



Information meeting on noise from passing REM cars in Pointe-Saint-Charles

Highlights and answers to questions

Date and time: September 26, 2023, 6:30 to 9:30 p.m

Location (hybrid): Saint-Charles Church, 2111 rue Centre
Online, via the icastPro platform

Highlights of the meeting

- More than 220 participants in person and online
- 5 speakers present:
 - o Mario Beausoleil, Chief Operating Officer, CDPQ Infra
 - o Élizabeth Boivin, Director of Environment, CDPQ Infra
 - o Isabelle Lachance, Chief Community Relations Officer, CDPQ Infra
 - o Jean-Luc Wojtowicki, Acoustics and Vibration Project Manager, SYSTRA
 - o Pierre Guillot-Hurtubise, Facilitator

Meeting agenda:

- Introduction of REM team
- Question period: answering participants' questions in person and online. Given the large number of questions asked in person, some of the online questions were not answered. The answers are presented below.

Contents of the presentation:

- Background
- Noise measurement campaign results
- Diagnosis: sources of noise
- Identified mitigation measures
- Timetable and next steps

Main topics addressed during the question period:

- Disturbance caused by noise from REM cars
- Concerns about the results of the noise measurement campaign and format of the data presented (over a 24-hour period)

- Questions about the location of dynamic absorbers on the Pointe-Saint-Charles route (the entire route is not covered)
- Clarifications on the diagnosis and choice of mitigation measures

The recording of the meeting and the documentation presented at the meeting are available at the following link: <https://rem.info/en/events/information-meeting-pointe-saint-charles-sector>

Back to main topics

Presentation of the data

In Pointe-Saint-Charles, on average, noise levels increase by 10 to 15 dBA (before the installation of dynamic absorbers and acoustic grinding) with each passing car, depending on the time of day and the associated ambient noise.

As promised at the public meetings, the data from the sound level meters installed at residents' homes are available at the end of this document and in our full report. Three periods of a typical day in operation are presented.

With the implementation of mitigation measures, we are aiming to reduce noise by 5 to 10 dB at the source. Noise monitoring will be carried out at the source, as close as possible to the tracks. The results will be made public.

Location of dynamic absorbers

Acoustic grinding will be carried out over the entire section. At Pointe-Saint-Charles, given the integrated nature of the elevated structure, dynamic absorbers will be installed near the existing residential areas closest to the route, to achieve acoustic gains for everyone.

These mitigation measures are currently being rolled out, to be implemented as quickly as possible and before winter. As indicated above, they will be monitored to validate their effectiveness.

Written answers

A large number of questions were asked during the evening. Here are our answers to the remaining questions:

Given that other cities around the world were already in need of solutions to the noise issues associated with rapid transit, why weren't these measures implemented at the outset of the project? How much extra will the noise reduction measures cost taxpayers?

- Measures have been taken at source right from the project design stage, and detailed sound modelling has been carried out to anticipate where more significant impacts might occur.

- This was a theoretical exercise based on the best of our knowledge and that of our experts, with the data available in 2018.
- At the start of dynamic testing, the “real” passage of cars showed us that adjustments were necessary, which we quickly did by launching noise measurement campaigns, carrying out a detailed diagnosis and identifying the most effective additional mitigation measures.
- Two measures at source are planned: acoustic grinding and the installation of dynamic absorbers. Rail grinding reduces imperfections, improving wheel/rail contact. This will reduce the transmission of vibrations to the structure. Absorbers will reduce the propagation of vibrations to the rail.
- The cost of the measures for the entire section is around \$10 million and is part of the overall project budget.

Service might be interrupted during the day to carry out the work for the additional measurements.

- We provide a public transit solution to tens of thousands of people every day.
- Our goal is to complete the work as quickly as possible. REM service will be interrupted from 10:00 pm Sunday to Thursday for about six weeks starting in mid-October.
- This interruption requires extensive coordination and the use of shuttle buses to keep users moving. Shuttle bus use would be impossible during the day.

I am hearing that Pointe-Saint-Charles residents are disappointed to be the guinea pigs for the REM, and are shocked to have been taken for granted and fooled by the project’s decision-makers. How are you going to work with the city to significantly improve the situation and win back the trust of residents in the long term?

- We are very sensitive to the situation and take it seriously. As soon as the first complaints were received, a rigorous process was put in place to carry out a detailed diagnosis of the sources of noise to determine the right solution in the right place.
- We announced the rapid roll-out of mitigation measures, which will be in place by early December.
- We are committed to noise monitoring to validate the achievement of noise reduction targets. The results of this monitoring will be shared publicly.
- We are continuing to collaborate with all project stakeholders.
- Our regulatory framework comes from the Quebec government.

I would like to go back to the 300m in the MTQ guide for noise impact studies. The guide states: [translation] “However, the limits of the study area and the completeness of the inventory may vary depending on the components studied. The study area must encompass all sensitive areas likely to be affected by noise from the proposed artery and associated access roads. The service provider must justify the limits to be used in the study report.” It is obvious that 300m in an urban setting is nothing like 300m without any vegetation or housing (such as between the REM and us in Pointe-St-Charles), where the sound encounters no obstacles. The neighbourhood needs to be taken into account. The noise study was botched, not to mention the long-planned social housing at the end of Bourgeois.

- Our sound modelling was based on best practices and was carried out in accordance with the *Politique du bruit routier* [road noise policy] of the Ministère des Transports et de la Mobilité durable du Québec, the regulatory framework imposed by the Quebec government.

- For light rail projects, a proven reference is the Federal Transit Administration's *Transit Noise and Vibration Impact Assessment Manual*, which specifies limits of 213 metres for study areas (in unobstructed areas).
- By using a 300-metre area, we relied on the most restrictive regulatory framework to configure our network.
- Modelling is a theoretical exercise carried out to anticipate significant noise-related impacts.
- In response to complaints received during the intensified testing, we quickly deployed a noise monitoring campaign and announced additional mitigation measures to reduce the impact of passing traffic noise in your neighbourhood. These measures are currently being installed.

Presentation of noise data (from residential sound level meters)

Rue Mullins, near rue De la Sucrerie

Wednesday, September 27, 2023, was selected.

Car passage data for three periods of the day are presented:

- Between 5:30 a.m. and 7:00 a.m. (start of service and morning rush hour)
- Between 4:30 pm and 6:00 pm (rush hour)
- Between 11:30 pm and 1:00 am (end of service)

Between 5.30 a.m. and 7.00 a.m

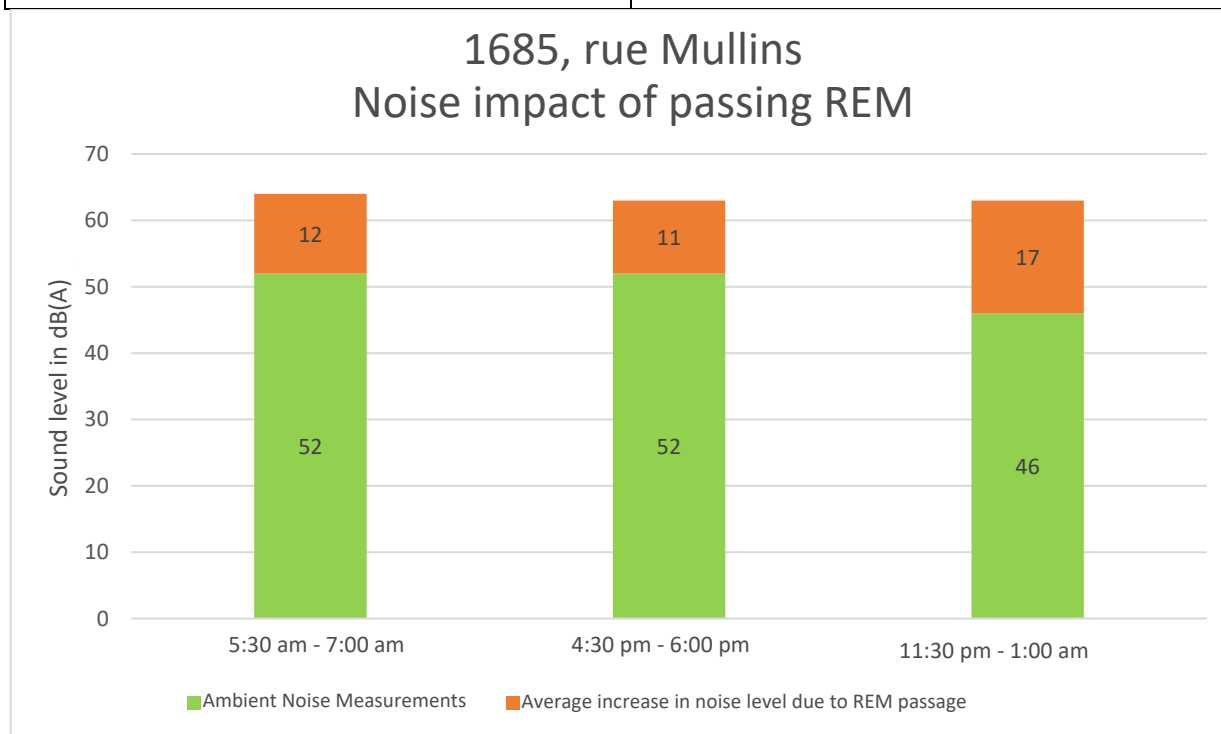
Indicator	Data
Ambient Noise Measurements	52 dB(A)
Average increase in noise level due to REM passage (noise peak)	12 dB(A)
Number of REM passages	23

Between 4:30 p.m. and 6:00 p.m

Indicator	Data
Ambient Noise Measurements	52 dB(A)
Average increase in noise level due to REM passage (noise peak)	11 dB(A)
Number of REM passages	45

Between 11:30 p.m. and 1:00 a.m

Indicator	Data
Ambient Noise Measurements	46 dB(A)
Average increase in noise level due to REM passage (noise peak)	17 dB(A)
Number of REM passages	22



Rue Sainte-Madeleine, near rue Le Ber

This sound level meter was in place during the REM testing phase, prior to commissioning. June 20, 2023 was therefore selected.

Car passage data for three periods of the day are presented:

- Between 5:30 a.m. and 7:00 a.m. (start of service and morning rush hour)
- Between 4:30 pm and 6:00 pm (rush hour)
- Between 11:30 pm and 1:00 am (end of service)

Between 5.30 a.m. and 7.00 a.m

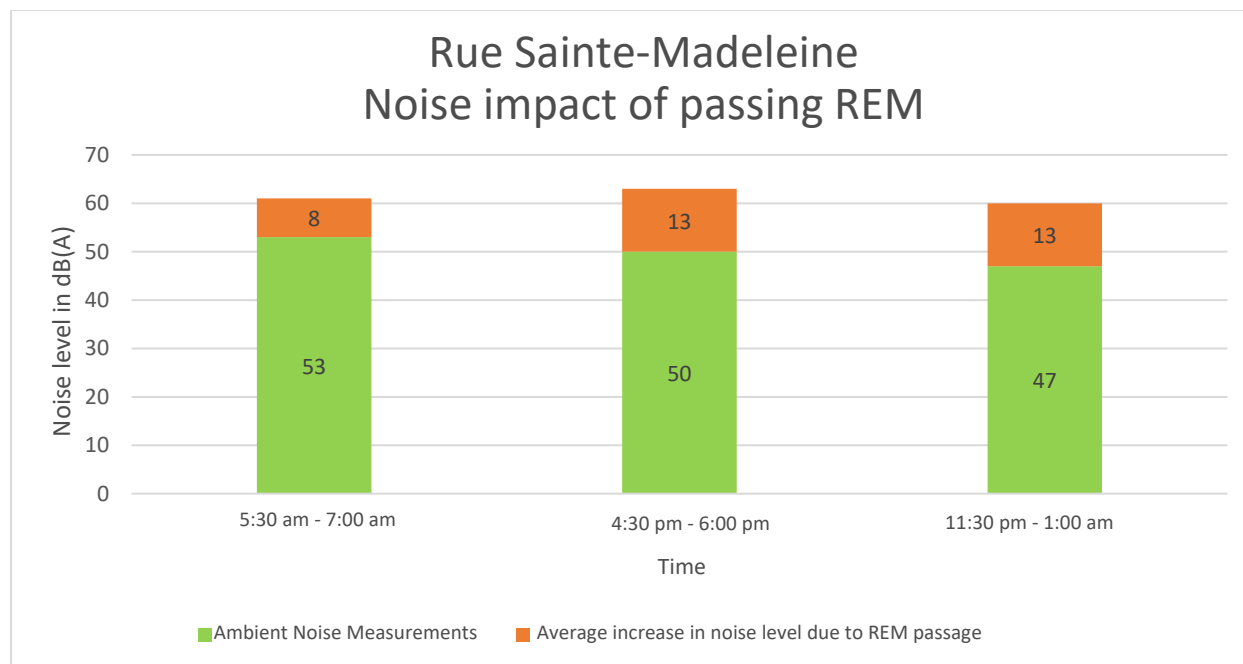
Indicator	Data
Ambient Noise Measurements	53 dB(A)
Average increase in noise level due to REM passage (noise peak)	8 dB(A)
Number of REM passages	11

Between 4:30 p.m. and 6:00 p.m

Indicator	Data
Ambient Noise Measurements	50 dB(A)
Average increase in noise level due to REM passage (noise peak)	13 dB(A)
Number of REM passages	7

Between 11:30 p.m. and 1:00 a.m

Indicator	Data
Ambient Noise Measurements	47 dB(A)
Average increase in noise level due to REM passage (noise peak)	13 dB(A)
Number of REM passages	14



225 Avenue Ash (YMCA)

Wednesday, September 27, 2023, was selected.

Car passage data for three periods of the day are presented:

- Between 5:30 a.m. and 7:00 a.m. (start of service and morning rush hour)
- Between 4:30 pm and 6:00 pm (rush hour)
- Between 11:30 pm and 1:00 am (end of service)

Between 5.30 a.m. and 7.00 a.m

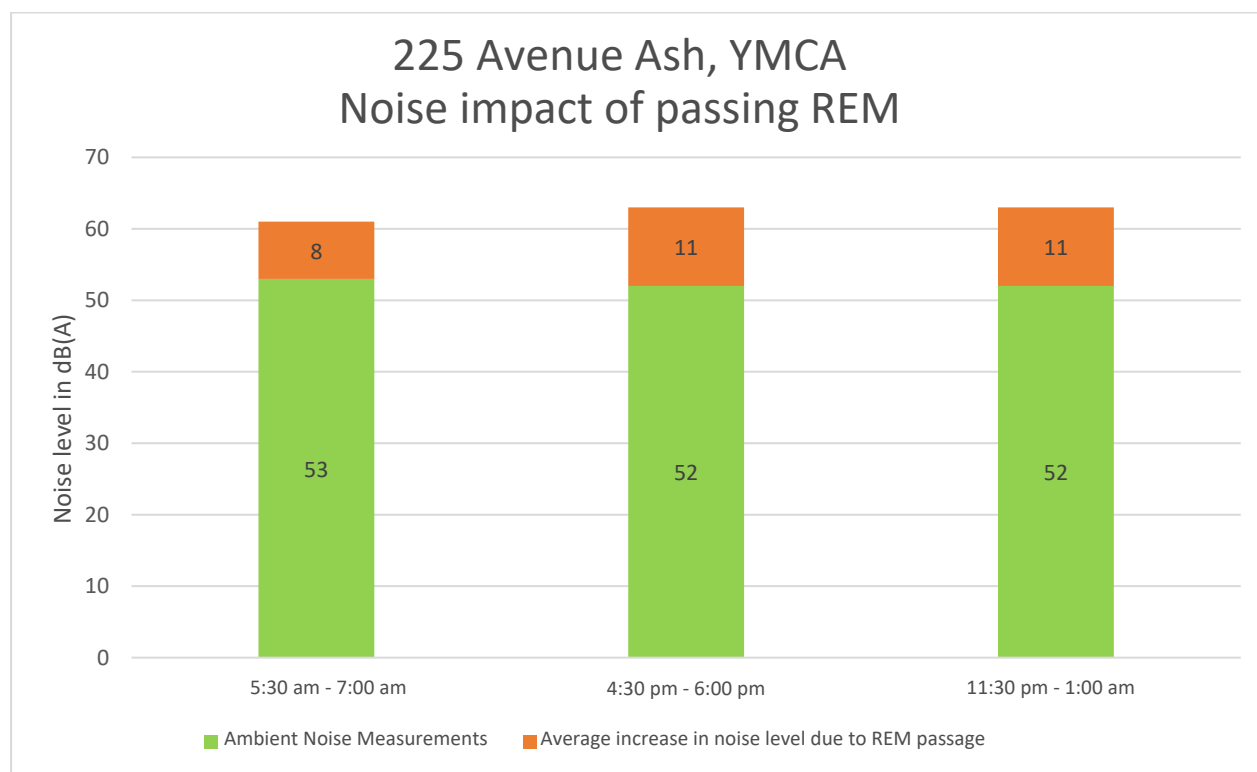
Indicator	Data
Ambient Noise Measurements	53 dB(A)
Average increase in noise level due to REM passage (noise peak)	8 dB(A)
Number of REM passages	19

Between 4:30 p.m. and 6:00 p.m

Indicator	Data
Ambient Noise Measurements	52 dB(A)
Average increase in noise level due to REM passage (noise peak)	11 dB(A)
Number of REM passages	25

Between 11:30 p.m. and 1:00 a.m

Indicator	Data
Ambient Noise Measurements	52 dB(A)
Average increase in noise level due to REM passage (noise peak)	11 dB(A)
Number of REM passages	11



Presentation begins: 6:30 p.m.

If you have any questions about the project, visit rem.info/en





Noise from passing cars

Analysis and measures selected
for the Pointe-Saint-Charles area

September 26, 2023

Réseau
express
métropolitain



Agenda

- Background
- Noise measurement campaign results
- Diagnosis: sources of noise
- Identified measures
- Timetable and next steps
- Question period



Background

A regulatory framework in place

Noise from the REM within a framework set by governmental authorities

Project decree requirements:



Creation of detailed sound modelling



Implementation of measures at source and mitigation measures for significant impacts



Follow-up program during operation beginning in the first year
→ deployed at the start of testing

A response to exchanges with citizens



1. Implementing noise measurement campaigns and data analysis
 - Seven sound level meters installed between Île-des-Sœurs and Griffintown
 - Additional campaign directly on the tracks
2. Hiring of acousticians from SYSTRA, specialized in railway acoustics and having worked on several networks around the world, to carry out a diagnosis

Mandate: identify targeted measures, sector by sector, to reduce noise for all





Noise measurement
campaign results
in your sector

Summary

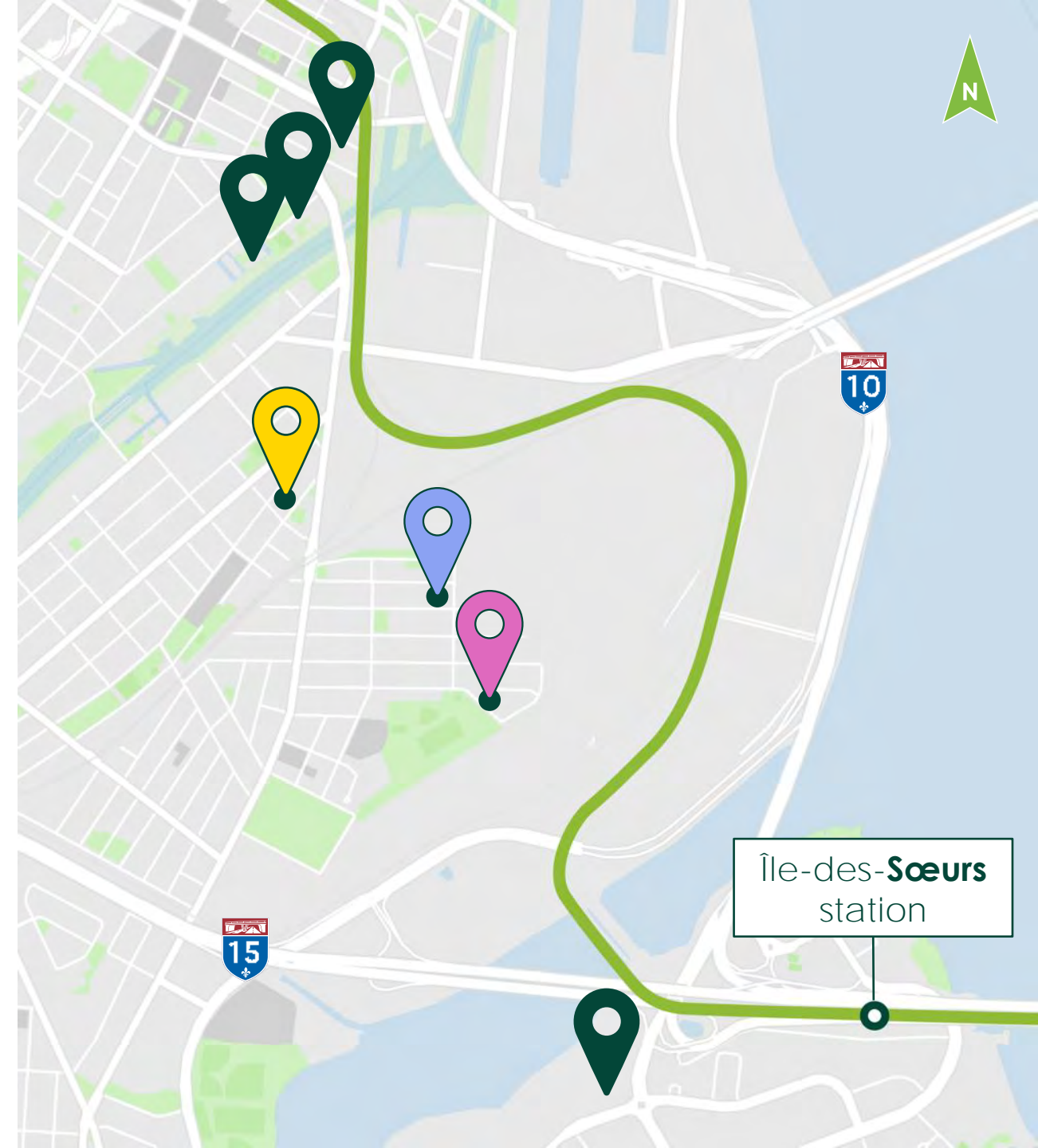
Three sound level meters deployed in Pointe-Saint-Charles, near the tracks

 Sainte-Madeleine Street
near Le Ber, upstairs terrace

 Mullins Street
near De La Sucrerie, upstairs
terrace

 255 avenue Ash, roof

 REM route



Methodology:

data collected over several weeks to obtain representative data

Results:

sound modelling data higher than expected in some areas

Approach:

act on the entire section, given the integrated nature of the structure and the proximity of the neighbourhoods

Presentation of results

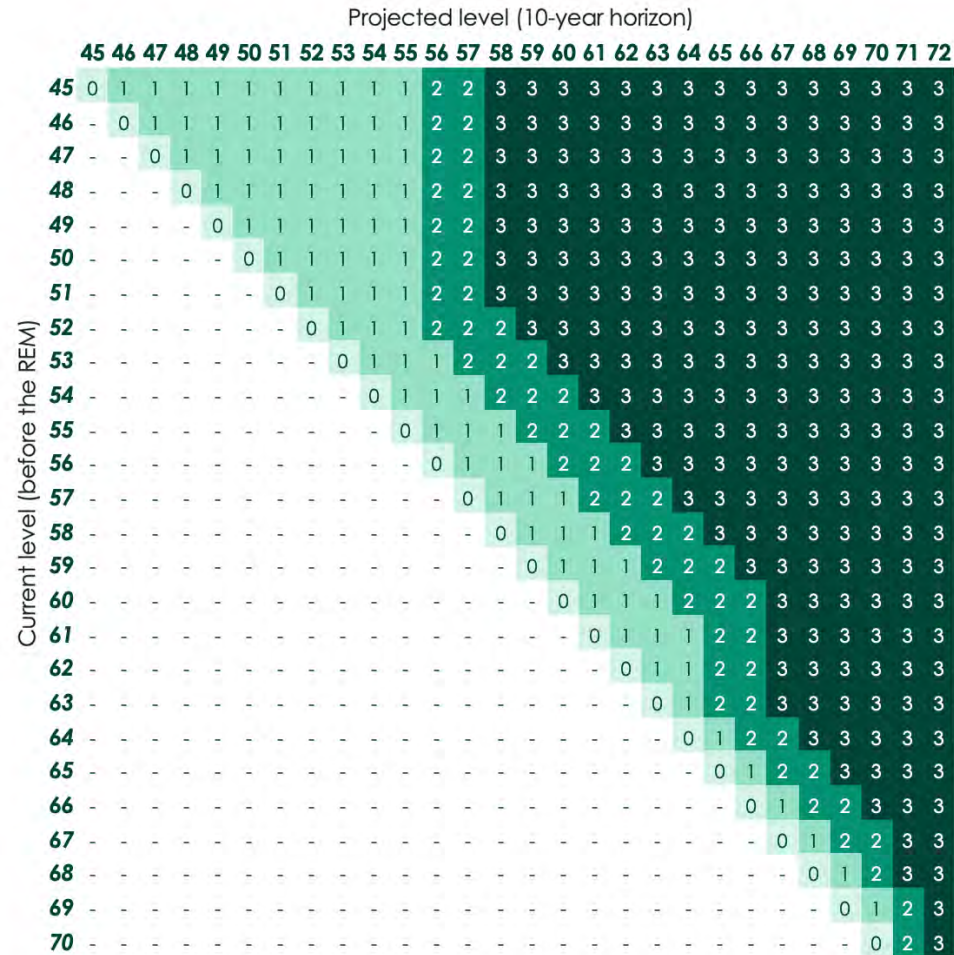


MTQ road noise policy:
based on a 24-hour period

- Noise before the REM (ambient noise)
- Noise with the REM

Analysis grid used to assess noise impact

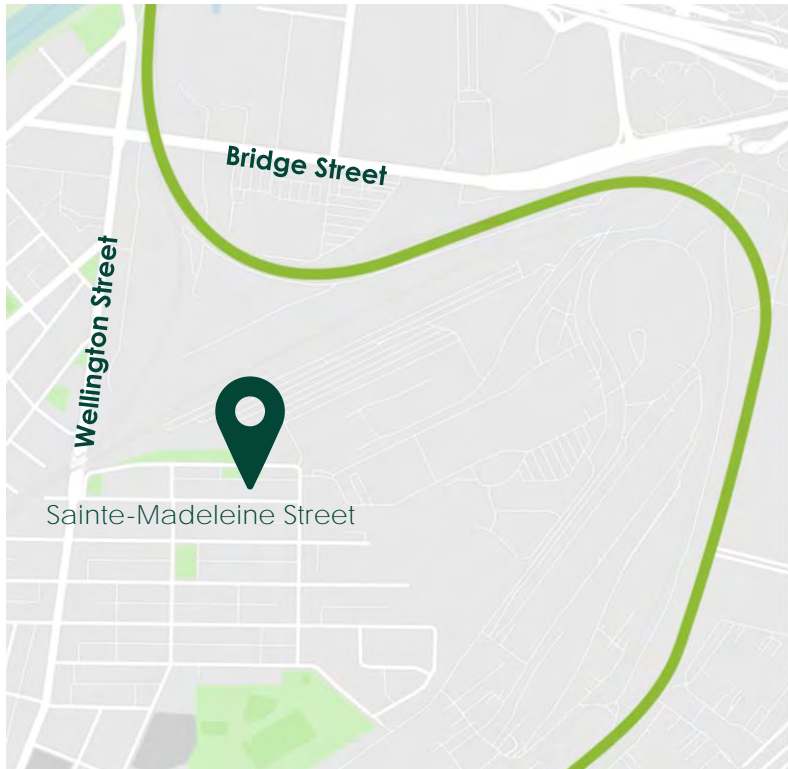
- Impact scale: none to high
- Significant impacts: medium to strong impact



Sainte-Madeleine Street



Summary of 2023 results



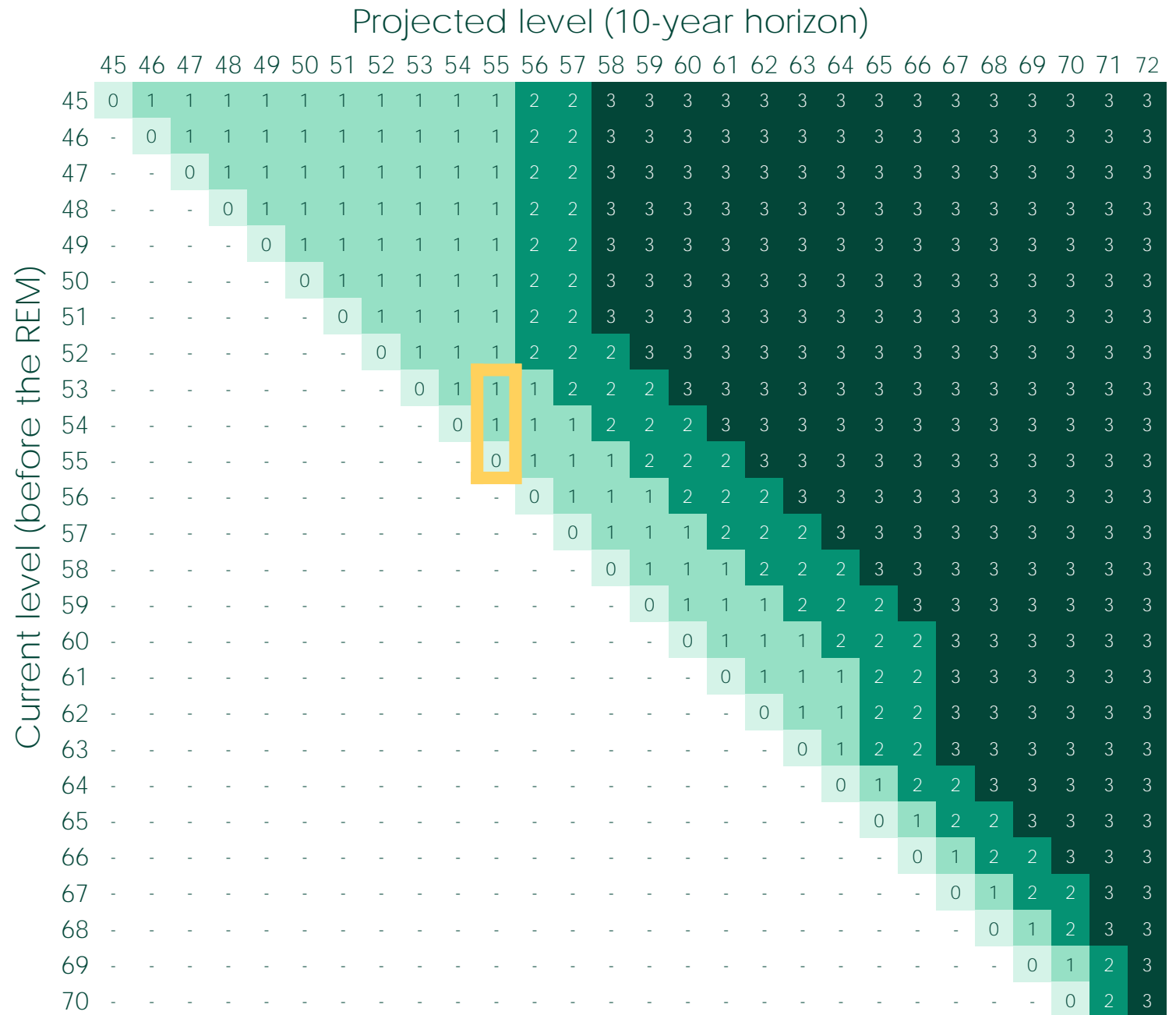
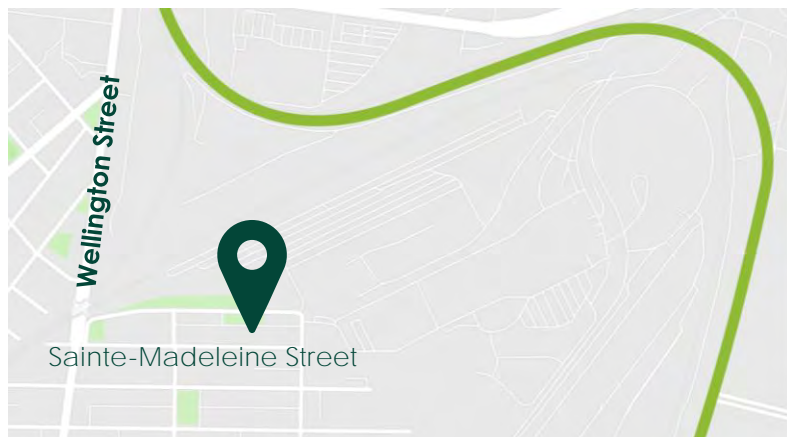
Ambient noise
53/55
dBA, Leq(A)24h



Ambient noise
with the REM
55
dBA, Leq(A)24h

Sainte-Madeleine Street

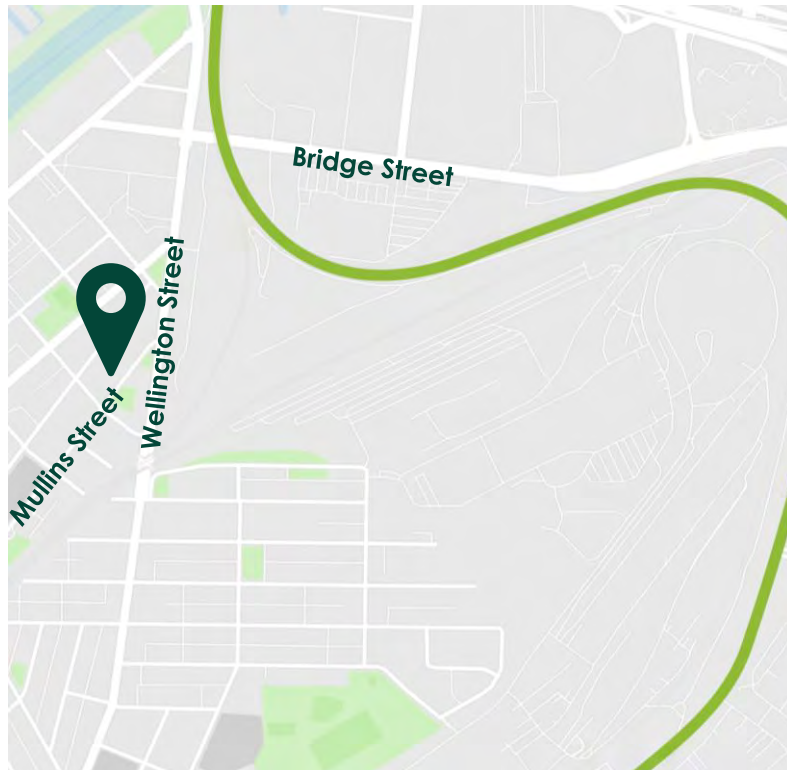
Noise impact grid



Mullins Street



Summary of 2023 results



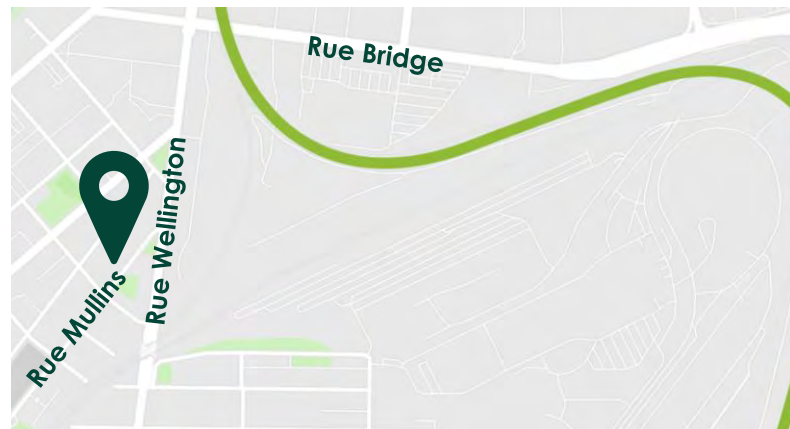
Ambient noise
52/54
dBA, Leq(A)24h



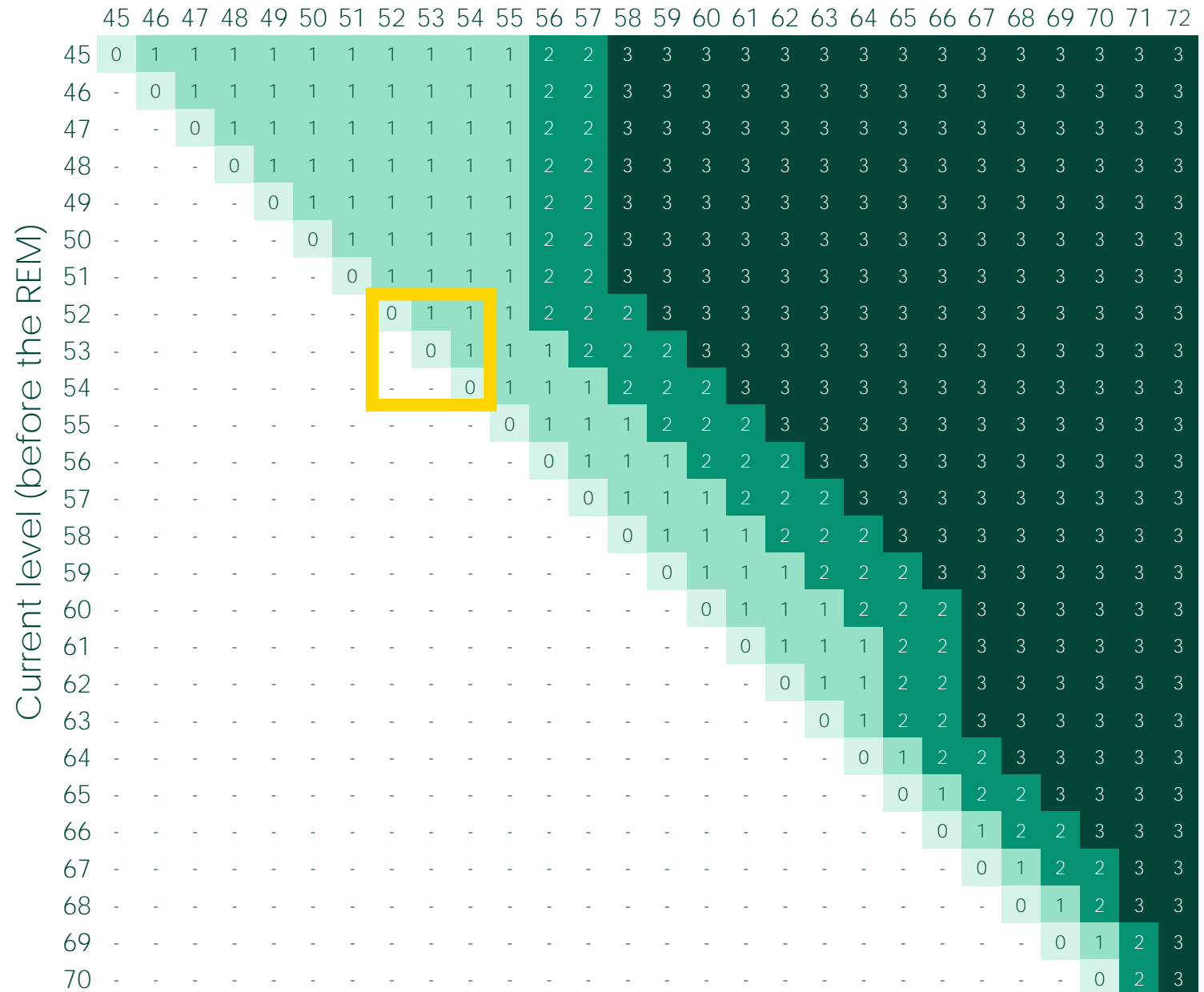
Ambient noise
with the REM
52/54
dBA, Leq(A)24h

Mullins Street

Noise impact grid



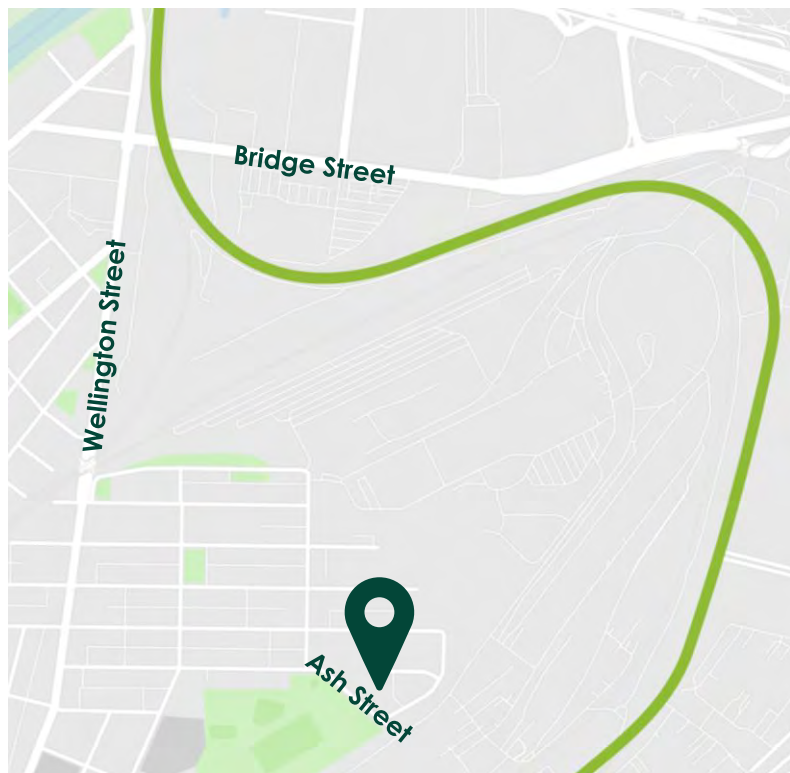
Projected level (10-year horizon)



Ash Street



Summary of 2023 results



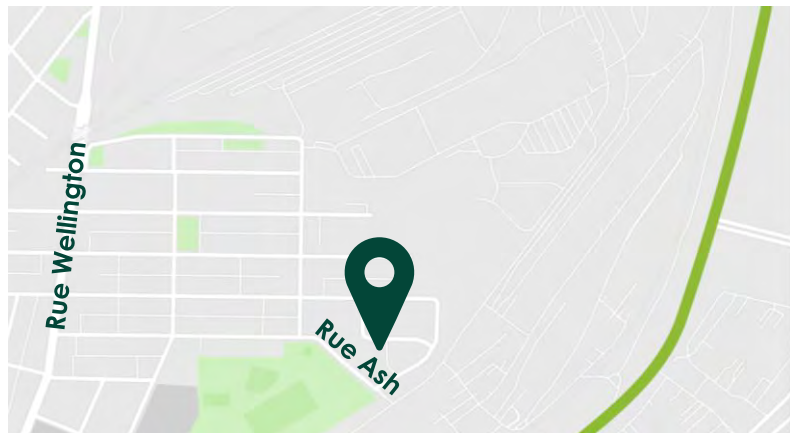
Bruit ambiant
56/57
dBA, Leq(A)24h



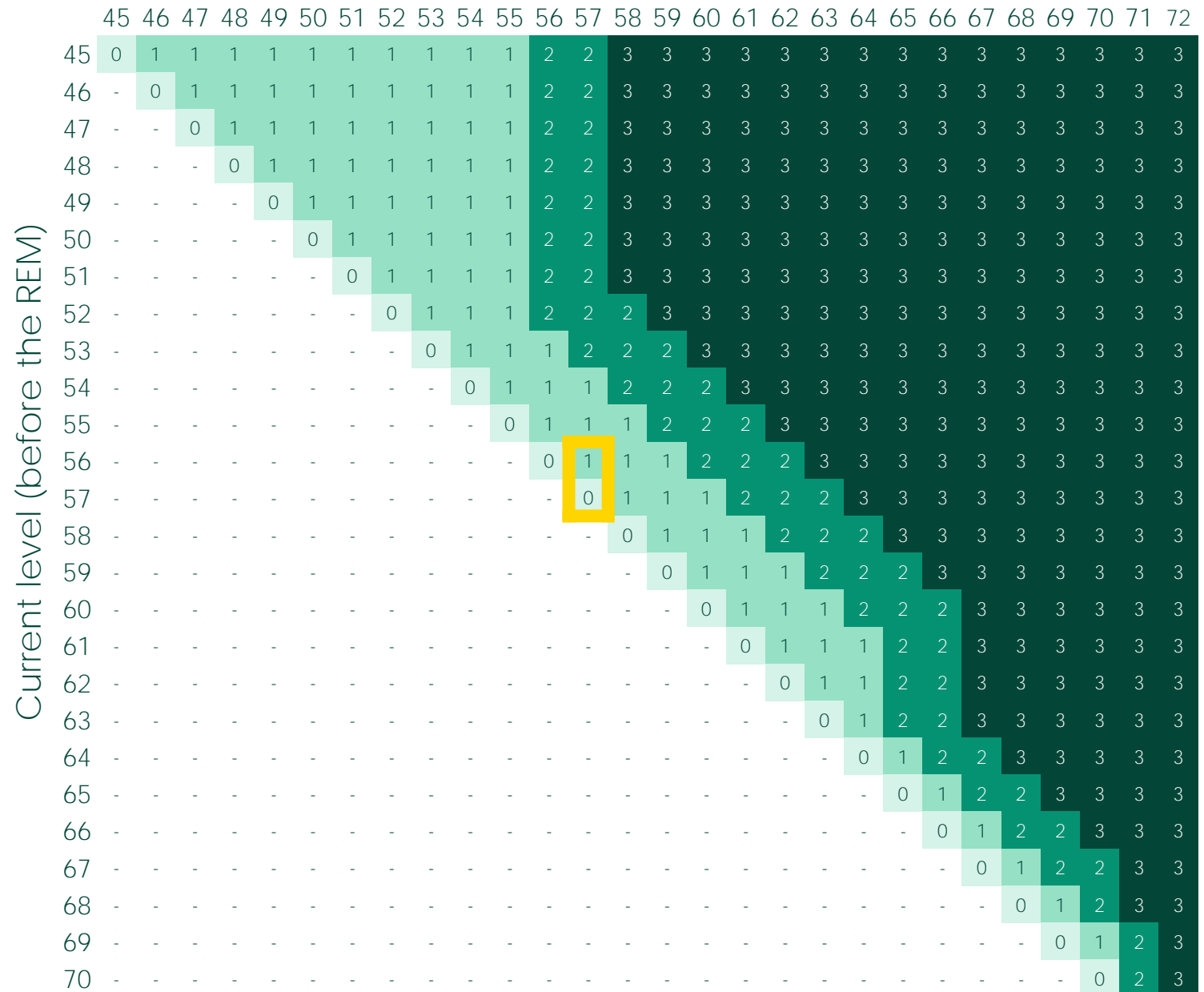
Bruit ambiant
avec REM
57
dBA, Leq(A)24h

Ash Street

Noise impact grid



Projected level (10-year horizon)





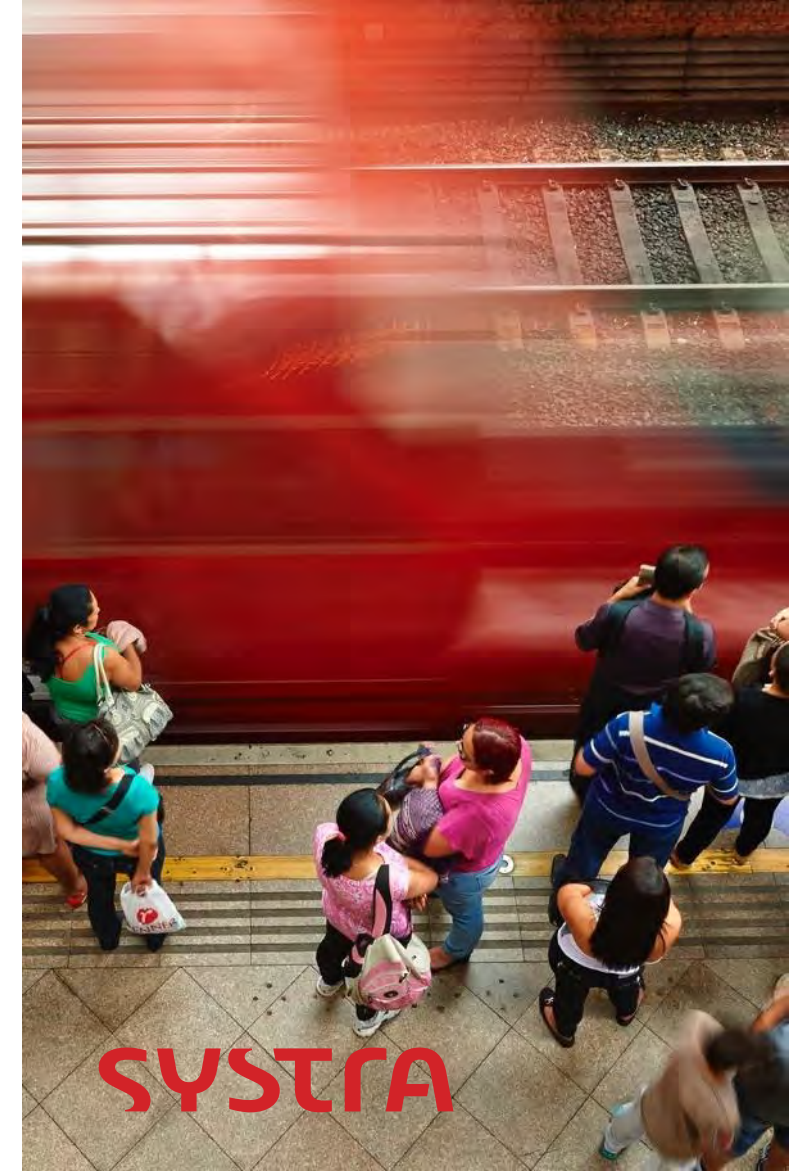
Diagnosis:
sources of noise

A firm of international experts on rail projects,
including light rail systems

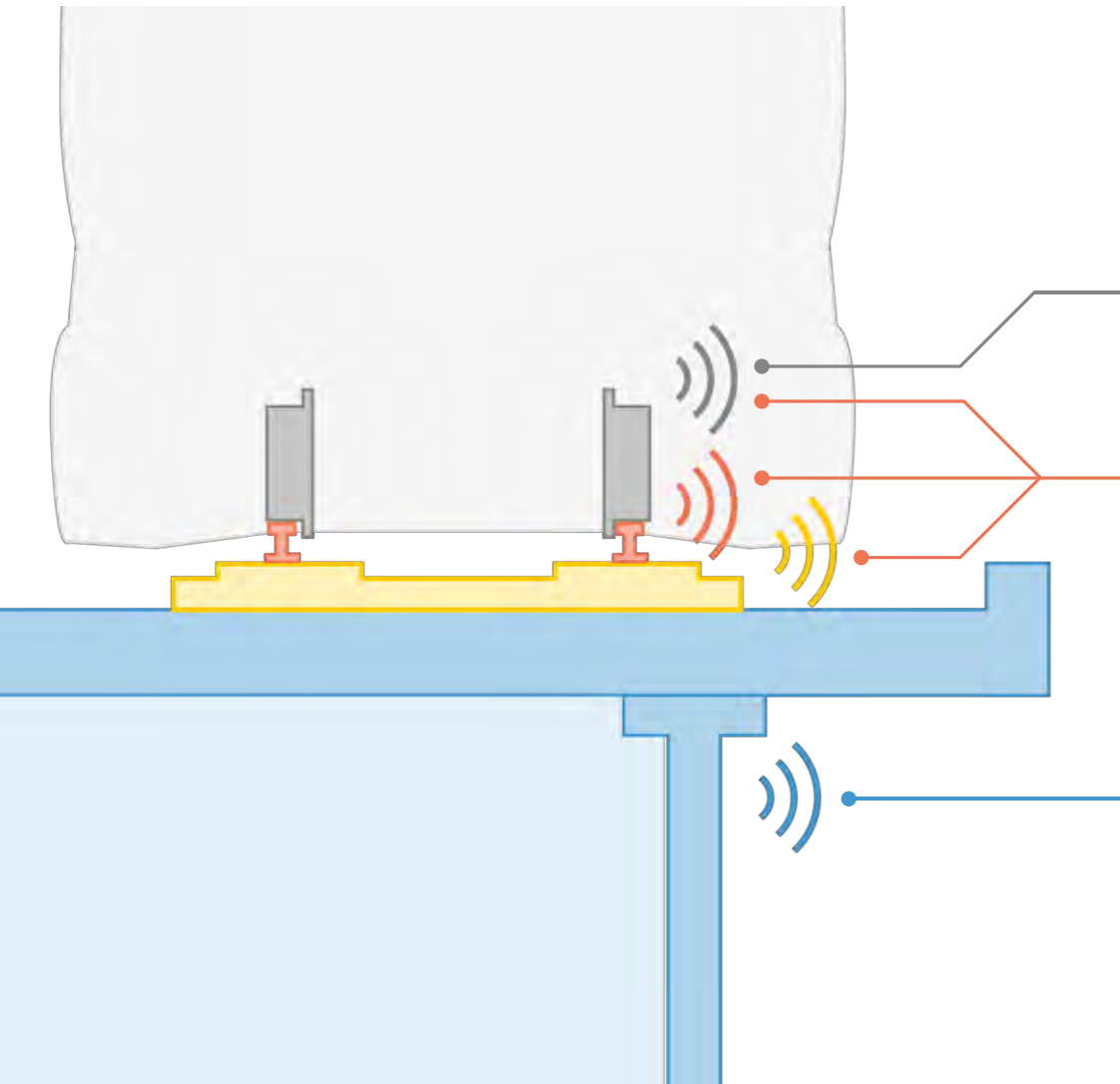


Jean-Luc
Wojtowicki:

- Acoustic engineer with over 30 years of experience
- Acoustics and vibration project manager
- Jointly responsible for the mandate with Projet REM



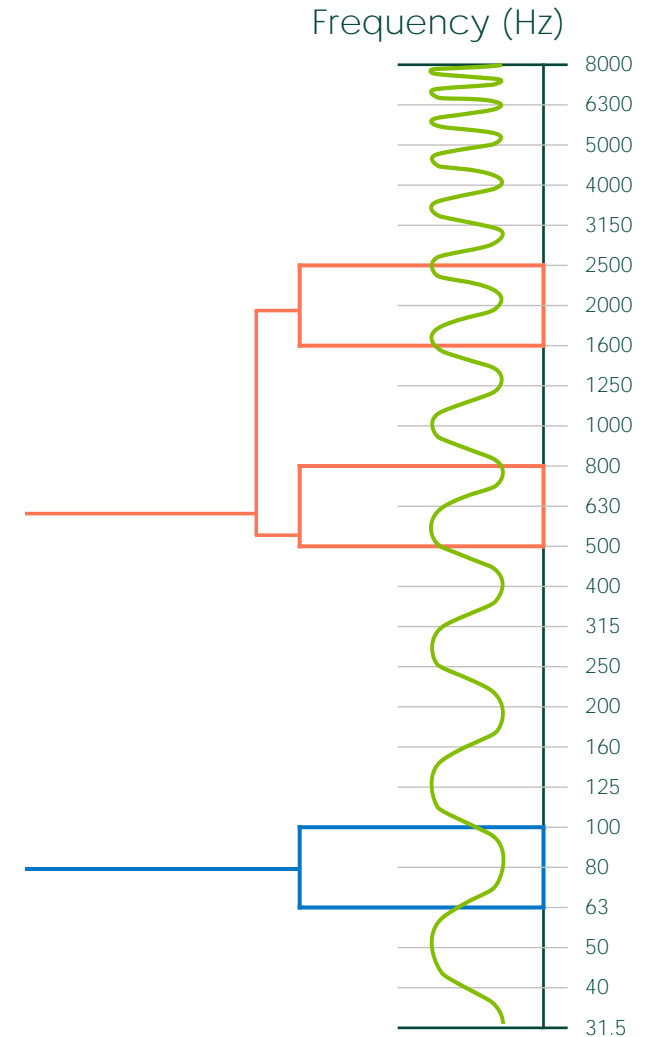
Noise generation mechanisms - Light rail systems



Traction noise:
motorization and auxiliaries

Rolling noise:
radiation of
wheels, rails and platform

Rumbling noise:
radiation from overhead
structure

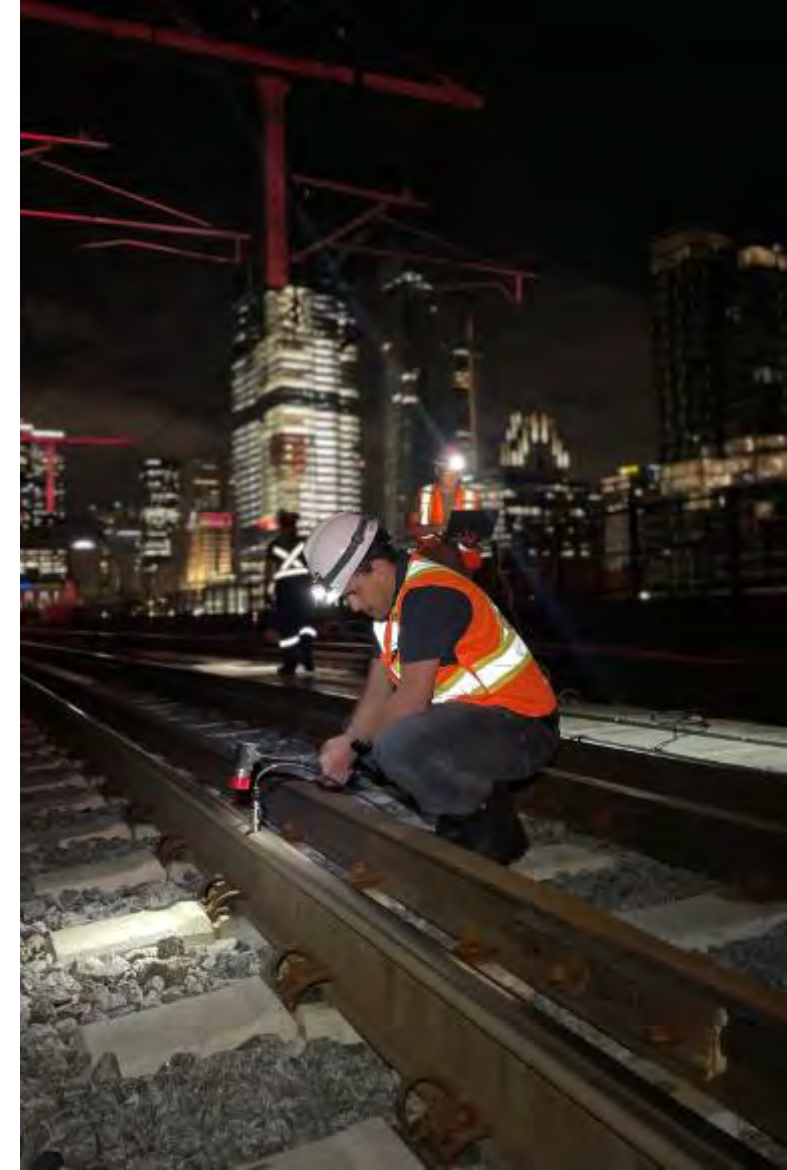


Acoustic characterization tests

Additional measurements taken directly on the tracks to evaluate:

- Noise level (at 7.5 metres)
- Track decay rate (rail behaviour)
- Rail roughness (condition of rail surface)
- Vibrations transmitted to the structure

Objective: understand sources of noise to target the most effective measures



Sources of noise – the REM

A specific infrastructure for this antenna

Two main types of structure: overhead structure and viaduct to Central Station

Various configurations and platforms in concrete or crushed stone

Main sources of noise from the REM:

- Rolling noise
wheels, rails and platform
- Rumbling noise
overhead structure





Identified
mitigation measures

Identified mitigation measures



The most effective method of noise reduction for all residents:

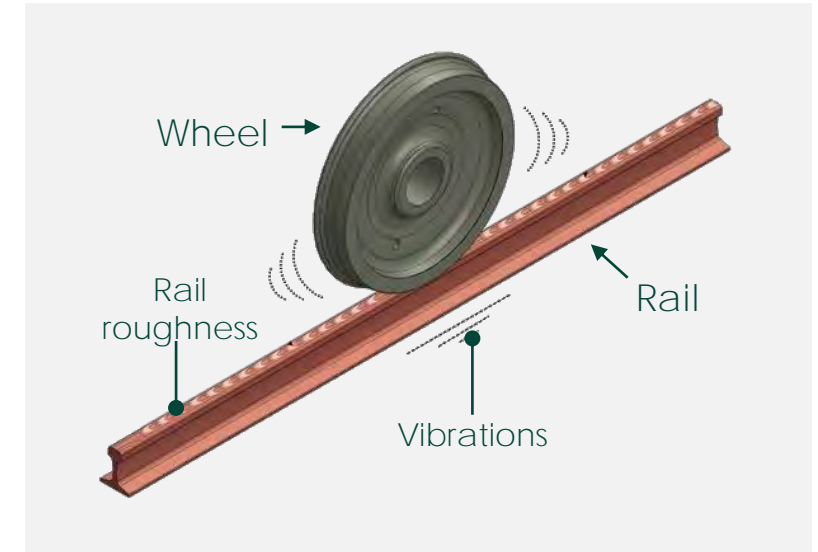
at source,
targeted to the
type of noise

1. Acoustic grinding to reduce rail roughness

- Rumbling noise
- Rolling noise

2. Dynamic absorbers to reduce rail radiation (propagation of vibrations)

- Rolling noise

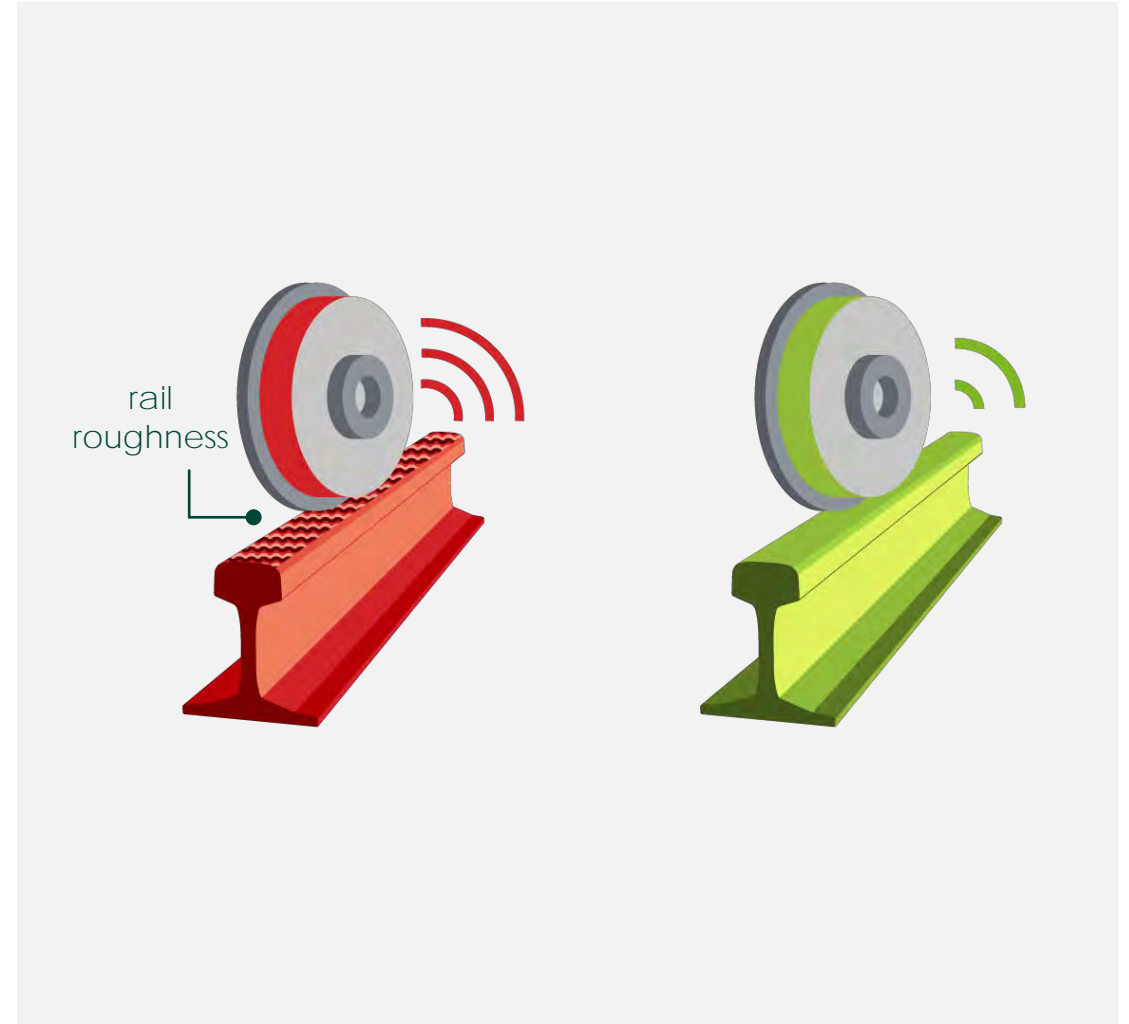


Grinding



Direct intervention on rails to make them smoother and reduce contact between the wheel and the rail

- Two types of grinding:
 - Maintenance (already planned)
 - Acoustics more targeted, better overall noise reduction
- In combination with wheel reprofiling
- Successfully deployed on other networks (Toulouse, Düsseldorf and Asia)



Dynamic absorbers



- Installed directly on the tracks
- Reduces rail radiation
- Proven solution with other networks around the world (Barcelona, Hong Kong, Sydney)



Test in summer 2023 on 240 m (1 lane) in the Lachine Canal area:
reduction of about 5 to 6 dB
(at 7.5 m from the lanes)

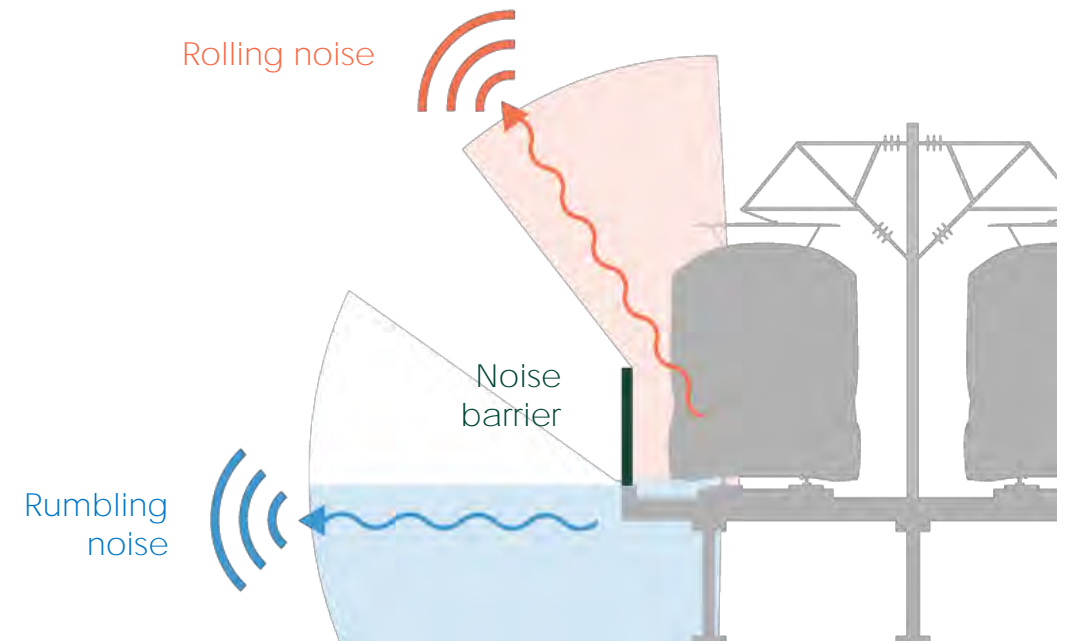
Deployment on both lanes and over a longer length for maximum efficiency

Noise barriers



Physical barrier that reduces noise propagation, possible at engineering level but:

- Few or no significant gains expected for all residents, given the type of built environment (density and height)
- Limited effectiveness for high-rise buildings (**rolling noise**) and for attenuating **rumble noise**



Objective: reduce noise at source to benefit all residents

Identified mitigation measures



Target reduction
of 5 to 10 dB
at passage, at the
source

depending on lane configuration

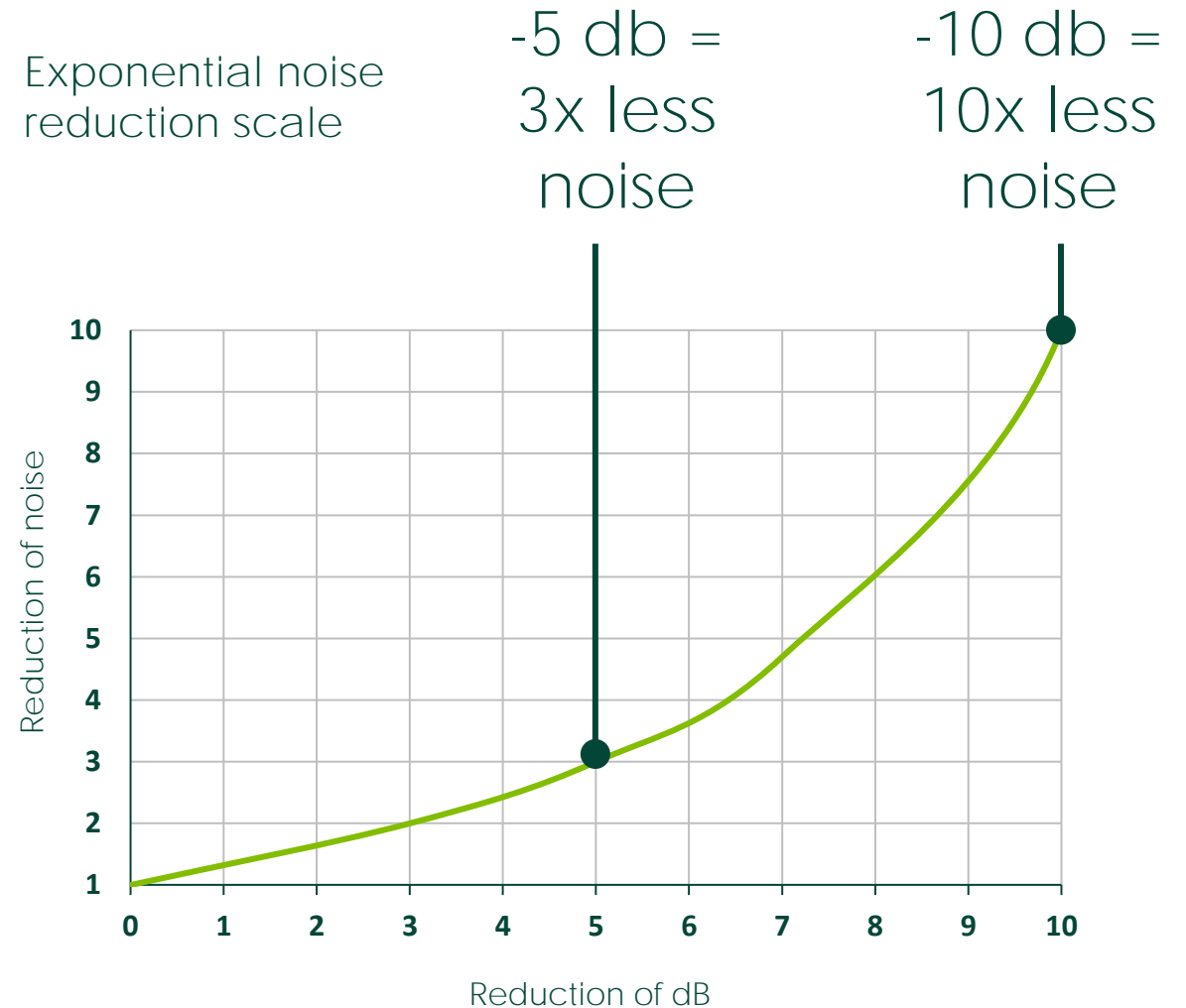
1.
Acoustic
grinding

2 to 5 dB

+

2.
Dynamic
absorbers

3 to 5 dB





Timetable and next steps

Measure for implementation



Grinding

- Objective: smooth the tracks
- Work carried out with specialized machinery
- Around forty passages required



Dynamic absorbers

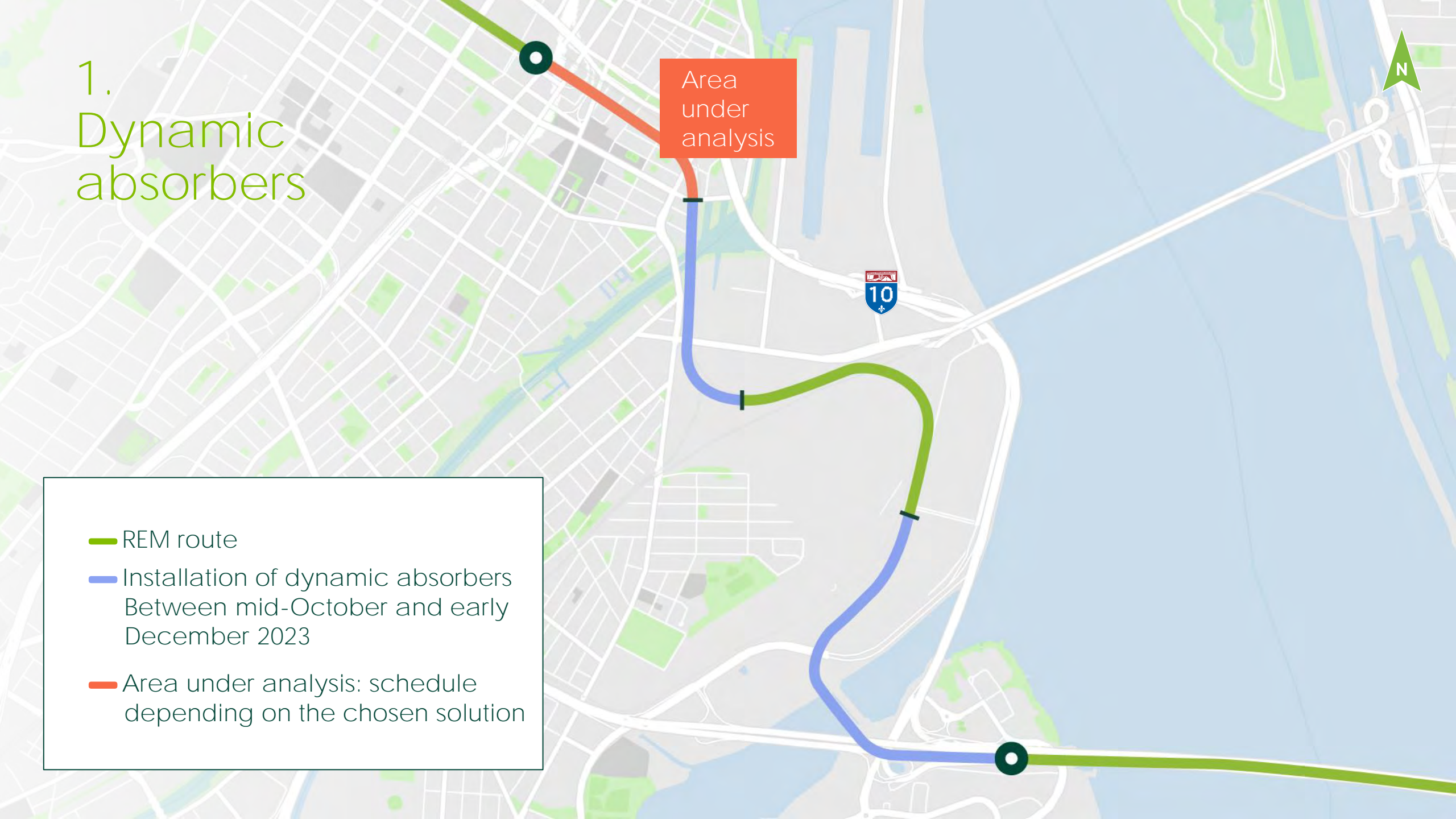
- Installed manually on both sides of the rail
- Absorbers installed on both sides of each sleeper



1. Dynamic absorbers

Area
under
analysis

- REM route
- Installation of dynamic absorbers
Between mid-October and early
December 2023
- Area under analysis: schedule
depending on the chosen solution



2. Acoustic grinding

- 
- The map displays a city grid with a river and a highway (Interstate 10). A green line represents the REM route, and a yellow line represents the Acoustic grinding route. The yellow route starts at a green dot in the top left, follows the REM route south, then turns east and south, crossing Interstate 10, and ending at a green dot in the bottom right. A north arrow is located in the top right corner.
- REM route
 - Acoustic grinding -
early November 2023

Performing the work



Performed at night
between mid-October
and early December,

from Sunday to
Thursday evenings

*cannot be carried out
during network operation*

- Network closes at 10 p.m.
*shuttles available from L'Île-
des-Sœurs to Central Station –
upcoming communications
campaign for users*
- Grinding:
high noise level for brief
periods as the grinder passes

Next steps



Analysis of the situation

Sound surveys, acoustic diagnostics, on-site tests (Lachine Canal)

Identification of target measures

Public feedback

Deployment of measures from October to beginning of December

Public feedback on results




Question period

**Réseau
express
métropolitain**

 REMgrandmtl

 REMgrandmtl

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 construction@rem.info

rem.info

A large, dark green, stylized letter 'R' is positioned on the right side of the image. A horizontal bar, colored in a lighter shade of green, passes behind the letter, extending across the width of the page. The 'R' has a thick, rounded top and a sharp, angled bottom.