

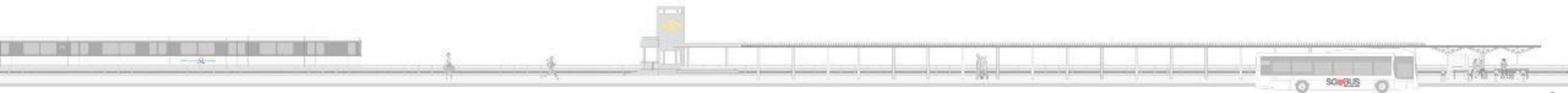
Problem Statement

To determine the wear index of road markings in accordance with SS589 in a fast and efficient way



Outline

- 1 Background
- 2 Key requirements of proposed solution
- 3 Timeframe for development of proposed solution/product
- 4 Procurement need of agency
- 5 Market potential for proposed solution/product
- 6 Evaluation Criteria









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Background

Currently, **regular visual inspections** are carried out by outsourced inspectors to check for any defects on road-related infrastructure, **including road markings**

Typically, re-painting will be carried out for road markings that are > 50% faded (wear index > 35)

Condition	Wear Index	% of marking faded
	20	< 5
	25	25
	35	50
	43	60
	63	75
	82	90

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Background

Another method to determine degree of erosion/wear is by grading the **test grid** of **20 squares** according to the rating system. This is usually the standard check for road markings that are newly laid for 5 months.

SS589 (Specification for hot-applied thermoplastic road marking materials)

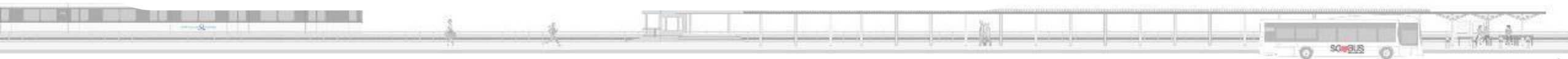
6.5 Degree of wear

*The durability of the thermoplastic road marking material **shall be assessed after 5 months** in accordance with Annex D* by the **wear index of each test area, which shall be less than or equal to 20** for all 4 types of road markings namely white, white profile, yellow and red.*

* Determination of degree of wear in SS589



Faded road markings with wear index > 20



1 Background

Steps in determining the degree of erosion/wear by grading the **test grid of 20 squares** in accordance to the rating system stated in **SS589**

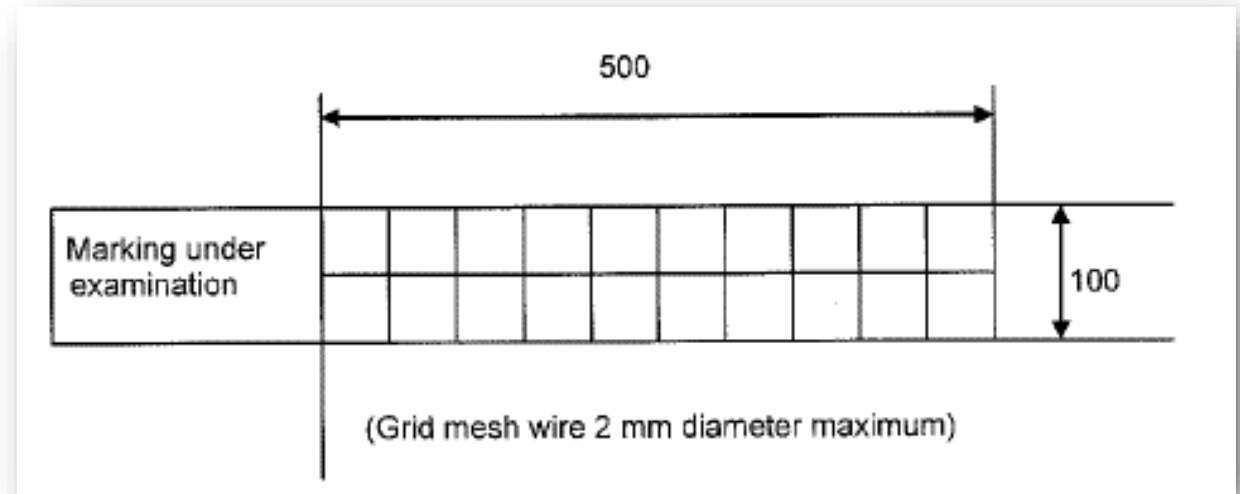
1 Firstly, inspectors would have to **close the road lane**



2 Prepare the selected area and **position the test grid** as such

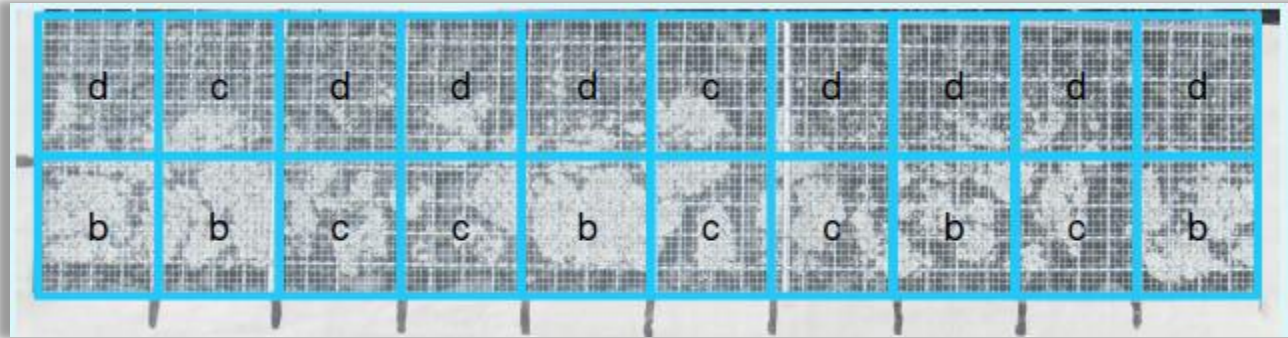


3 **Take a picture of the test area** with the grid in position, for post-evaluation of the results



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Background



Grade	Area of thermoplastic remaining	Weighting factor
a	Greater than or equal to 75%	1
b	Greater than or equal to 50% and less than 75%	2
c	Greater than or equal to 25% and less than 50%	3
d	Less than 25%	4

Grade	Number of squares	Weighting factor	Wear Index
a	0	x 1	0
b	5	x 2	10
c	7	x 3	21
d	8	x 4	32
Total :	20		63

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Post-evaluation: **Assess the degree of wear** of each of the 20 grid squares according to the **table rating** and record the number of squares in each grade



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Calculate the wear index by multiplying the number of squares in each grade with their respective weighing factor and summing them



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Background

The challenges faced with adopting the current method:

Subjective

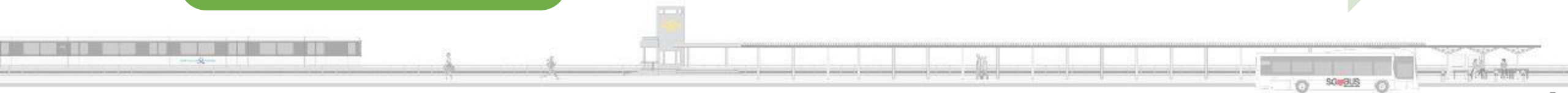
- Visual inspection is subjective in nature, which does not allow for an standardised assessment of the wearing index

Time-Consuming

- Requires approximately 30 min for lane closure & an additional 10 to 15 min for the wear index assessment for a road marking

No network level data

- Sample-based series of measurements by locations does not give a total representation of conditions of road markings



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Key requirements of proposed solution

Key requirements



Physical requirements

- **Contactless/scanning technology** to capture condition of road markings **continuously** at traffic speed **without the need for lane closures**

Technical requirements

- The wear index results must be in **accordance with SS589**
- The wear index results must be presented in a **graphical/map format**

3 Timeframe for development of proposed solution/product

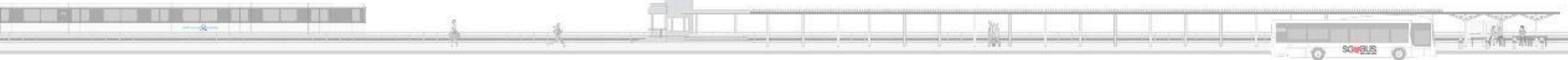
- The prototype must be able to capture the condition of the road markings **instantaneously and continuously**

Q2 2020
(Prototype)

Q4 2020
(Pilot Deployment)

Q3 2021
(Implementation)

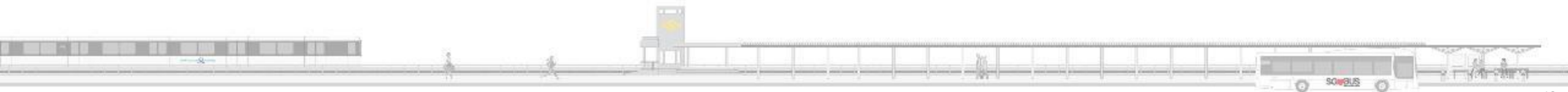
- The wear index results must be **in accordance with SS589** and be measured continuously at traffic speed **without lane closures.**



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Procurement need of agency

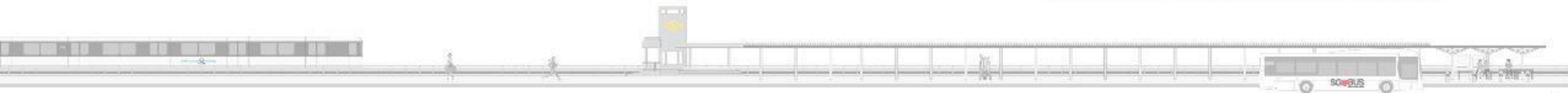
- Ultimately, the proposed solution should use **contactless technology** to measure the wear index of the road markings **instantaneously and continuously**



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Market potential for proposed solution/product

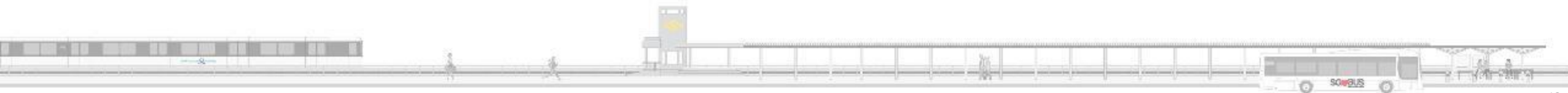
- These solutions, **if coupled with other advanced technology**, may have the potential to be extended to other construction or maintenance companies to **capture road defects or hazards on the roads.**



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Evaluation Criteria

Evaluation Criterion	Weightage (%)
1. Technical feasibility of solution	30
2. Innovation	20
3. Economic Feasibility and Commercialization Potential (Include development cost and final product cost)	30
4. Capacity and Expertise to Execute Project	20
Total Score	100



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