#ErfRam

By Bjarne Bylov Jensen, Grontmij A/S

RAM SYSTEM – BEST PRACTICE

European Roads Need Your Assistance

Your task is: Maintain the road capital value in Europe as economically optimum as possible

A rough estimate: The capital value may exceed by far

€ 5,000,000,000,000

Your challenge is:

Roads are an important precondition for our welfare and not least our competitive power

How do we ensure that 500,000,000 million citizens can apply the road network safely - and not least without wasting time?

Road maintenance in Denmark

Maintained by the Danish Road Directorate:

Motorway network: Approx. 1,200 km
Other nat. roads: Approx. 2,600 km

Maintained by 98 municipalities:

Municipal road network: Approx. 70,500 km

The *smallest* municipality maintains approx. 60 km road network

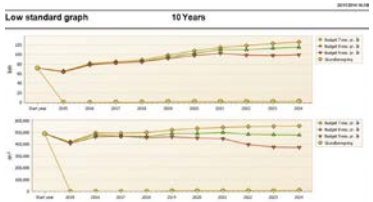
The *largest* municipality maintains approx. 2,000 km road network

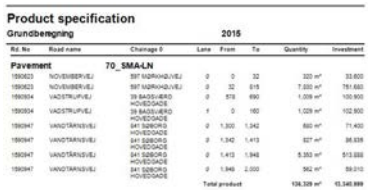
Why RoSy PMS/RAMS is needed

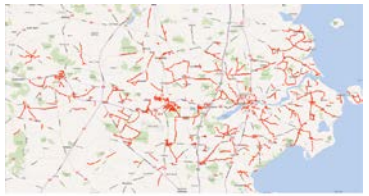
Overview of:

- Municipal road network (basic data)
- Condition of road network
- Traffic load in road network
- Calculation of maintenance requirement
- Consequence calculation using various budget scenarios:
  - Backlog
  - Number of km low standard roads
  - Road capital
  - Average remaining service life
  - Concrete measures in the individual years

  … etc.



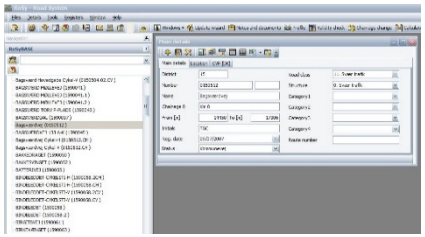


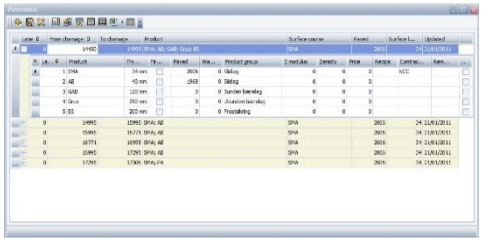


RoSy RAMS – Main modules

RoSy BASE

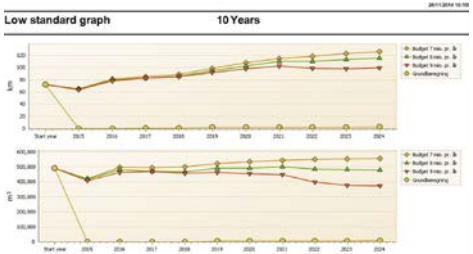
All relevant data about the road Network

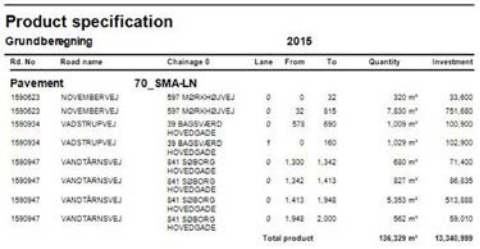




RoSy PLAN

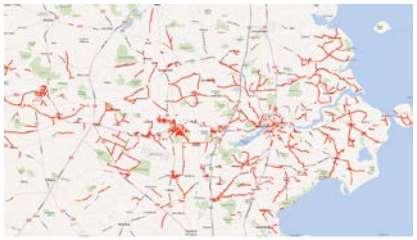
Kalkulation engene.
Budget scenarios & consequences

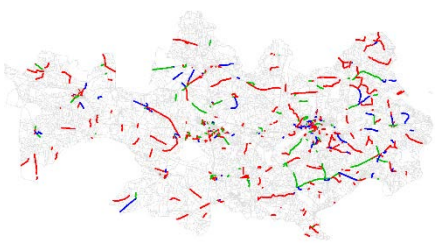


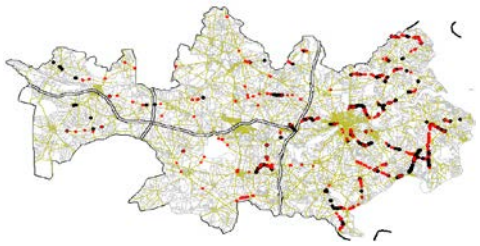


RoSy MAP

GIS-engine
RoSy data in a MAP







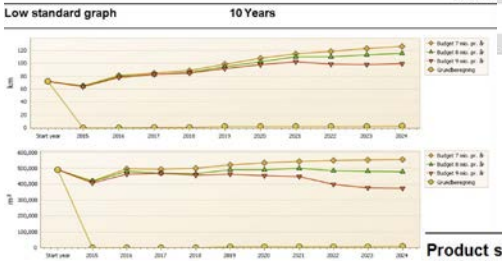
RoSy PLAN – overview and consequences

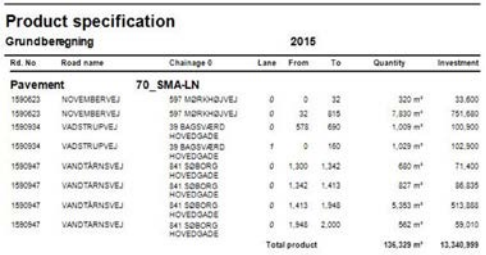
Condition of road network

Consequence calculation using various budget scenarios – 10 year perspective

Optimum budget

Budget needed to keep status quo





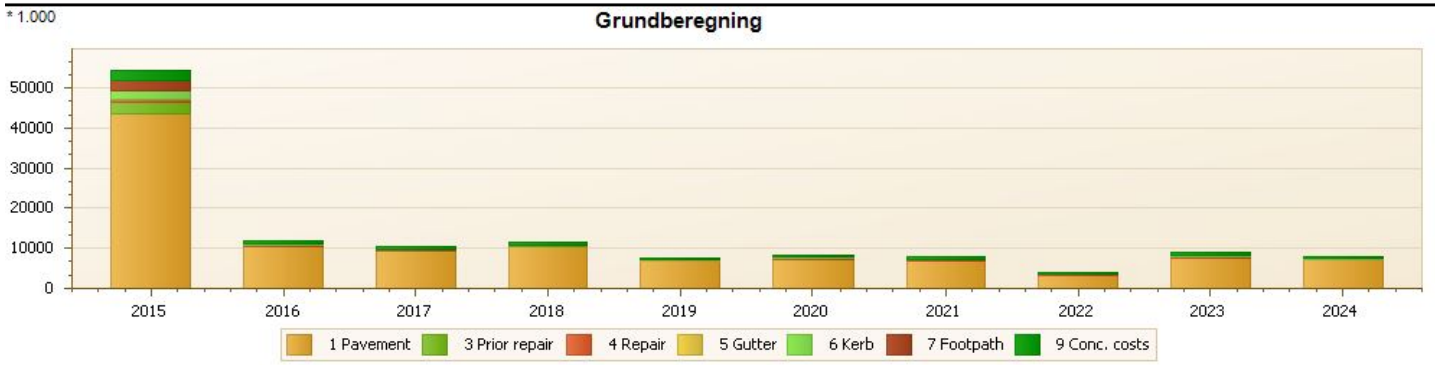
Your overview

- Backlog
- Number of km low standard roads
- Road capital
- Average remaining service life
- Concrete measures in the individual years

… etc.

Optimal budget

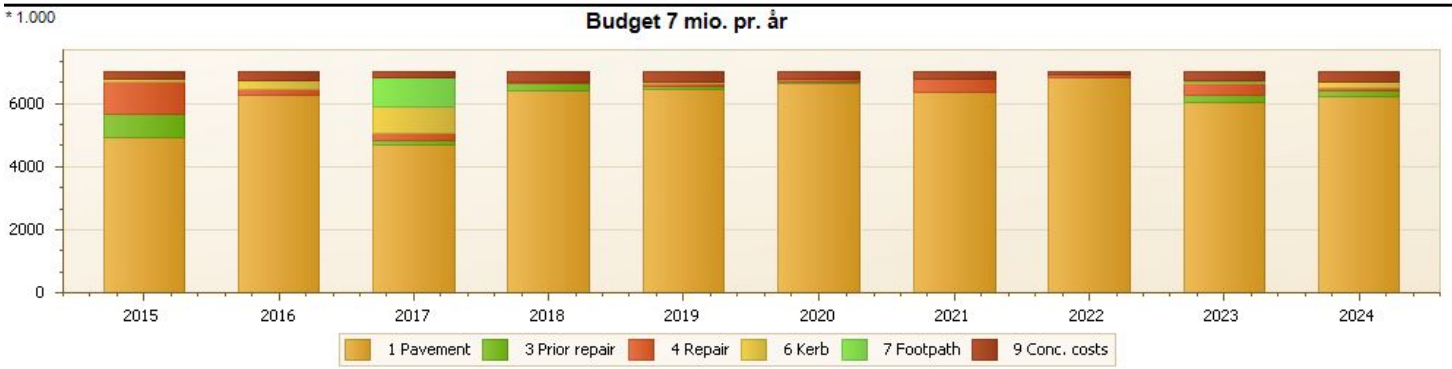
Investment allocation per product group **10 Years** 26/11/2014 16:18



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	
1 Pavement	43,398	10,409	9,326	10,565	6,844	7,176	6,919	3,351	7,514	7,143	**112,645**
3 Prior repair	2,991	188	186	132	103	131	53	28	168	157	**4,137**
4 Repair	694	144	130	89	60	334	249	81	398	79	**2,258**
5 Gutter					17	16					**33**
6 Kerb	2,324	359	130	37	8	167		99	203	93	**3,420**
7 Footpath	2,360		59	19	18				16	57	**2,529**
9 Conc. costs	2,553	668	555	715	557	488	568	313	758	513	**7,688**
1. In budget	**54,320**	**11,768**	**10,386**	**11,557**	**7,607**	**8,312**	**7,789**	**3,872**	**9,057**	**8,042**	**132,710**
10 Safety repair	3	1	3	5	7	8	8	13	17	17	**82**
11 Shoulder	57	3	28	2	55	153	312		57	3	**670**
12 Ditch						2	17				**19**
2. Not in budget	**60**	**4**	**31**	**7**	**62**	**163**	**337**	**13**	**74**	**20**	**771**
	54,380	**11,772**	**10,417**	**11,564**	**7,669**	**8,475**	**8,126**	**3,885**	**9,131**	**8,062**	**133,481**

Budget – DKK 7 million per year

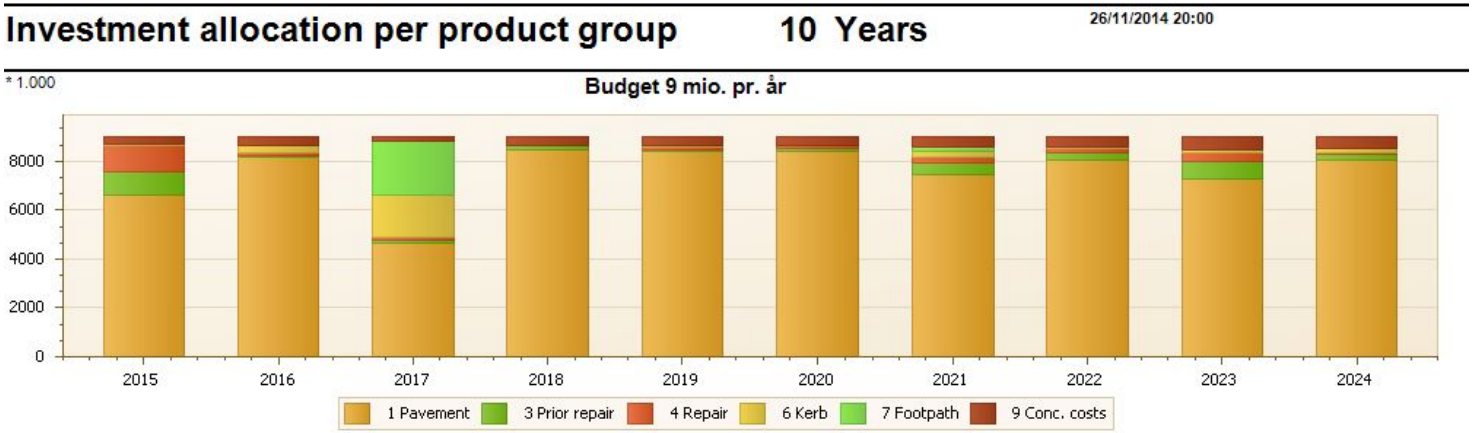
Investment allocation per product group **10 Years** 26/11/2014 16:18



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	
1 Pavement	4,916	6,250	4,685	6,423	6,446	6,618	6,350	6,837	6,010	6,227	**60,762**
3 Prior repair	749	37	158	220	92	60	22		250	178	**1,766**
4 Repair	1,033	154	229	54	112	84	406	57	360	81	**2,570**
6 Kerb	57	286	816		39				48	178	**1,424**
7 Footpath	38		929						54		**1,021**
9 Conc. costs	207	269	172	298	304	235	220	100	281	328	**2,414**
1. In budget.	**7,000**	**6,996**	**6,989**	**6,995**	**6,993**	**6,997**	**6,998**	**6,994**	**7,003**	**6,992**	**69,957**
10 Safety repair	9	10	14	21	29	39	46	65	70	82	**385**
11 Shoulder	57	3	28	2	55	153	312		57	3	**670**
12 Ditch						2	17				**19**
2. Not in budget.	**66**	**13**	**42**	**23**	**84**	**194**	**375**	**65**	**127**	**85**	**1,074**
	7,066	**7,009**	**7,031**	**7,018**	**7,077**	**7,191**	**7,373**	**7,059**	**7,130**	**7,077**	**71,031**

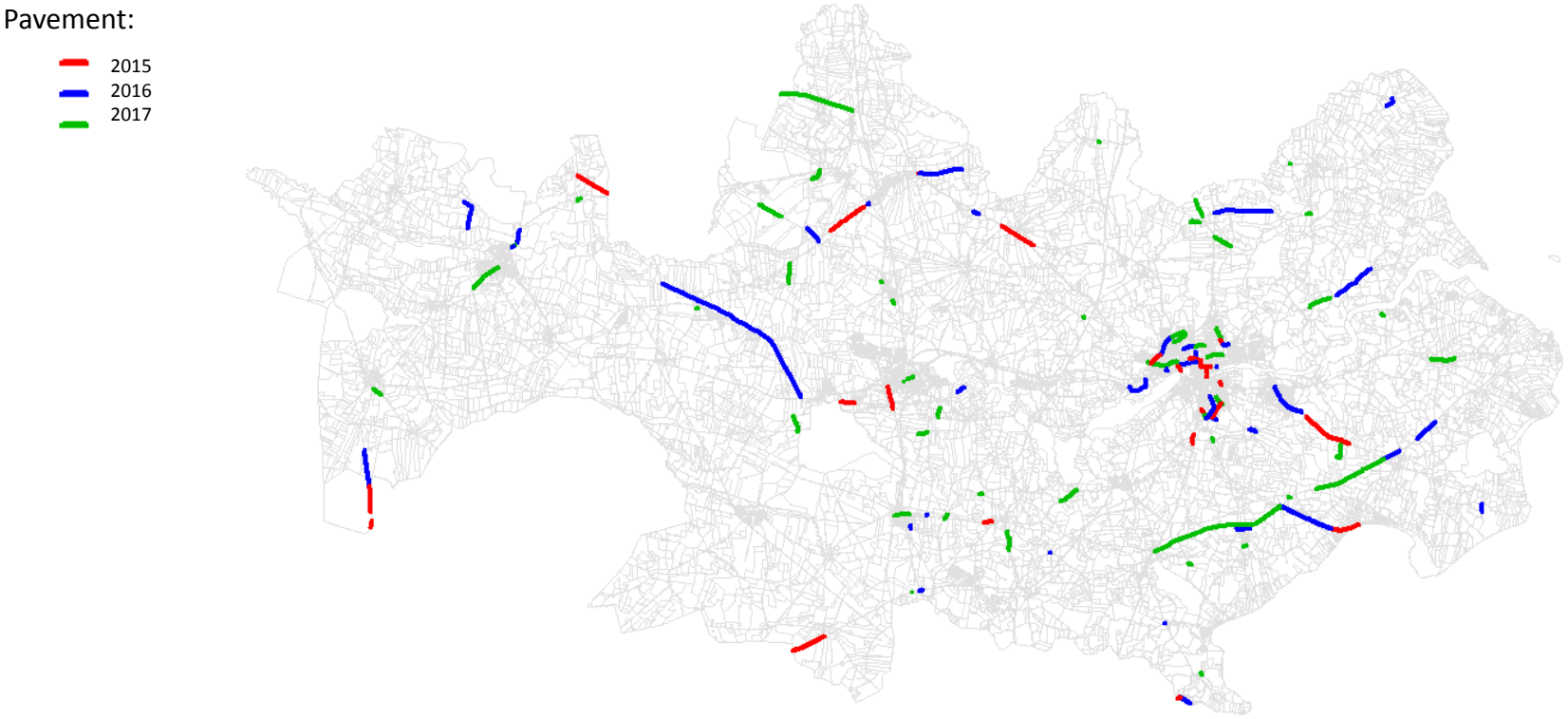
Budget – DKK 9 million per year

Investment allocation per product group **10 Years** 26/11/2014 20:00



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	
1 Pavement	6,627	8,150	4,659	8,459	8,380	8,410	7,472	8,062	7,273	8,074	**75,566**
3 Prior repair	966	95	106	166	109	97	485	302	727	186	**3,239**
4 Repair	1,029	130	154	32	90	150	206	139	372	64	**2,366**
6 Kerb	57	286	1,707		39		257	82	99	184	**2,711**
7 Footpath	38		2,187				159	5	1	5	**2,395**
9 Conc. costs	281	335	178	337	380	336	413	394	510	477	**3,641**
1. In budget.	**8,998**	**8,996**	**8,991**	**8,994**	**8,998**	**8,993**	**8,992**	**8,984**	**8,982**	**8,990**	**89,918**
10 Safety repair	9	10	14	21	28	36	33	44	53	60	**308**
11 Shoulder	57	3	28	2	55	153	312		57	3	**670**
12 Ditch						2	17				**19**
2. Not in budget.	**66**	**13**	**42**	**23**	**83**	**191**	**362**	**44**	**110**	**63**	**997**
	9,064	**9,009**	**9,033**	**9,017**	**9,081**	**9,184**	**9,354**	**9,028**	**9,092**	**9,053**	**90,915**

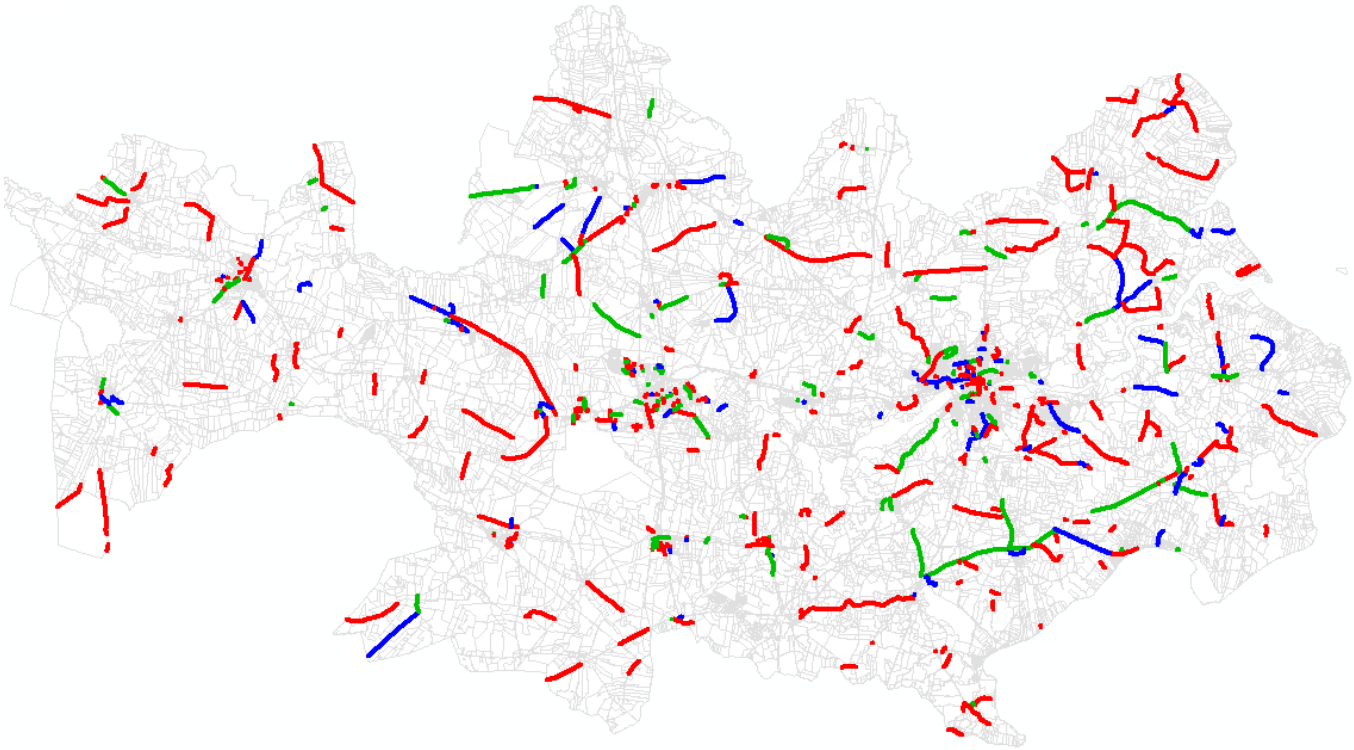
Pavement 2015-2017 – with low budget



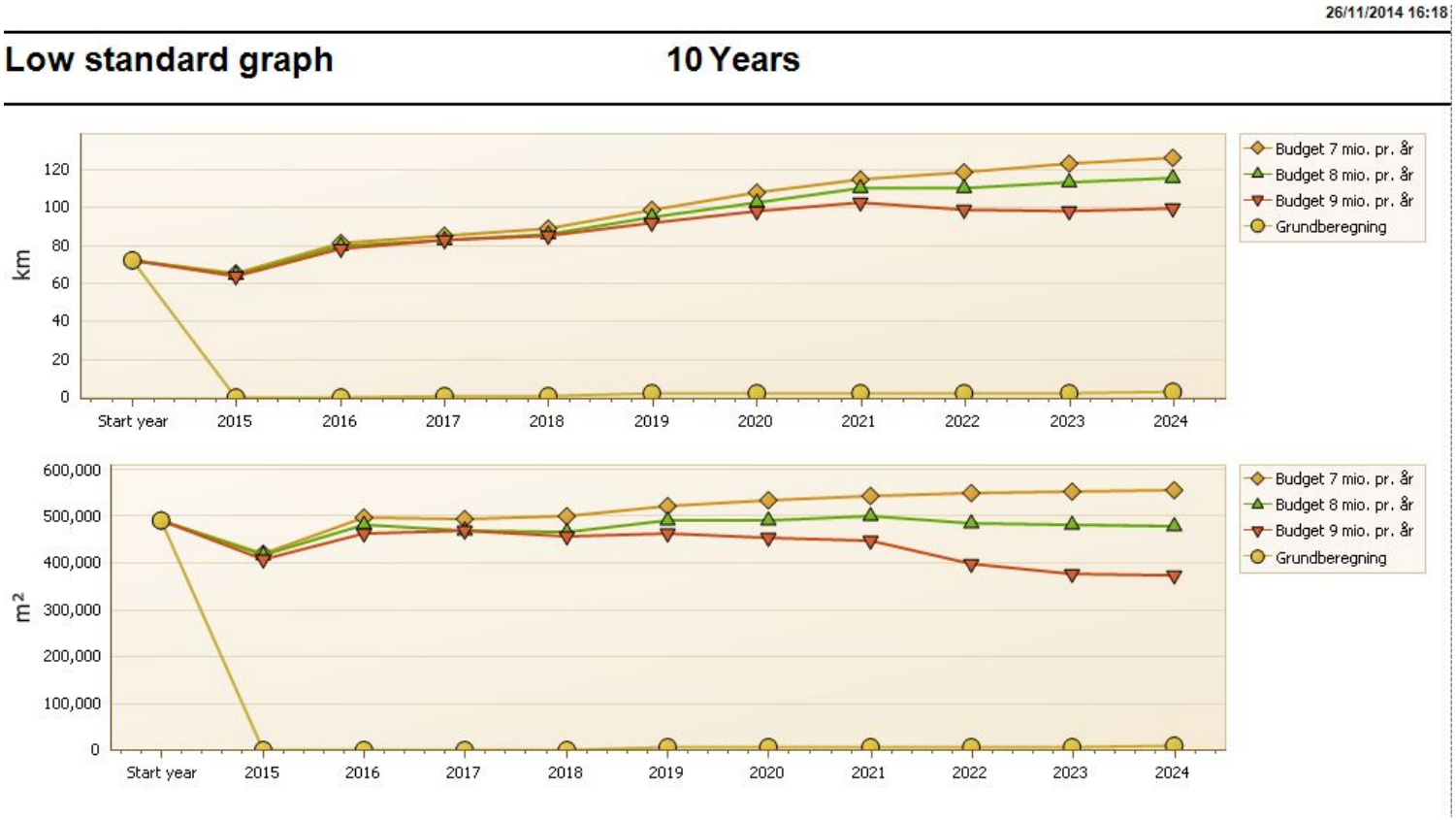
Pavement 2015-2017 – optimum budget

Pavement:

- 2015
- 2016
- 2017



Low standard roads – various budgets



Low standard roads – development in km

Budget DKK 7m/year

Low standard — **10 Years**

Budget 7 mio. pr. år

Kilometers per priority/road class

Priority	Class	Start year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1	0. Cykelsti langs vej	12.6	12.6	19.0	21.8	23.3	28.9	36.1	42.1	44.9	47.6	50.2
	1. Trafikvej	22.2	19.1	19.6	15.4	13.8	8.8	6.0	3.7	2.6	2.5	2.5
	10. Sekundær stier i eg	2.3	2.3	2.6	2.6	2.8	2.8	3.5	4.4	5.6	5.6	6.4
	11. Svær trafik	7.6	4.2	1.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2. Fordelingsvej	5.5	5.3	10.4	11.5	10.8	13.0	12.1	11.2	10.5	7.1	5.4
	3. Lokalveje	21.5	21.5	28.6	32.5	36.4	39.0	41.2	44.6	46.1	50.0	50.8
	4. P. plads/Torv	0.1	0.1	0.2	0.3	0.3	0.3	0.5	0.5	0.6	0.6	0.6
	9. Primær stier i eget tr	0.0	0.0	0.0	0.2	1.5	5.4	7.9	8.3	8.5	9.3	10.3
1 Total		71.8	65.1	81.4	84.8	89.0	98.3	107.4	114.7	118.7	122.6	126.2

Low standard roads – development in km

Budget DKK 9m/year

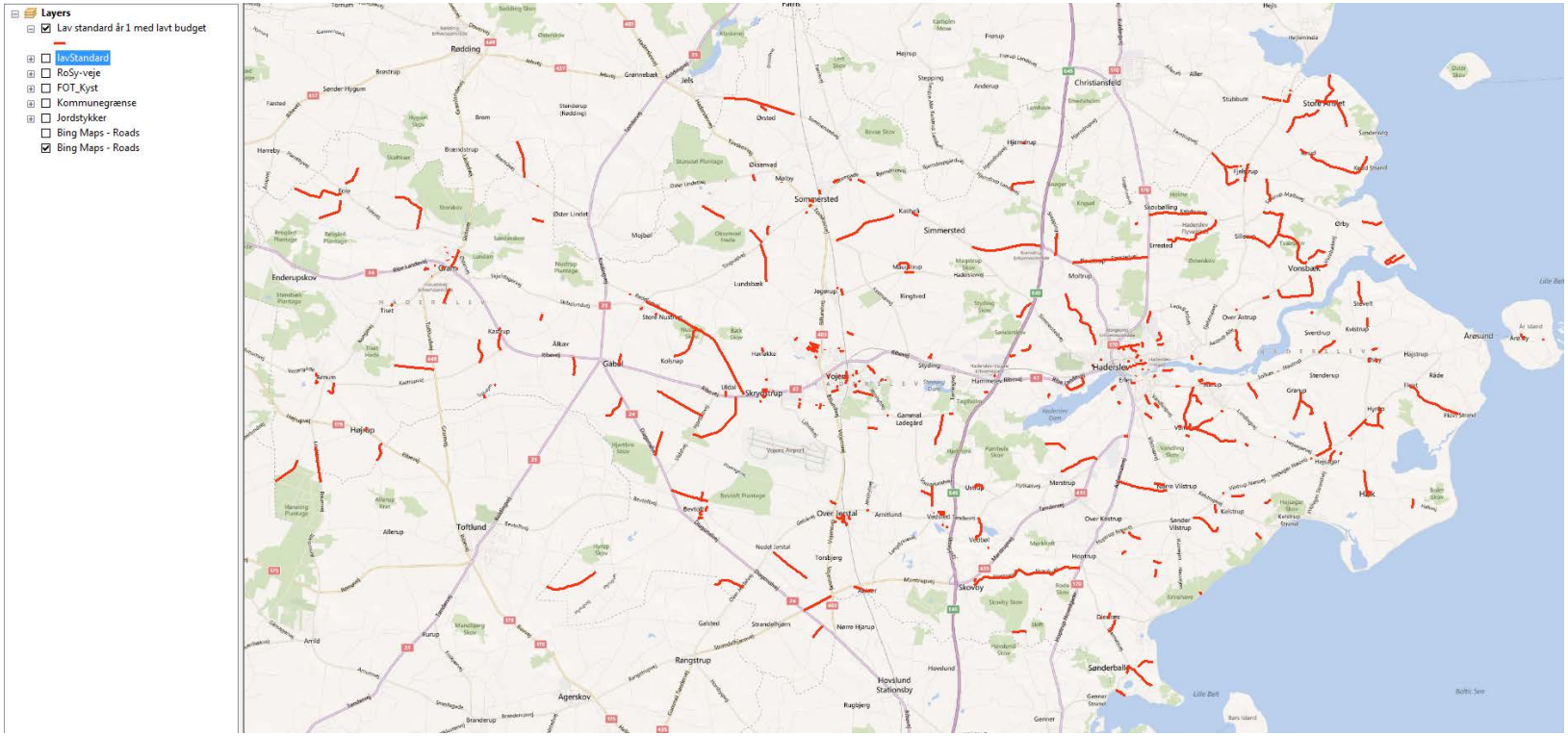
Low standard — **10 Years**

Budget 9 mio. pr. år

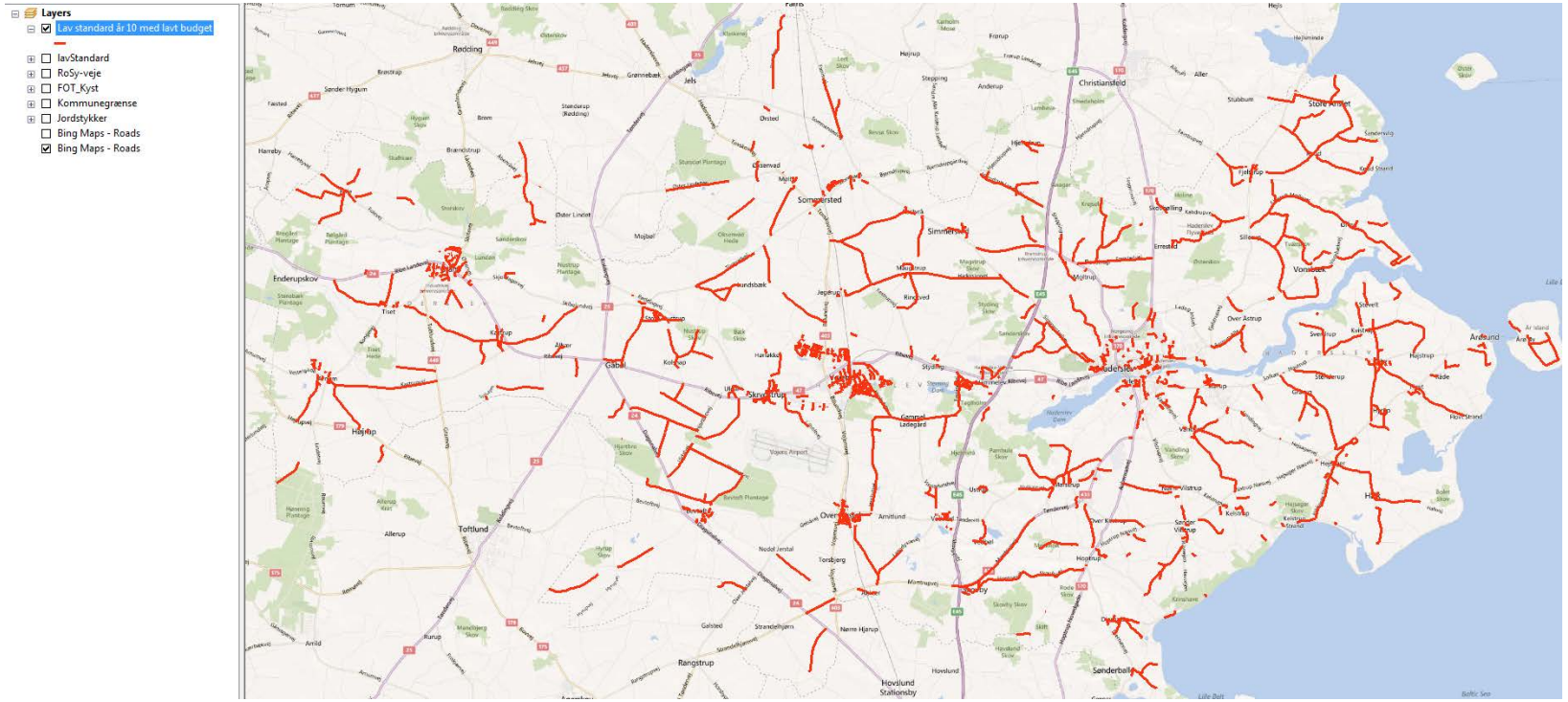
Kilometers per priority/road class

Priority	Class	Start year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1	0. Cykelsti langs vej	12.6	12.6	19.0	21.8	23.3	28.9	36.1	42.1	44.9	47.6	50.2
	1. Trafikvej	22.2	17.5	16.5	13.2	9.2	5.4	2.7	2.6	2.6	2.5	2.5
	10. Sekundær stier i eg	2.3	2.3	2.6	2.6	2.8	2.8	3.5	4.4	5.6	5.6	6.0
	11. Svær trafik	7.6	4.2	1.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2. Fordelingsvej	5.5	5.3	9.9	11.5	11.1	10.7	7.4	4.2	0.9	0.5	0.0
	3. Lokalveje	21.5	21.5	28.7	32.5	36.4	38.1	39.6	40.3	36.1	32.0	30.6
	4. P. plads/Torv	0.1	0.1	0.2	0.3	0.3	0.3	0.5	0.5	0.3	0.3	0.3
	9. Primær stier i eget tr	0.0	0.0	0.0	0.2	1.5	5.4	7.9	8.3	8.5	9.3	9.4
1 Total		71.8	63.5	77.8	82.5	84.7	91.7	97.7	102.3	98.8	97.8	99.1

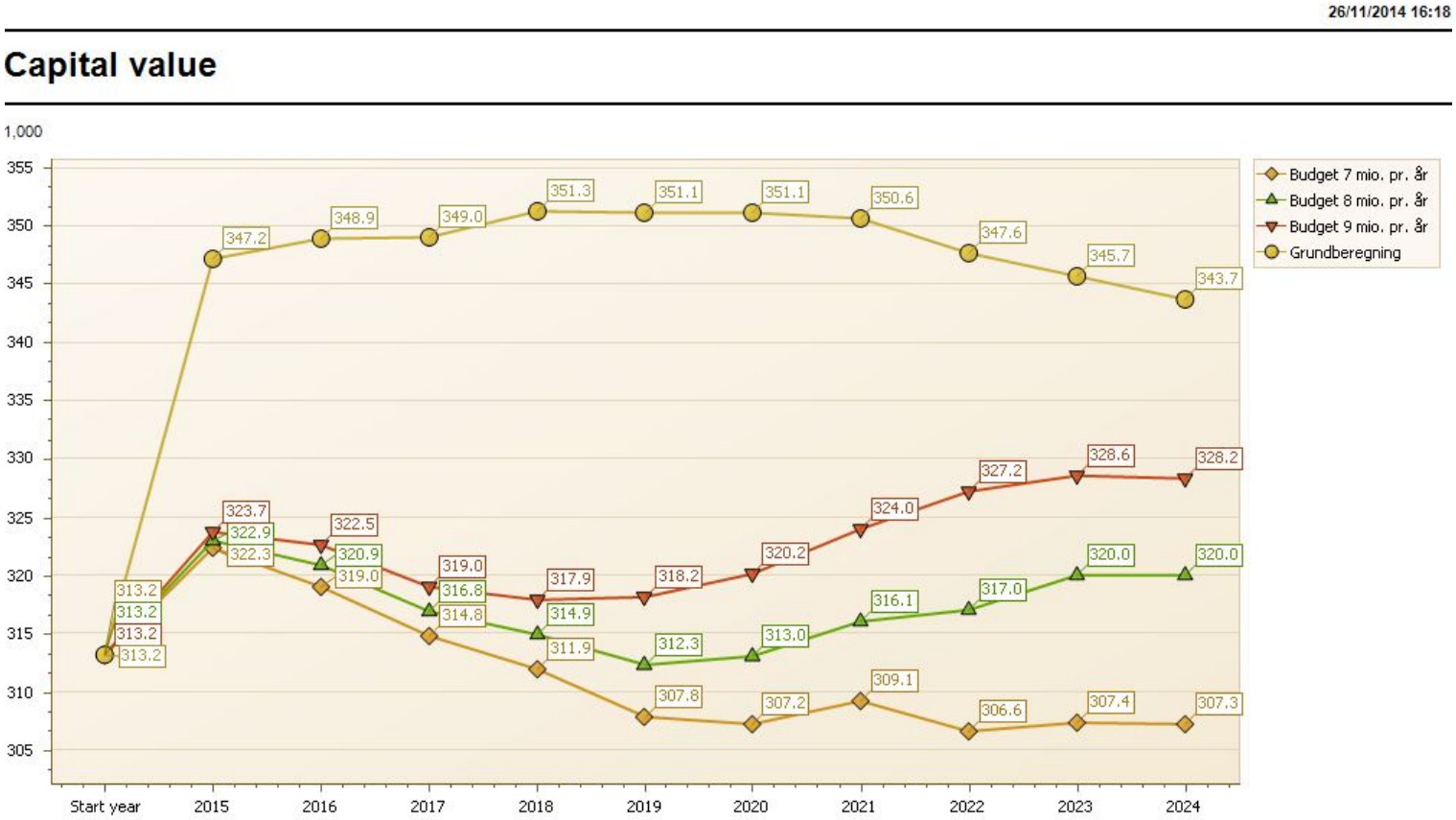
Low standard roads – year one



Low standard roads – year 10 (budget too low)



Road capital value – with various budgets



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Overview of:

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- Condition of road network
- Traffic load in road network
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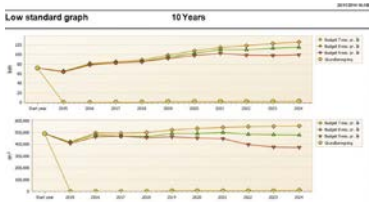

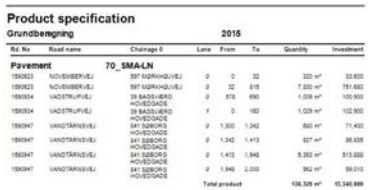

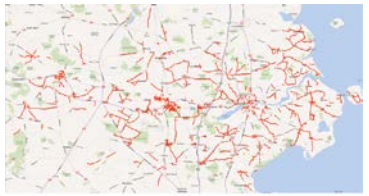

Thank you for your attention!

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