

NWA methodology Pilot Implementation: Portugal

Workshop on the Methodology Network
Wide Road Safety Assessment
16 January 2023



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/ Road Administration:



Açores - São Miguel



Madeira



/ 02 SELECTED ROADS AXES



/ Road type: Flat and Urban Motorway

/ Length: 22,9 km

/ High Traffic (AATD)

/ 02 SELECTED ROADS AXES



 A24



/ Road type:
Mountainous and Rural motorway

/ Length – 156 km

/ Low Traffic (AATD)

Açores - São Miguel

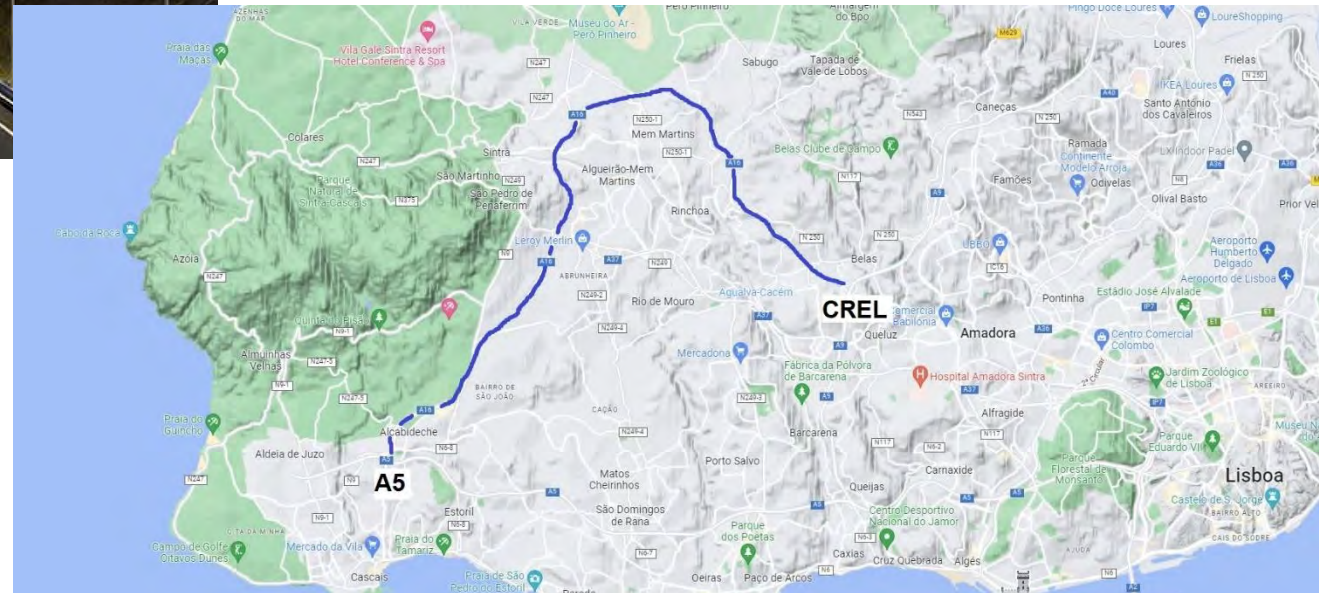


Madeira



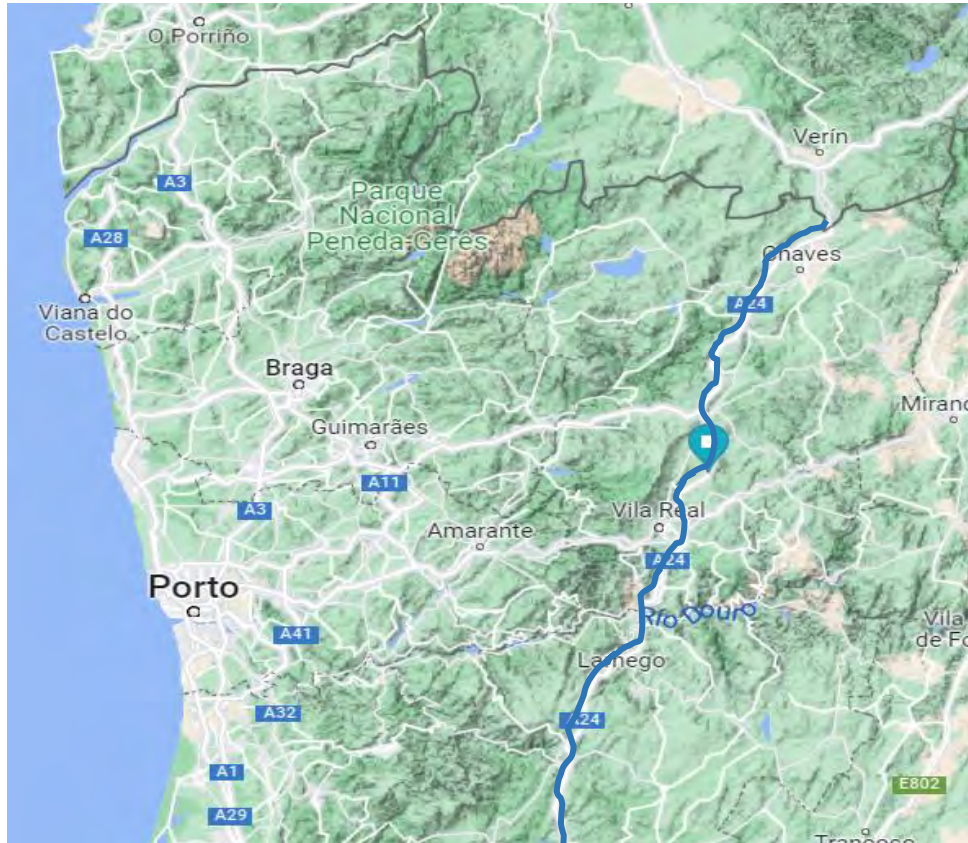
/ 02 SELECTED ROADS AXES

/ A16



/ 02 SELECTED ROADS AXES

/ A24



/ 03 AXIS 1: A16

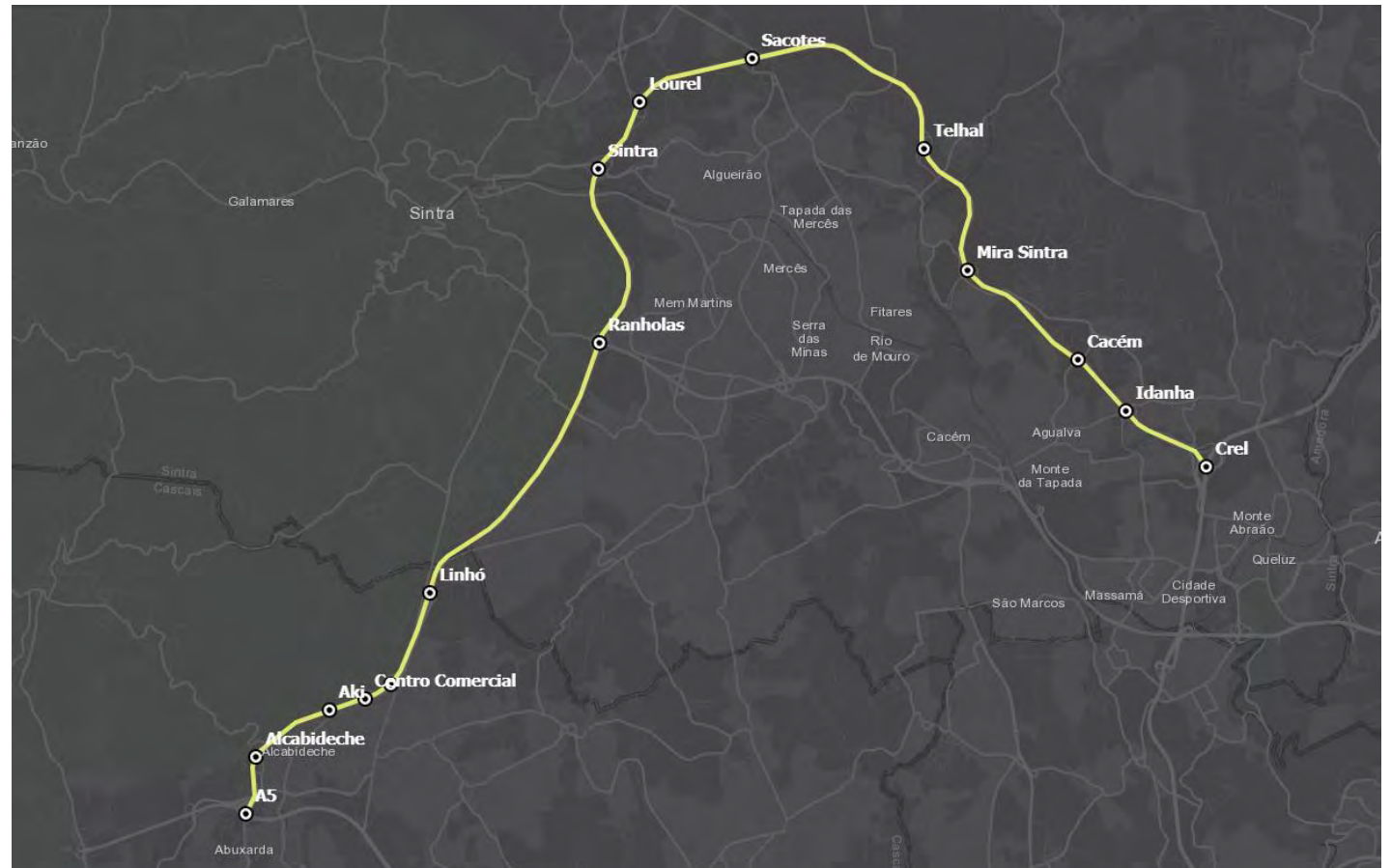
/ Road type: Urban Motorway

/ Length: 22,9 km

/ Cross section: 2 or 3 lanes per direction plus emergency lane, central median with concrete barrier;

/ Junctions: **15** grade-separated interchanges inside the motorway

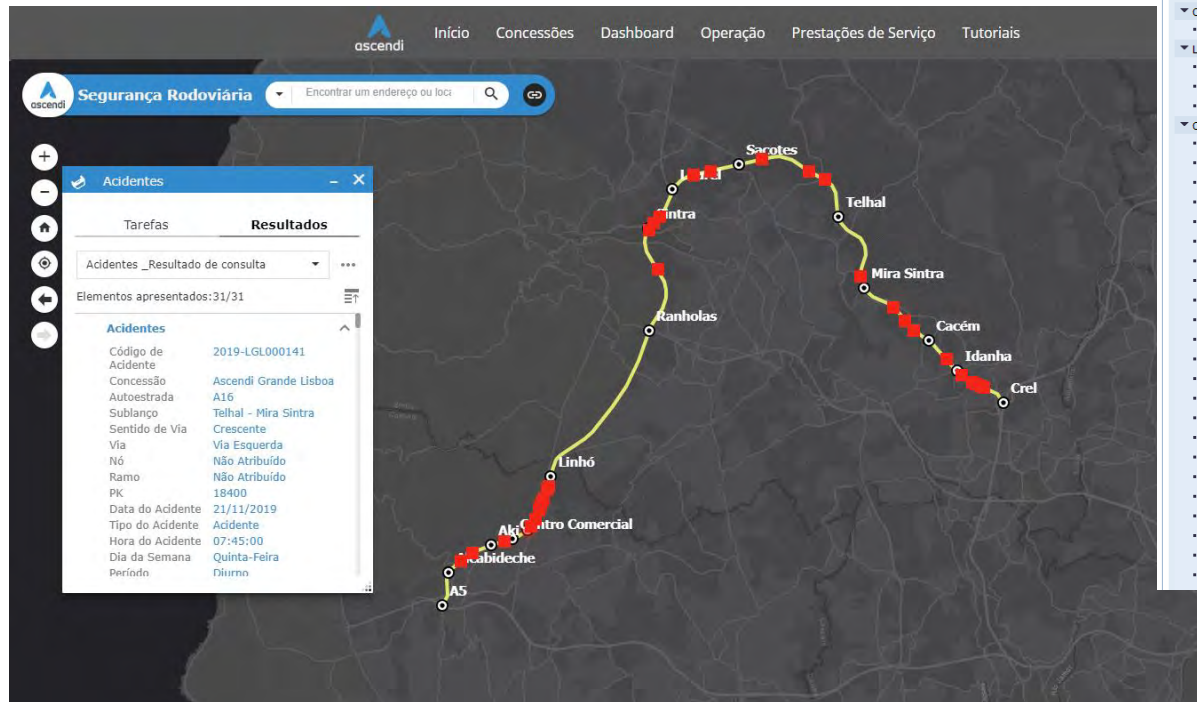
/ Timeframe for the data: 2018 to 2020.



Toll Station Areas



ArcGIS Tools



Análise Sinistralidade

[Nova análise](#) | [Abrir](#) | [Gravar como...](#) | Exibir como: Tabela | [Info](#) | [Enviar](#) | [Versão de impressão](#) | [Exportar para Excel](#) | [Notas](#)

Auto-Estrada Δ	Sublanço Δ	Concessionária Δ	Auto-Estrada Δ	PK Δ	Indicador de gravidade Δ	Nº de registos Δ	Nº Acidentes com vilmas Δ	Nº Acidentes com mortos Δ
A16	A5 - Alcabideche	LGL	A16	0+250	0	1	0	0
				0+400	3	2	1	0
				0+500	0	2	0	0
				0+600	3	1	1	0
				0+700	0	2	0	0
				0+750	3	1	1	0
				0+000	6	19	2	0
	Alcabideche - AKI	LGL	A16	1+100	0	1	0	0
				1+175	3	1	1	0
				1+200	0	3	0	0
				1+300	3	2	1	0
				1+400	0	1	0	0
				1+450	0	1	0	0
				1+500	3	2	1	0
				1+800	0	1	0	0
				1+950	0	1	0	0
				0+000	3	1	1	0

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Proactive Methodology

➤ Ascending direction (C)

no.	Subsection	Direction	Segment Start (chainage)	Segment End	Length of motorway segment (m)	RF						NWA Score Estimation :
						LW	RS	CU	IC	PB	OC	
						1	2	3	4	5	6	/100
1	A5 - Alcabideche	C	0	299	299	1,000	0,934	0,448	1,000	1,000	0,950	39,777
2	A5 - Alcabideche	C	299	798	499	1,000	0,935	0,574	1,000	1,000	0,950	51,020
3	Alcabideche - AKI	C	798	1988	1190	1,000	0,948	0,798	1,000	1,000	1,000	75,638
4	AKI - Centro Comercial	C	1988	2490	502	1,000	0,874	1,000	1,000	1,000	0,950	83,015
5	Centro Comercial - Alcoitão	C	2490	2892	402	1,000	0,924	0,791	1,000	1,000	0,950	69,429
6	Alcoitão - Linhó	C	2892	4221	1329	1,000	0,942	0,928	0,976	1,000	0,950	81,080
7	Linhó - Ranholas	C	4221	7430	3209	1,000	0,957	0,901	1,000	1,000	1,000	86,174
8	Linhó - Ranholas	C	7430	7667	237	1,000	0,960	1,000	1,000	1,000	0,950	91,237
9	Linhó - Ranholas	C	8058	8369	311	1,000	0,940	0,924	1,000	1,000	0,950	82,486
10	Ranholas - Sintra	C	8369	10937	2568	1,000	0,950	0,835	1,000	1,000	1,000	79,315
11	Sintra - Lourel	C	10937	11996	1059	1,000	0,936	0,763	0,869	1,000	0,950	58,990
12	Lourel - Sacotes	C	11996	12675	679	1,000	0,924	0,846	1,000	1,000	0,950	74,228
13	Lourel - Sacotes	C	12675	13665	990	1,000	0,946	1,000	0,830	1,000	0,950	74,563
14	Sacotes - Telhal	C	13665	14153	488	1,000	0,924	1,000	1,000	1,000	0,950	87,760
15	Sacotes - Telhal	C	14451	15400	949	1,000	0,948	0,828	1,000	1,000	0,950	74,551
16	Sacotes - Telhal	C	15400	16754	1354	1,000	0,952	0,778	1,000	1,000	1,000	74,109
17	Telhal - Mira Sintra	C	16754	18671	1917	1,000	0,948	0,745	1,000	1,000	0,950	67,126
18	Mira Sintra - Cacém	C	18671	19141	470	1,000	0,930	0,780	1,000	1,000	0,950	68,925
19	Mira Sintra - Cacém	C	19141	20602	1461	1,000	0,933	0,802	1,000	1,000	1,000	74,789
20	Cacém - Idanha	C	20602	21543	941	1,000	0,936	0,854	0,869	1,000	0,950	65,963
21	Idanha - Crel	C	21543	21917	374	1,000	0,934	0,674	1,000	1,000	0,950	59,810
22	Idanha - Crel	C	22477	22881	404	1,000	0,924	0,288	1,000	1,000	0,950	25,270

Proactive Methodology

➤ Descending direction (D)

no.	Subsection	Direction	Segment Start (chainage)	Segment End	Length of motorway segment (m)	RF						NWA Score Estimation /100
						LW	RS	CU	IC	PB	OC	
						1	2	3	4	5	6	
1	A5 - Alcabideche	D	0	435	435	1,000	0,924	0,476	1,000	1,000	0,950	41,758
2	A5 - Alcabideche	D	435	798	363	1,000	0,936	0,584	1,000	1,000	0,950	51,957
3	Alcabideche - AKI	D	798	1988	1190	1,000	0,954	0,784	1,000	1,000	1,000	74,820
4	AKI - Centro Comercial	D	1988	2490	502	1,000	0,945	1,000	1,000	1,000	0,950	89,743
5	Centro Comercial - Alcoitão	D	2490	2892	402	1,000	0,935	0,791	1,000	1,000	0,950	70,259
6	Alcoitão - Linhó	D	2892	4221	1329	1,000	0,945	0,928	0,885	1,000	0,950	73,755
7	Linhó - Ranholas	D	4221	7767	3546	1,000	0,957	0,909	1,000	1,000	1,000	87,028
8	Linhó - Ranholas	D	8058	8369	311	1,000	0,925	0,924	1,000	1,000	0,950	81,196
9	Ranholas - Sintra	D	8369	10937	2568	1,000	0,951	0,835	1,000	1,000	1,000	79,440
10	Sintra - Lourel	D	10937	11445	508	1,000	0,942	0,745	1,000	1,000	0,950	66,672
11	Sintra - Lourel	D	11445	11996	551	1,000	0,942	0,780	1,000	1,000	0,950	69,799
12	Lourel - Sacotes	D	11996	13665	1669	1,000	0,945	0,931	0,981	1,000	1,000	86,290
13	Sacotes - Telhal	D	13665	14153	488	1,000	0,940	1,000	1,000	1,000	0,950	89,291
14	Sacotes - Telhal	D	14451	16754	2303	1,000	0,952	0,798	0,918	1,000	0,950	66,253
15	Telhal - Mira Sintra	D	16754	18671	1917	1,000	0,953	0,745	1,000	1,000	0,950	67,443
16	Mira Sintra - Cacém	D	18671	18950	279	1,000	0,942	0,869	0,806	1,000	0,950	62,778
17	Mira Sintra - Cacém	D	18950	19097	147	1,000	0,924	0,703	1,000	1,000	0,950	61,697
18	Mira Sintra - Cacém	D	19097	20602	1505	1,000	0,936	0,794	1,000	1,000	1,000	74,385
19	Cacém - Idanha	D	20602	21543	941	1,000	0,939	0,854	1,000	1,000	0,950	76,159
20	Idanha - Crel	D	21543	21917	374	1,000	0,934	0,674	1,000	1,000	0,950	59,787
21	Idanha - Crel	D	22477	22881	404	1,000	0,924	0,255	1,000	1,000	0,950	22,370

Reactive Methodology

➤ Ascending direction (C)

D	Section code	Start point (km)	End point (km)	Input Length (km)	n. accidents	AADT	Lower Accident Cl	Upper Accident Cl	Lower Acc. Density	Upper Acc. Density	Lower Acc. Rate	Upper Acc. Rate	By Acc. Density	By Acc. Rate	Final ranking
													Status	Status	Status
C	A5 - Alcabideche	0	0,798	0,798	0	23 079	0	4	0	1,67	0	19,82	Unsure	Unsure	Unsure
C	Alcabideche - AKI	0,798	1,988	1,19	3	20 535	1	9	0,28	2,52	3,73	33,61	Unsure	Unsure	Unsure
C	AKI - Centro Comercial	1,988	2,489	0,501	1	20 546	1	6	0,67	3,99	8,87	53,2	High Risk	Unsure	Unsure
C	Centro Comercial - Alcoitão	2,489	2,892	0,403	1	16 384	1	6	0,83	4,96	13,82	82,93	High Risk	High Risk	High Risk
C	Alcoitão - Linhó	2,892	4,221	1,329	10	22 476	5	19	1,25	4,77	15,28	58,05	High Risk	High Risk	High Risk
C	Linhó - Ranholas	4,221	7,667	3,446	1	9 904	1	6	0,1	0,58	2,67	16,04	Unsure	Unsure	Unsure
C	Linhó - Ranholas	8,058	8,368	0,31	0	9 904	0	4	0	4,3	0	118,9	Unsure	Unsure	Unsure
C	Ranholas - Sintra	8,368	10,939	2,571	3	26 941	1	9	0,13	1,17	1,32	11,86	Unsure	Unsure	Unsure
C	Sintra - Lourel	10,939	11,998	1,059	5	24 303	2	12	0,63	3,78	7,09	42,55	High Risk	Unsure	Unsure
C	Lourel - Sacotes	11,998	13,667	1,669	2	5 670	1	8	0,2	1,6	9,64	77,15	Unsure	Unsure	Unsure
C	Sacotes - Telhal	13,667	14,153	0,486	0	6 979	0	4	0	2,74	0	107,62	Unsure	Unsure	Unsure
C	Sacotes - Telhal	14,451	16,756	2,305	3	6 979	1	9	0,14	1,3	5,67	51,06	Unsure	Unsure	Unsure
C	Telhal - Mira Sintra	16,756	18,673	1,917	1	8 075	1	6	0,17	1,04	5,9	35,37	Unsure	Unsure	Unsure
C	Mira Sintra - Cacém	18,673	20,604	1,931	3	9 607	1	9	0,17	1,55	4,92	44,27	Unsure	Unsure	Unsure
C	Cacém - Idanha	20,604	21,545	0,941	3	9 677	1	9	0,35	3,19	10,02	90,19	Unsure	High Risk	High Risk
C	Idanha - CREL	21,545	21,917	0,372	1	10 597	1	6	0,9	5,38	23,15	138,91	High Risk	High Risk	High Risk
C	Idanha - CREL	22,477	22,882	0,405	0	10596,9	0	4	0	3,29	0	85,06	Unsure	Unsure	Unsure

Reactive Methodology

➤ Descending direction (D)

D	Section code	Start point (km)	End point (km)	Input Length (km)	n. accidents	AADT	Lower Accident CI	Upper Accident CI	Lower Acc. Density	Upper Acc. Density	Lower Acc. Rate	Upper Acc. Rate	By Acc. Density	By Acc. Rate	Final ranking
													Status	Status	Status
D	CREL - Idanha	22,882	22,477	0,405	0	7 631	0	4	0	3,29	0	118,11	Unsure	Unsure	Unsure
D	CREL - Idanha	21,917	21,545	0,372	1	7 631	1	6	0,9	5,38	32,15	192,88	High Risk	High Risk	High Risk
D	Idanha - Cacém	21,545	20,604	0,941	0	12 082	0	4	0	1,42	0	32,11	Unsure	Unsure	Unsure
D	Cacém - Mira Sintra	20,604	18,673	1,931	3	12 116	1	9	0,17	1,55	3,9	35,11	Unsure	Unsure	Unsure
D	Mira Sintra - Telhal	18,673	16,756	1,917	0	8 990	0	4	0	0,7	0	21,18	Unsure	Unsure	Unsure
D	Telhal - Sacotes	16,756	14,451	2,305	1	5 517	1	6	0,14	0,87	7,18	43,06	Unsure	Unsure	Unsure
D	Telhal - Sacotes	14,153	13,667	0,486	0	5 517	0	4	0	2,74	0	136,14	Unsure	Unsure	Unsure
D	Sacotes - Lourel	13,667	11,998	1,669	2	7 935	1	8	0,2	1,6	6,89	55,13	Unsure	Unsure	Unsure
D	Lourel - Sintra	11,998	10,939	1,059	5	24 865	2	12	0,63	3,78	6,93	41,59	High Risk	Unsure	Unsure
D	Sintra - Ranholas	10,939	8,368	2,571	7	28 458	3	15	0,39	1,94	3,74	18,71	Unsure	Unsure	Unsure
D	Ranholas - Linhó	8,368	8,058	0,31	0	9 500	0	4	0	4,3	0	123,95	Unsure	Unsure	Unsure
D	Ranholas - Linhó	7,667	4,221	3,446	6	9 500	3	14	0,29	1,35	8,36	39,03	Unsure	Unsure	Unsure
D	Linhó - Alcoitão	4,221	2,892	1,329	5	22 646	2	12	0,5	3,01	6,06	36,39	Unsure	Unsure	Unsure
D	Alcoitão - Centro Comercial	2,892	2,489	0,403	1	15 627	1	6	0,83	4,96	14,49	86,95	High Risk	High Risk	High Risk
D	Centro Comercial - AKI	2,489	1,988	0,501	4	22 443	2	11	1,33	7,32	16,23	89,28	High Risk	High Risk	High Risk
D	AKI - Alcabideche	1,988	0,798	1,19	1	23 576	1	6	0,28	1,68	3,25	19,52	Unsure	Unsure	Unsure
D	Alcabideche - A5	0,798	0	0,798	6	25701,1	3	14	1,25	5,85	13,35	62,3	High Risk	High Risk	High Risk

Integration

➤ Ascending direction (C)

NWA Proactive							NWA Reactive						NWA Integrated		
no.	Subsection	Direction	Segment Start (Chainage)	Segment End (Chainage)	Length of motorway segment (m)	NWA Score Estimation: /100	Section no.	Subsection	Direction	Segment Start (Chainage)	Segment End (Chainage)	Length of section (km)		Reactive Classification	
1	A5 - Alcabideche	C	0	299	299	39,777	High Risk	1	A5 - Alcabideche	C	0	0,798	0,798	Unsure	class 4
2	A5 - Alcabideche	C	299	798	499	51,020	High Risk	2	Alcabideche - AKI	C	0,798	1,988	1,19	Unsure	class 4
3	Alcabideche - AKI	C	798	1988	1190	75,638	Intermediate Risk	3	AKI - Centro Comercial	C	1,988	2,489	0,501	Unsure	class 3
4	AKI - Centro Comercial	C	1988	2490	502	83,015	Intermediate Risk	4	Centro Comercial - Alcoitão	C	2,489	2,892	0,403	High Risk	class 3
5	Centro Comercial - Alcoitão	C	2490	2892	402	69,429	Intermediate Risk	5	Alcoitão - Linhó	C	2,892	4,221	1,329	High Risk	class 5
6	Alcoitão - Linhó	C	2892	4221	1329	81,080	Intermediate Risk	6	Linhó - Ranholas	C	4,221	7,667	3,446	Unsure	class 5
7	Linhó - Ranholas	C	4221	7430	3209	86,174	Low Risk	7	Linhó - Ranholas	C	8,058	8,368	0,31	Unsure	class 2
8	Linhó - Ranholas	C	7430	7667	237	91,237	Low Risk	8	Ranholas - Sintra	C	8,368	10,939	2,571	Unsure	class 2
9	Linhó - Ranholas	C	8058	8369	311	82,486	Intermediate Risk	9	Sintra - Lourel	C	10,939	11,998	1,059	Unsure	class 3
10	Ranholas - Sintra	C	8369	10937	2568	79,315	Intermediate Risk	10	Sintra - Lourel	C	10,939	11,998	1,059	Unsure	class 4
11	Sintra - Lourel	C	10937	11996	1059	58,990	High Risk	11	Lourel - Sacotes	C	11,998	13,667	1,669	Unsure	class 3
12	Lourel - Sacotes	C	11996	12675	679	74,228	Intermediate Risk	12	Sacotes - Telhal	C	13,667	14,153	0,486	Unsure	class 3
13	Lourel - Sacotes	C	12675	13665	990	74,563	Intermediate Risk	13	Sacotes - Telhal	C	13,667	14,153	0,486	Unsure	class 2
14	Sacotes - Telhal	C	13665	14153	488	87,760	Low Risk	14	Sacotes - Telhal	C	14,451	16,756	2,305	Unsure	class 3
15	Sacotes - Telhal	C	14451	15400	949	74,551	Intermediate Risk	15	Telhal - Mira Sintra	C	16,756	18,673	1,917	Unsure	class 3
16	Sacotes - Telhal	C	15400	16754	1354	74,109	Intermediate Risk	16	Telhal - Mira Sintra	C	16,756	18,673	1,917	Unsure	class 3
17	Telhal - Mira Sintra	C	16754	18671	1917	67,126	Intermediate Risk	17	Mira Sintra - Cacém	C	18,673	20,604	1,931	Unsure	class 3
18	Mira Sintra - Cacém	C	18671	19141	470	68,925	Intermediate Risk	18	Mira Sintra - Cacém	C	18,673	20,604	1,931	Unsure	class 3
19	Mira Sintra - Cacém	C	19141	20602	1461	74,789	Intermediate Risk	19	Mira Sintra - Cacém	C	19,141	20,604	1,463	Unsure	class 3
20	Cacém - Idanha	C	20602	21543	941	65,963	Intermediate Risk	20	Cacém - Idanha	C	20,604	21,545	0,941	High Risk	class 5
21	Idanha - Crel	C	21543	21917	374	59,810	High Risk	21	Idanha - Crel	C	21,545	21,917	0,372	High Risk	class 5
22	Idanha - Crel	C	22477	22881	404	25,270	High Risk	22	Idanha - Crel	C	22,477	22,882	0,405	Unsure	class 4

Integration

➤ Descending direction (D)

no.	Subsection	Direction	Segment Start (chainage)	Segment End	Length of motorway segment (m)	NWA Score Estimation:		Reactive Classification
						Len	/100	
1	A5 - Alcabideche	D	0	435	435	41,758	High Risk	class 5
2	A5 - Alcabideche	D	435	798	363	51,957	High Risk	class 5
3	Alcabideche - AKI	D	798	1988	1190	74,820	Intermediate Risk	class 3
4	AKI - Centro Comercial	D	1988	2490	502	89,743	Low Risk	class 5
5	Centro Comercial - Alcoitão	D	2490	2892	402	70,259	Intermediate Risk	class 5
6	Alcoitão - Linhó	D	2892	4221	1329	73,755	Intermediate Risk	class 3
7	Linhó - Ranholas	D	4221	7767	3546	87,028	Low Risk	class 2
8	Linhó - Ranholas	D	8058	8369	311	81,196	Intermediate Risk	class 3
9	Ranholas - Sintra	D	8369	10937	2568	79,440	Intermediate Risk	class 3
10	Sintra - Lourel	D	10937	11445	508	66,672	Intermediate Risk	class 3
11	Sintra - Lourel	D	11445	11996	551	69,799	Intermediate Risk	class 3
12	Lourel - Sacotes	D	11996	13665	1669	86,290	Low Risk	class 2
13	Sacotes - Telhal	D	13665	14153	488	89,291	Low Risk	class 2
14	Sacotes - Telhal	D	14451	16754	2303	66,253	Intermediate Risk	class 3
15	Telhal - Mira Sintra	D	16754	18671	1917	67,443	Intermediate Risk	class 3
16	Mira Sintra - Cacém	D	18671	18950	279	62,778	High Risk	class 4
17	Mira Sintra - Cacém	D	18950	19097	147	61,697	High Risk	class 4
18	Mira Sintra - Cacém	D	19097	20602	1505	74,385	Intermediate Risk	class 3
19	Cacém - Idanha	D	20602	21543	941	76,159	Intermediate Risk	class 3
20	Idanha - Crel	D	21543	21917	374	59,787	High Risk	class 5
21	Idanha - Crel	D	22477	22881	404	22,370	High Risk	class 4

Section no.	Subsection	Direction	Segment Start (Chainage)	Segment End (Chainage)	Length of section (m)	Reactive Classification
1	A5 - Alcabideche	D	0	0,798	0,798	High Risk
2	Alcabideche - AKI	D	0,798	1,988	1,19	High Risk
3	AKI - Centro Comercial	D	1,988	2,489	0,501	Unsure
4	Centro Comercial - Alcoitão	D	2,489	2,892	0,403	High Risk
5	Alcoitão - Linhó	D	2,892	4,221	1,329	High Risk
6	Linhó - Ranholas	D	4,221	7,667	3,446	Unsure
7	Linhó - Ranholas	D	8,058	8,368	0,31	Unsure
8	Ranholas - Sintra	D	8,368	10,939	2,571	Unsure
9	Sintra - Lourel	D	10,939	11,998	1,059	Unsure
10	Lourel - Sacotes	D	11,998	13,667	1,669	Unsure
11	Sacotes - Telhal	D	13,667	14,153	0,486	Unsure
12	Sacotes - Telhal	D	14,451	16,756	2,305	Unsure
13	Telhal - Mira Sintra	D	16,756	18,673	1,917	Unsure
14	Mira Sintra - Cacém	D	18,673	20,604	1,931	Unsure
15	Cacém - Idanha	D	20,604	21,545	0,941	Unsure
16	Idanha - Crel	D	21,545	21,917	0,372	High Risk
17	Idanha - Crel	D	22,477	22,882	0,405	Unsure

Integration

➤ Final Results

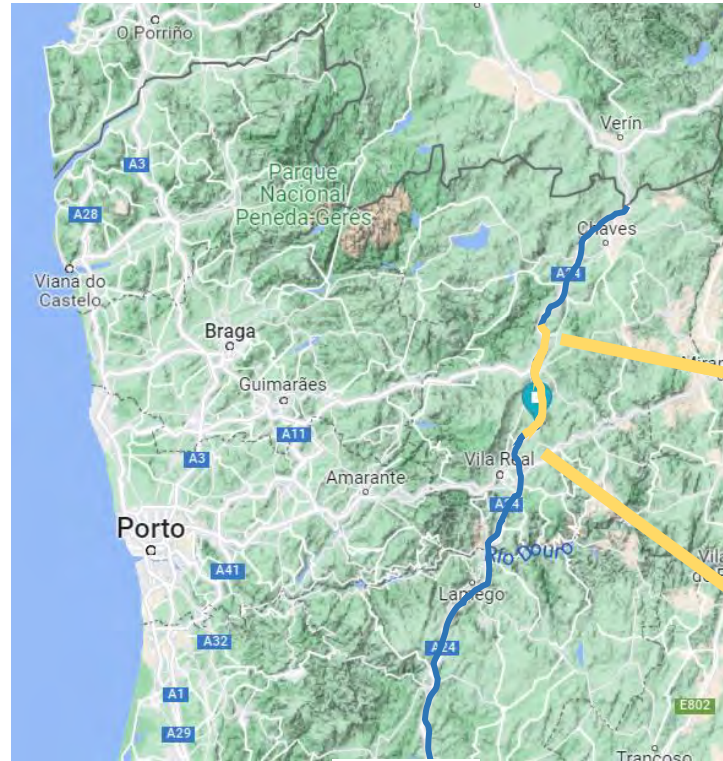
	Length (km)	
Direction C	23	
Direction D	23	
Total	46	%
Class 1	0,00	0%
Class 2	9,53	22%
Class 3	24,02	56%
Class 4	4,60	11%
Class 5	5,12	12%

/ 04 AXIS 2: A24

/ Road type: Rural Motorway

/ Length: 30,3 km

/ Cross section: 2 or 3 lanes per direction, plus emergency lane;



Proactive Methodology

/ Segmentation based on
Roughly Homogenous Sections:

- Number of lanes;
- AADT;
- Bridges > 400 m;
- Speed constant at 120 Km/h
- Terrain Type: Mountainous



Proactive Methodology

➤ Ascending direction (C)

no.	Subsection	Direction	Pki	PKf	Length of motorway segment (m)	RF						NWA Score Estimation /100
						LW	RS	CU	IC	PB	OC	
						1	2	3	4	5	6	
I	Pedras Salgadas - A7	C	34 400	35 800	1 400	1,000	0,765	0,932	1,000	1,000	1,000	71,325
II	Pedras Salgadas - A7	C	35 800	40 000	4 200	1,000	0,311	0,928	1,000	1,000	1,000	28,817
II.1	Pedras Salgadas - A7	C	40 000	45 000	5 000	1,000	0,431	0,938	1,000	1,000	1,000	40,428
III	A7 - Vila Pouca de Aguiar	C	45 000	45 600	600	1,000	0,961	0,887	1,000	1,000	1,000	85,174
IV	Vila Pouca de Aguiar - Fortunho	C	45 600	46 900	1 300	1,000	1,307	0,871	0,767	1,000	1,000	87,356
V	Vila Pouca de Aguiar - Fortunho	C	46 900	48 300	1 400	1,000	0,961	1,000	1,000	1,000	1,000	96,061
VI	Vila Pouca de Aguiar - Fortunho	C	48 300	48 800	500	1,000	0,875	0,877	1,000	1,000	1,000	76,731
VII	Vila Pouca de Aguiar - Fortunho	C	48 800	53 000	4 200	1,000	0,383	0,947	1,000	1,000	1,000	36,257
VIII	Vila Pouca de Aguiar - Fortunho	C	53 000	53 900	900	1,000	0,884	0,941	1,000	1,000	1,000	83,206
IX	Vila Pouca de Aguiar - Fortunho	C	53 900	54 800	900	1,000	0,428	1,000	1,000	1,000	1,000	42,808
X	Vila Pouca de Aguiar - Fortunho	C	54 800	56 200	1 400	1,000	0,268	0,964	1,000	1,000	1,000	25,801
XI	Vila Pouca de Aguiar - Fortunho	C	56 200	60 200	4 000	1,000	0,922	0,923	1,000	1,000	1,000	85,088
XI.1	Vila Pouca de Aguiar - Fortunho	C	60 200	64 700	4 500	1,000	0,907	0,907	1,000	1,000	1,000	82,187

Proactive Methodology

➤ Descending direction (D)

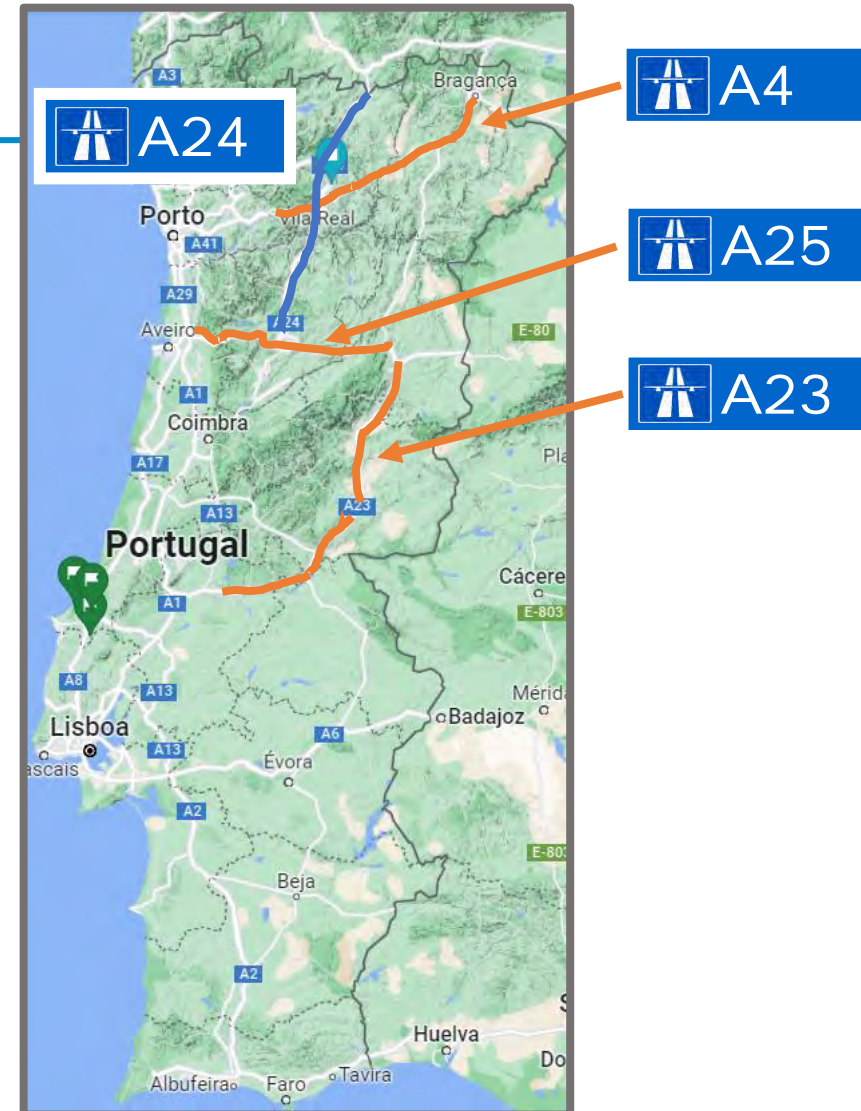
no.	Subsection	Direction	Pki	PKf	Length of motorway segment (m)	RF						NWA Score Estimation /100
						LW	RS	CU	IC	PB	OC	
						1	2	3	4	5	6	
I	Pedras Salgadas - A7	D	34 400	38 600	4 200	1,000	0,784	0,907	1,000	1,000	1,000	71,139
I.1	Pedras Salgadas - A7	D	38 600	43 600	5 000	1,000	0,792	0,949	0,916	1,000	1,000	68,810
II	Pedras Salgadas - A7	D	43 600	45 000	1 400	1,000	0,458	0,949	1,000	1,000	1,000	43,458
III	A7 - Vila Pouca de Aguiar	D	45 000	45 600	600	1,000	0,118	0,887	1,000	1,000	1,000	10,460
IV	Vila Pouca de Aguiar - Fortunho	D	45 600	46 900	1 300	1,000	0,431	0,871	0,813	1,000	1,000	30,519
V	Vila Pouca de Aguiar - Fortunho	D	46 900	48 300	1 400	1,000	0,960	1,000	1,000	1,000	1,000	95,969
VI	Vila Pouca de Aguiar - Fortunho	D	48 300	54 200	5 900	1,000	0,818	0,942	1,000	1,000	1,000	77,019
VII	Vila Pouca de Aguiar - Fortunho	D	54 200	55 200	1 000	1,000	0,790	0,974	1,000	1,000	1,000	76,973
VIII	Vila Pouca de Aguiar - Fortunho	D	55 200	60 000	4 800	1,000	0,489	0,933	1,000	1,000	1,000	45,631
VIII.1	Vila Pouca de Aguiar - Fortunho	D	60 000	64 700	4 700	1,000	0,414	0,909	1,000	1,000	1,000	37,591

Reactive Methodology

/ (Roughly) Homogenous Sections

/ Accident Data – 5 years

/ Reference Population Group:
Portuguese motorways A23; A4; A25



Reactive Methodology

➤ Ascending direction (C)

no.	Subsection	Direction	Pki	PKf	Length of motorway segment (Km)	AADT Md 2016-2020 By direction	No accidents with fatalities 2016-2020	ANSR	NWA Reactive Final ranking
					L				Status
I	Pedras Salgadas - A7	C	34	36	1,400	2 608	0		Low risk
II	Pedras Salgadas - A7	C	36	45	9,200	2 608	2		Unsure
III	A7 - Vila Pouca de Aguiar	C	45	46	0,600	1 844	0		Low risk
IV	Vila Pouca de Aguiar - Fortunho	C	46	47	1,300	1 700	2		Unsure
V	Vila Pouca de Aguiar - Fortunho	C	47	49	1,900	1 700	2		Unsure
VI	Vila Pouca de Aguiar - Fortunho	C	49	53	4,200	1 700	1		Unsure
VII	Vila Pouca de Aguiar - Fortunho	C	53	54	0,900	1 700	0		Low risk
VIII	Vila Pouca de Aguiar - Fortunho	C	54	56	2,300	1 700	4		Unsure
X	Vila Pouca de Aguiar - Fortunho	C	56	65	8,500	1 700	4		Unsure

➤ Descending direction (D)

no.	Subsection	Direction	Segment Start (chainage)	Segment End	Length of motorway segment (Km)	AADT Md 2016-2020 By direction	No accidents with fatalities 2016-2020	ANSR	NWA Reactive Final ranking
					L				Status
I	Pedras Salgadas - A7	D	34	44	9,200	2 608	2		High risk
II	Pedras Salgadas - A7	D	44	45	1,400	2 608	1		Unsure
III	A7 - Vila Pouca de Aguiar	D	45	46	0,600	1 844	0		Low risk
IV	Vila Pouca de Aguiar - Fortunho	D	46	47	1,300	1 700	0		Low risk
V	Vila Pouca de Aguiar - Fortunho	D	47	48	1,400	1 700	0		Low risk
VI	Vila Pouca de Aguiar - Fortunho	D	48	55	6,900	1 700	1		Unsure
VIII	Vila Pouca de Aguiar - Fortunho	D	55	65	9,500	1 700	2		Unsure

Integration

➤ Ascending direction (C)

NWA Proactive							NWA Reactive							NWA Integrated
no.	Subsection	Direction	Segment Start (Chainage)	Segment End (Chainage)	Length of motorway segment (m)	NWA Proactive Final ranking	no.	Subsection	Direction	Pki	PKf	Length of motorway segment (Km)	NWA Reactive Final ranking	
					Len							L		
I	Pedras Salgadas - A7	C	34 400	35 800	1400	Intermediate Risk	I	Pedras Salgadas - A7	C	34,400	35,800	1,400	Low risk	class 2
II	Pedras Salgadas - A7	C	35 800	40 000	4200	High Risk	II	Pedras Salgadas - A7	C	35,800	40,000	4,200	Unsure	class 5
II.1	Pedras Salgadas - A7	C	40 000	45 000	5000	High Risk	II.1	Pedras Salgadas - A7	C	40,000	45,000	5,000	Unsure	class 5
III	A7 - Vila Pouca de Aguiar	C	45 000	45 600	600	Low Risk	III	A7 - Vila Pouca de Aguiar	C	45,000	45,600	0,600	Low risk	class 1
IV	Vila Pouca de Aguiar - Fortunho	C	45 600	46 900	1300	Low Risk	IV	Vila Pouca de Aguiar - Fortunho	C	45,600	46,900	1,300	Unsure	class 2
V	Vila Pouca de Aguiar - Fortunho	C	46 900	48 300	1400	Low Risk	V	Vila Pouca de Aguiar - Fortunho	C	46,900	48,300	1,400	Unsure	class 2
VI	Vila Pouca de Aguiar - Fortunho	C	48 300	48 800	500	Intermediate Risk	VI	Vila Pouca de Aguiar - Fortunho	C	48,300	48,800	0,500	Unsure	class 3
VII	Vila Pouca de Aguiar - Fortunho	C	48 800	53 000	4200	High Risk	VI	Vila Pouca de Aguiar - Fortunho	C	48,800	53,000	4,200	Unsure	class 5
VIII	Vila Pouca de Aguiar - Fortunho	C	53 000	53 900	900	Intermediate Risk	VII	Vila Pouca de Aguiar - Fortunho	C	53,000	53,900	0,900	Low risk	class 2
IX	Vila Pouca de Aguiar - Fortunho	C	53 900	54 800	900	High Risk	VIII	Vila Pouca de Aguiar - Fortunho	C	53,900	54,800	0,900	Unsure	class 5
X	Vila Pouca de Aguiar - Fortunho	C	54 800	56 200	1400	High Risk	X	Vila Pouca de Aguiar - Fortunho	C	54,800	56,200	1,400	Unsure	class 5
XI	Vila Pouca de Aguiar - Fortunho	C	56 200	60 200	4000	Low Risk	X	Vila Pouca de Aguiar - Fortunho	C	56,200	60,200	4,000	Unsure	class 2
XI.1	Vila Pouca de Aguiar - Fortunho	C	60 200	64 700	4500	Intermediate Risk	XI.1	Vila Pouca de Aguiar - Fortunho	C	60,200	64,700	4,500	Unsure	class 3

Integration

➤ Descending direction (D)

no.	Subsection	Direction	Segment Start (chainage)	Segment End	Length of motorway segment (m)	NWA Proactive Final ranking		no.	Subsection	Direction	Segment Start (chainage)	Segment End	Length of motorway segment (Km)	NWA Reactive Final ranking	NWA Integrated
					Len								L		
I	Pedras Salgadas - A7	D	34400	38600	4200	Intermediate Risk		I	Pedras Salgadas - A7	D	34,400	38,600	4,200	High risk	class 4
I.1	Pedras Salgadas - A7	D	38600	43600	5000	Intermediate Risk		I.1	Pedras Salgadas - A7	D	38,6	43,6	5,000	High risk	class 4
II	Pedras Salgadas - A7	D	43600	45000	1400	High Risk		II	Pedras Salgadas - A7	D	43,600	45,000	1,400	Unsure	class 5
III	A7 - Vila Pouca de Aguiar	D	45000	45600	600	High Risk		III	A7 - Vila Pouca de Aguiar	D	45,000	45,600	0,600	Low risk	class 2
IV	Vila Pouca de Aguiar - Fortunho	D	45600	46900	1300	High Risk		IV	Vila Pouca de Aguiar - Fortunho	D	45,600	46,900	1,300	Low risk	class 2
V	Vila Pouca de Aguiar - Fortunho	D	46900	48300	1400	Low Risk		V	Vila Pouca de Aguiar - Fortunho	D	46,900	48,300	1,400	Low risk	class 1
VI	Vila Pouca de Aguiar - Fortunho	D	48300	54200	5900	Intermediate Risk		VI	Vila Pouca de Aguiar - Fortunho	D	48,300	54,200	5,900	Unsure	class 3
VII	Vila Pouca de Aguiar - Fortunho	D	54200	55200	1000	Intermediate Risk		VII	Vila Pouca de Aguiar - Fortunho	D	54,2	55,2	1,000	Unsure	class 3
VIII	Vila Pouca de Aguiar - Fortunho	D	55200	60000	4800	High Risk		VIII	Vila Pouca de Aguiar - Fortunho	D	55,200	60,000	4,800	Unsure	class 5
VIII.1	Vila Pouca de Aguiar - Fortunho	D	60000	64700	4700	High Risk		VIII.1	Vila Pouca de Aguiar - Fortunho	D	60	64,7	4,700	Unsure	class 5

Integration

➤ Final Results

	Length (Km)	% of Analyzed section
Class 1	2,000	1%
Class 2	10,900	8%
Class 3	11,900	9%
Class 4	82,200	62%
Class 5	26,600	20%

/ **Lengthy process** Data collection, segmentation and data assessment (a high level of detail is required)

/ **Data Availability** Access to construction data in older roads may not be possible

/ **User-Friendly Excel Tools** A significant amount of operations are needed before entering the data on the tools, namely on NWA- Proactive

/ **NWA-Proactive Parameters**

Lane Width, Roadside distance, Curvature are parameters which are very difficult to change in a road already operating

Roadside parameter penalizes significantly reduced roadside width, despite the existence of safety barriers

/ It would be useful if different intervention scenarios could be simulated to assess the impact on the NWA results

THANK YOU

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