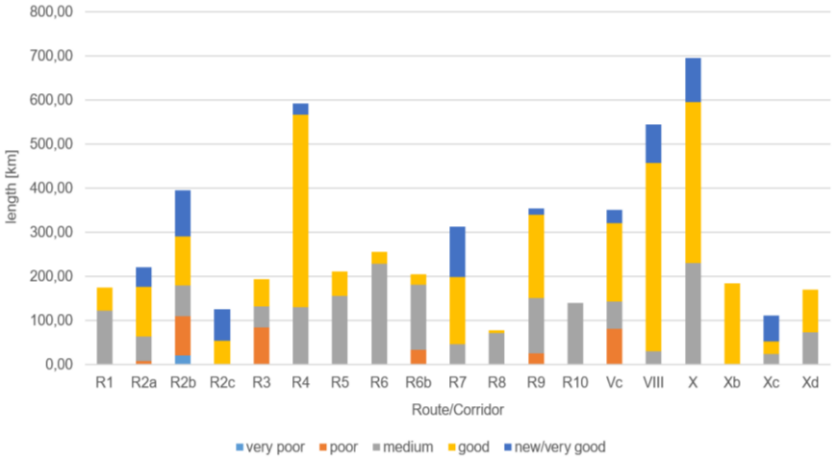
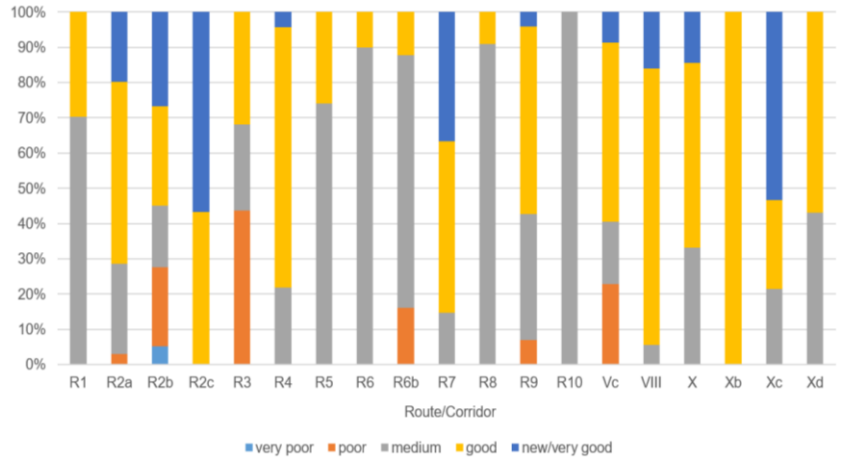
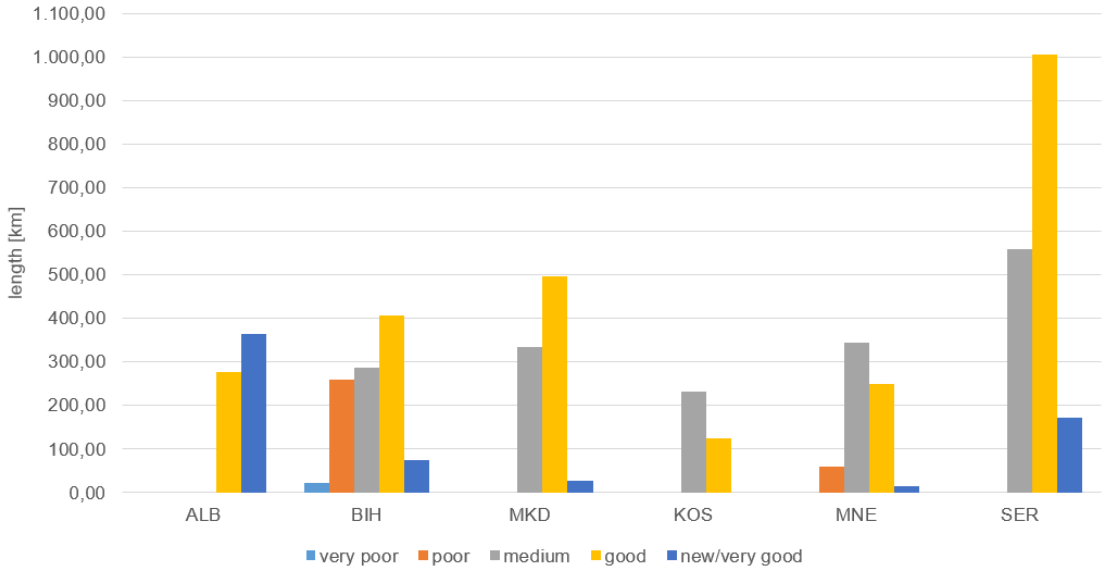
Review and analysis of the current maintenance practices and needs (2)

- condition per route/corridor and within each RP







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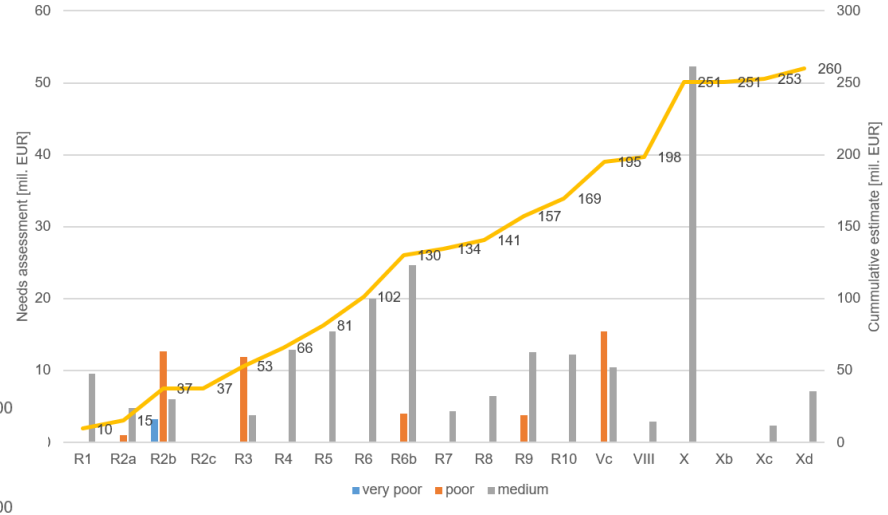
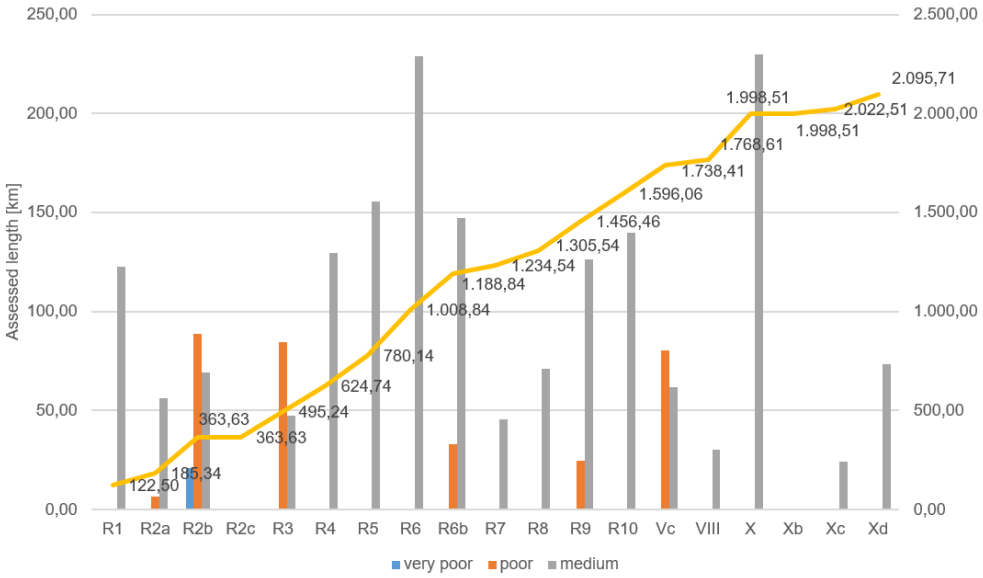
Review and analysis of the current maintenance practices and needs (3)

- total needs estimate for the identified portion (medium, poor and very poor condition) of the Extension of TEN-T Core/Comprehensive to WB of almost 2,100 km (39.4% of total network) is approximately EUR 260 million





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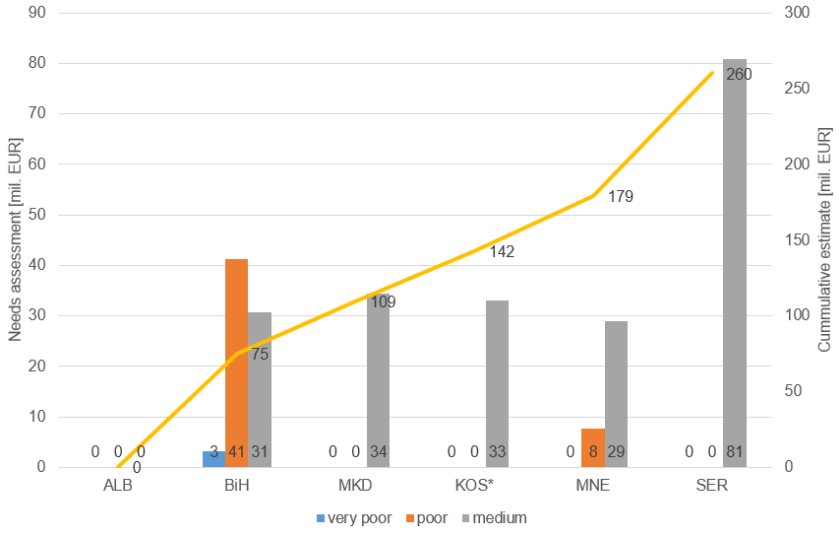
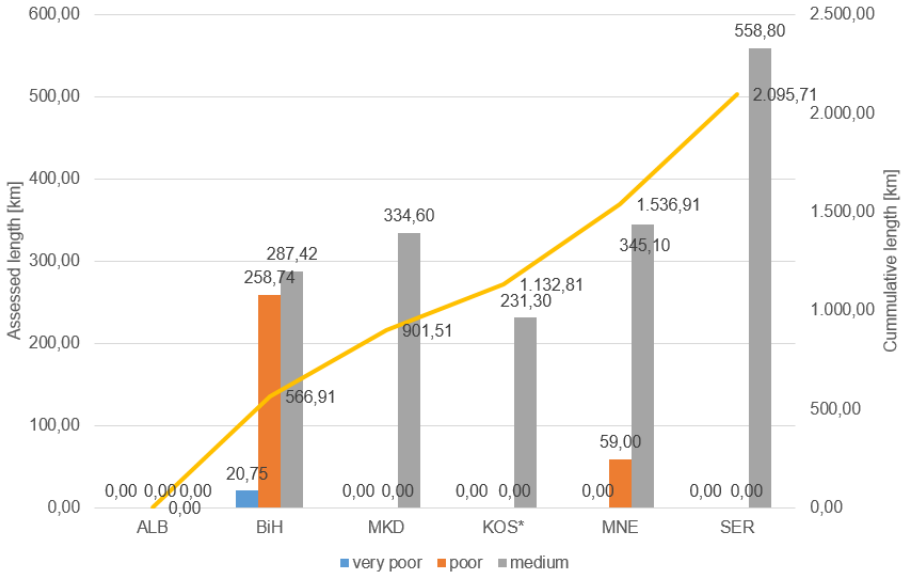
Review and analysis of the current maintenance practices and needs (4)

- overview of needs per each RP



- structures' maintenance - add about 15-20%to come to the final estimate of EUR 300-315 million
- routine maintenance needs for the total network of about 5,300 km would be approximately EUR 50 million per annum



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Review and analysis of the current maintenance practices and needs (5)

- Need to establish proper practice of road network data collection for ALL roads under the jurisdiction of each road authority
- Need for the road authorities to make a strategic decision on how to collect data (in-house or outsourcing) and how to use existing equipment
- Need for completion/establishment of the system and implementation of asset management principles
- Need for the RPs to follow the “asset valuation” approach to evaluate performance of the road authorities and get a wider picture of the network

Support to regional participants in preparing maintenance plans 2019-2023 (1)

- Research for an optimal solution has been done using an HDM-4 model for each RP separately
- The results of the analysis performed for the Maintenance Plans (2019-2023), for the analyzed road network indicate that:

  (i) Values of IRI and IRI flow through time prove the efficiency of suggested work programs on pavement condition maintenance and repair

  (ii) The process is characterized by large investments in the first year and an unfavorable schedule of investments (due to deteriorated condition of RPs' networks)

  (iii) Work profitability on some RPs (BIH, MNE, SER and KOS) roads; Net Present Value (NPV) on the MKD roads should be interpreted from the point of large investments required in 2019 and rather low traffic volume along the identified routes

Support to regional participants in preparing maintenance plans 2019-2023 (2)

- recommended maintenance plan for 2019-2023 resulting from revised time distribution and leveling to current RPs' allocations for periodic maintenance

RP	Year	Length [km]	Cost per year [EUR million]	Total RP cost [EUR million]
BIH	2019	140.43	18.42	85.86
	2020	178.47	23.83	
	2021	160.84	23.04	
	2022	87.18	10.74	
	2023	83.41	9.84	
MKD	2019	88.80	6.52	12.76
	2020	73.60	6.24	
KOS	2019	163.30	7.87	25.56
	2020	142.60	8.47	
	2022	92.10	10.22	
MNE	2019	94.20	8.77	28.98
	2020	73.80	7.31	
	2021	33.00	6.41	
	2023	71.20	6.50	
SER	2019	208.10	16.15	45.76
	2020	220.60	17.21	
	2022	115.20	12.40	
			Total [EUR million]	198.92

Route/ Corridor No.	Total treated length [km]	Years of intervention
R1	122.80	2019, 2023
R2a	92.88	2019, 2020, 2022, 2023
R2b	175.29	2019, 2020, 2021, 2022, 2023
R3	131.62	2020, 2021, 2022
R4	99.60	2019, 2020, 2023
R5	155.40	2019, 2020
R6	208.80	2019, 2020, 2022
R6b	235.00	2019, 2020, 2021, 2022
R7	46.40	2019, 2020, 2022
R8	71.00	2019, 2020
R9	144.59	2019, 2020, 2021, 2022, 2023
R10	56.80	2019
Vc	167.15	2019, 2020, 2021, 2023
VIII	14.60	2020
X	260.90	2019, 2020, 2022
Xb	24.00	2019
Xc	20.00	2020

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Support to regional participants in preparing maintenance plans 2019-2023 (3)

- summary of the reduced maintenance plan for 2019-2023 resulting from the assumption that only sections with IRI higher than 3.5 should be treated

RP	Year	Length [km]	Cost per year [EUR million]	Total RP cost [EUR million]
BIH	2019	140.43	18.42	74.99
	2020	155.92	19.90	
	2021	160.84	23.04	
	2022	47.18	7.72	
	2023	60.87	5.91	
MKD	2019	88.80	4.17	4.17
KOS	2019	88.70	4.51	6.13
	2020	24.10	1.62	
MNE	2019	94.20	8.77	28.98
	2020	73.80	7.31	
	2021	33.00	6.41	
	2023	71.20	6.50	
SER	2019	150.70	11.83	33.64
	2020	135.30	11.09	
	2022	99.00	10.72	
Total [EUR million]				147.91

partial exclusion of sections in medium condition assumed that all RPs would properly take care of all sections having an IRI lower than 3.5 and preserve these from further degradation

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Support to regional participants in preparing maintenance plans 2019-2023 (4)

- summary of the reduced maintenance plan for 2019-2023 resulting from the assumption that only sections in poor and very poor condition should be treated

RP	Year	Length [km]	Cost per year [EUR million]	Total RP cost [EUR million]
BIH	2019	44.80	9.39	46.96
	2020	88.47	14.46	
	2021	125.37	19.42	
	2022	20.75	3.69	
MNE	2021	33.00	6.41	6.41
Total [EUR million]				53.37

by completely excluding sections in medium condition, only BIH and MNE should work on improvement of their respective parts of the Extension of TEN-T Core/Comprehensive to WB, while the remaining four RPs (ALB, MKD, KOS and SER) should at least preserve their assets above the threshold for poor condition

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Support to regional participants in preparing maintenance plans 2019-2023 (5)

- performed analysis should represent a basis for further programming of works on the Extension of TEN-T Core/Comprehensive to WB rehabilitation with more detailed information (ideally from current or future established RAMS) by each RP
- intervention levels should be retained at the predicted level, at least in the first five-year period, in order to reach a satisfactory standard for the network with the highest transport work for the overall region

Development of common maintenance guidelines (1)

- Ensure that the road agencies use a systematic common approach to decision making within a consistent framework
- Provide a common and consistent basis for assessing the overall maintenance needs
- Ensure that roads are maintained to a consistent standard, and continue to be so following the completion of all planned project works
- Conduct regular review of policies, standards and the effectiveness of maintenance program
- Establish road maintenance management (elaborating on the general principles of maintenance management)

Development of common maintenance guidelines (2)

- Elaborate on road network and traffic data (road classification and establishment of a road reference system and data necessary for system support)
- Collect data (establishment of types of road condition surveys and frequency of their performance)
- Perform road maintenance planning and programming (establishing maintenance standards and programming maintenance activities)
- Operate road asset management system (overview and recommendations on how to approach systematic asset management)
- Conduct operationalization (considering participants and levels in the decision-making process and institutionalization of the system)

Analysis and recommendations for setting up PBMCs (1)

- regional experience in PBMCs is not extensive
- previous PBMC pilot project in SER confirmed its suitability to introduce such an approach related to routine and winter maintenance; following this, SER has launched procurement of PBMC for approximately 3,000 km of national roads through its own budget resources
- ALB has also performed one pilot project covering approximately 270 km of national roads, and is currently in the process of implementing another four contracts of five-year duration
- experience of BIH showed lack of interest, very high rates and revealed the opinion that the resources are spent without quantity justification
- it is worthwhile to try to introduce the PBMC within WB6 in response to international maintenance practice and good governance
- none of the RPs is fully prepared for the introduction of PBMC
- all RPs would require the change of certain legal solutions to allow for multi-year contracting and provision of financial resources

Analysis and recommendations for setting up PBMCs (2)

- The networks that the PBMC will apply should be carefully selected, considering the Extension of TEN-T Core/Comprehensive to WB a good starting point for consideration
- The Extension of TEN-T Core/Comprehensive to WB is not continuous in not even one of the RPs and that it is composed of single carriageway (two-lane roads) and motorways/highways/expressways
- Since all RPs have a certain maintenance backlog, it is necessary to decide about a possible initial rehabilitation/reconstruction (afterward applying PBMC on a network of a certain quality)
- In relation to the type of contract, for all RPs except ALB and SER who have already taken this step in the previous period, it is very likely that the approach with the PBMC pilot will give the best results and reveal all positive sides and deficiencies that should be removed

Analysis and recommendations for setting up PBMCs (3)

- The implementation of a hybrid contract, with certain Bill of Quantities items that have increased risk level for the contractors to be contracted on the admeasure basis, would allow an effective and relatively painless adjustment of the Contractors in the case of advanced methodologies
- Training, both for managers and for local contractors and consultants, is mandatory given the lack of experience, certainly with the engagement of the TA consultant
- One of the mandatory steps in improving maintenance practices for all RPs should be the introduction of RWIS especially in the winter maintenance phase

Analysis and recommendations for setting up PBMCs (4)

- the roadmap for starting the PBMC implementation with details of the possible strategy for the implementation of the contract

PBMC type	1st generation pilot PBMC	2nd generation PBMC	Comprehensive PBMC	Comprehensive PBMC + asset management
Duration	3-5 years	5-7 years	5-10 years	15+ years
Pavement maintenance	✓	✓	✓	✓
Drainage maintenance	✓	✓	✓	✓
Maintenance of signalization and equipment	✓	✓	✓	✓
Trees and vegetation control	✓	✓	✓	✓
Road cleaning	✓	✓	✓	✓
Winter maintenance	PB + BoQ	PB + BoQ	✓	✓
Emergency maintenance	BoQ	BoQ	BoQ	BoQ
Minimal rehabilitation	BoQ, if unavoidable	PB or BoQ	✓	✓
Major periodic intervention	-	PB or BoQ	PB or BoQ	PB or BoQ
Major rehabilitation	-	-	PB or BoQ	PB or BoQ

PB - performance-based; BoQ - Bill of Quantity, i.e. admeasurement, input-based

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