

Environmental Impact Assessment

October 2020

India: Bengaluru Metro Rail Project

Phase 2A (Outer Road Ring Metro Line)

Volume 8
Annex 5

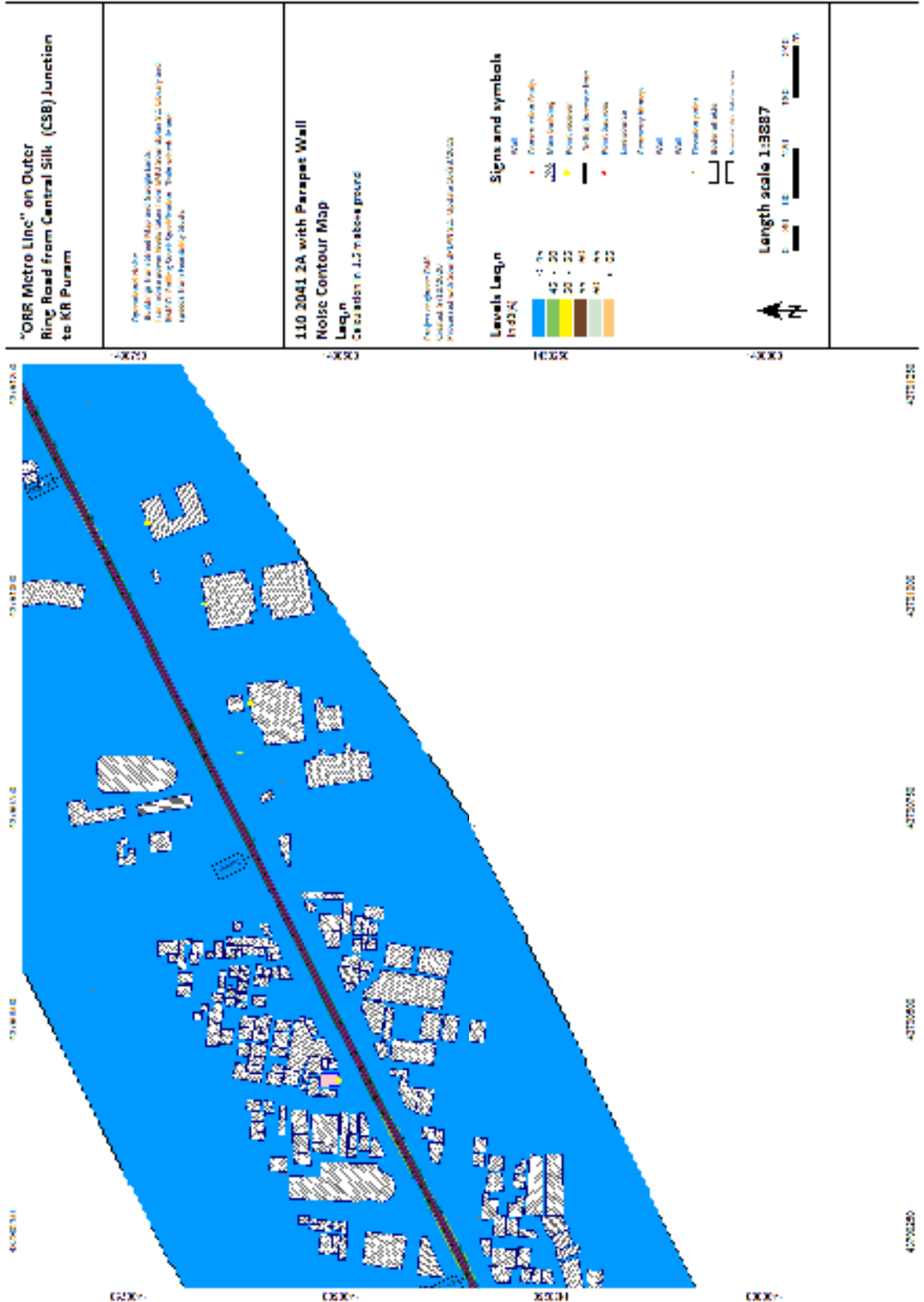
Prepared by Bangalore Metro Rail Corporation Ltd. (BMRCL), India for the Asian Development Bank.

NOTES

- (i) The fiscal year (FY) of the Government of India and its agencies ends on 31 March. "FY" before a calendar year denotes the year in which the fiscal year ends, e.g., FY2019 ends on 31 March 2019.
- (ii) In this report, "\$" refers to United States dollars.

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1. This map is for Civil and Map and Survey Dept. Use for non-commercial purposes only. All rights reserved. © 2014. All rights reserved.

"ORR Metro Line" on Outer Ring Road from Central Silk (CSB) Junction to KR Puram

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise power levels taken from DMU Soundpower & L Library and
MILCI Rating from 'Open Urban', from selection and
inputs from feasibility study.

110 2041 ZA with Parapet Wall Noise Contour Map
Leq,d
Calculation in 1.5 m above ground

Project engineer: CMR
Contract: 1710/0301
Processed with SoundPLAN 8.1, Update 10/03/2018

Levels Leq,d
in dB(A)

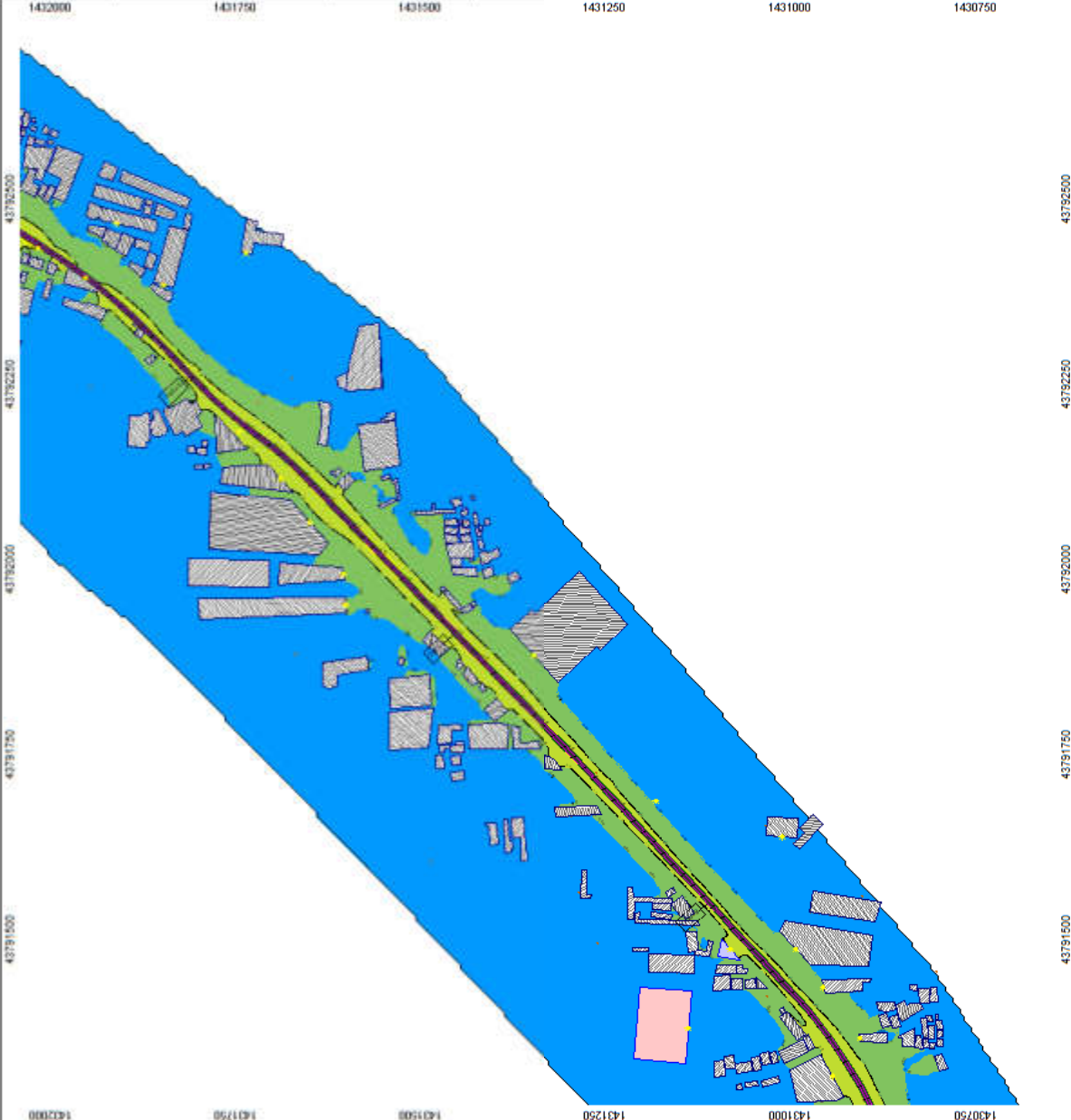
< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry blimp
- Wall
- Wall
- Elevation point
- Bodeneffekte
- Noise calculation area

Length scale 1:5245

0 45 90 180 270 360 m



"ORR Metro Line" on Outer Ring Road from Central Silk (CSB) Junction to KR Puram

Operational Noise Contour Map and Geoside Earth. Train noise power levels taken from BML Soundplan 8.1 Library and BMLCL Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

110 2041 2A with Parapet Wall Noise Contour Map
Leq,n
 Calculation in 1.5 m above ground

Project engineer: CMR
 Created: 9/10/2020
 Processed with SoundPLAN 8.1, Update: 10/23/2018

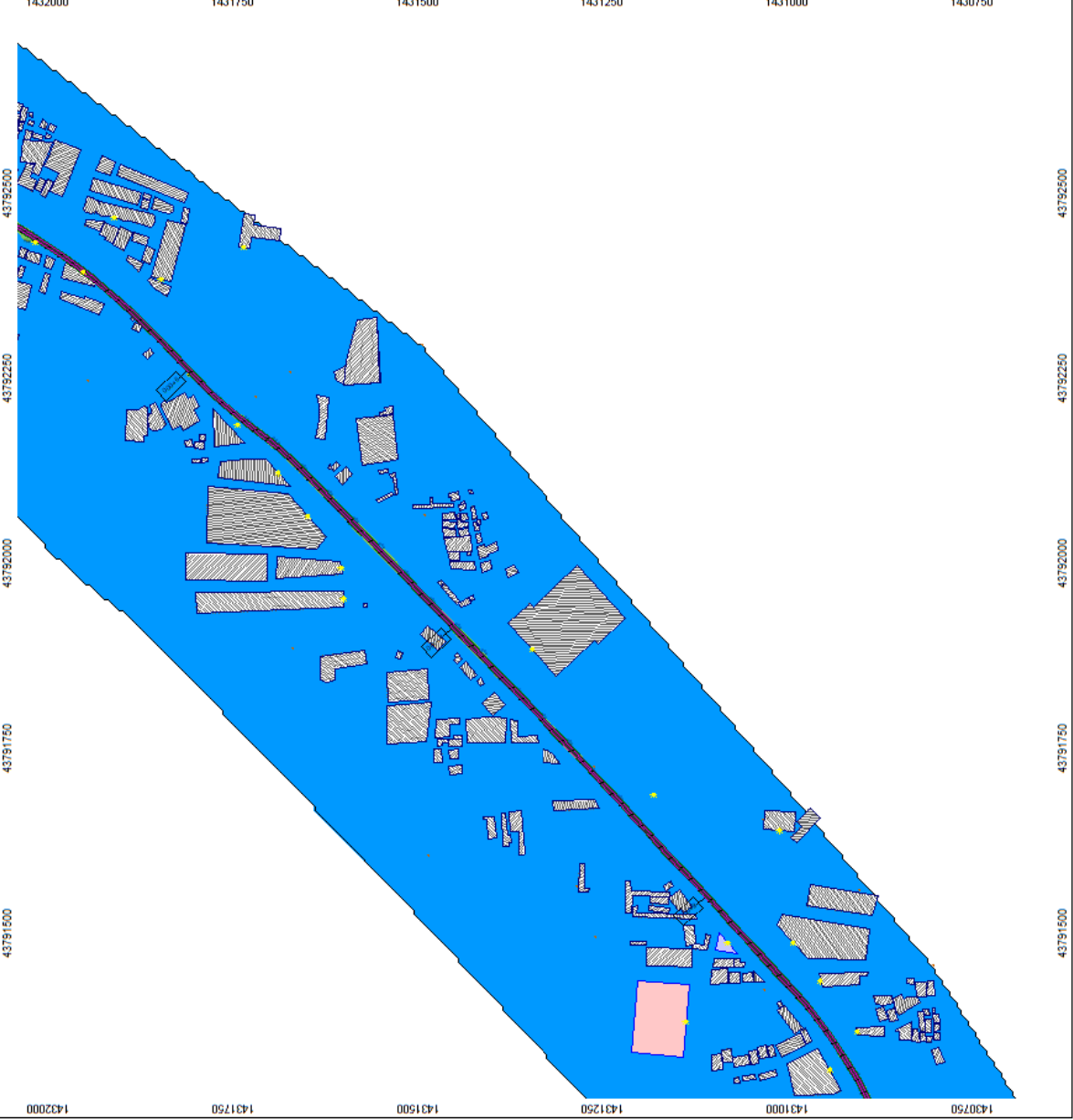
Levels Leq,n in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Construction Equip
Main building
Point receiver
+3dB(A) increase from
Point Sources
Line source
Geometry bitmap
Wall
Wall
Elevation point
Bodenreflekte
Noise calculation area

Length scale 1:5245
 0 45 90 180 270 360 m



"ORR Metro Line" on Outer Ring Road from Central Silk (CSB) Junction to KR Puram

Operational Noise:
Buildings from Street Map and Google's Earth.
Trees and power lines from DTU Soundplan 8.1 Library and BIMBCL. Noise contours and sound level calculation: Train schedule and speeds from Feasibility Study.

110 2041 2A with Parapet Wall Noise Contour Map
Leq,d
Calculation in 1.5 m above ground

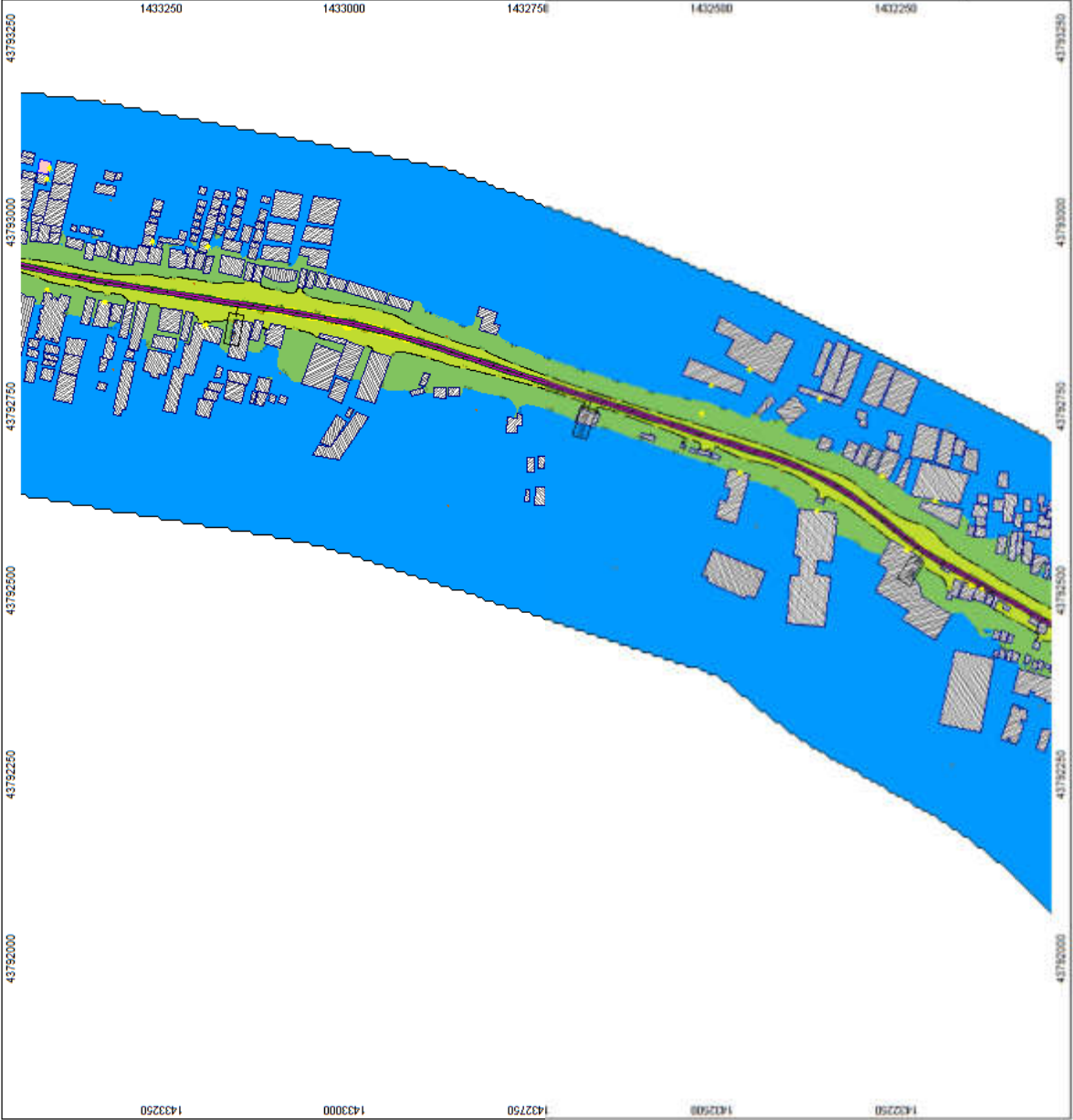
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,d (in dB(A))

Blue	< 45
Light Blue	45 - 50
Yellow	50 - 55
Orange	55 - 60
Red	60 - 65
Dark Red	>= 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- 3 dB(A) increase floor
- Point receiver
- Line source
- Geometry barrier
- Wall
- Wall
- Direction point
- Receiver
- Receiver with obstacle screen



"ORR Metro Line" on Outer Ring Road from Central Silk (CSB) Junction to KR Puram

Operational Noise
Buildings from Street Map and Google Earth.
Train noise power levels taken from BMU Soundplan 8.1 Library and
BMRL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**110 2041 2A with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

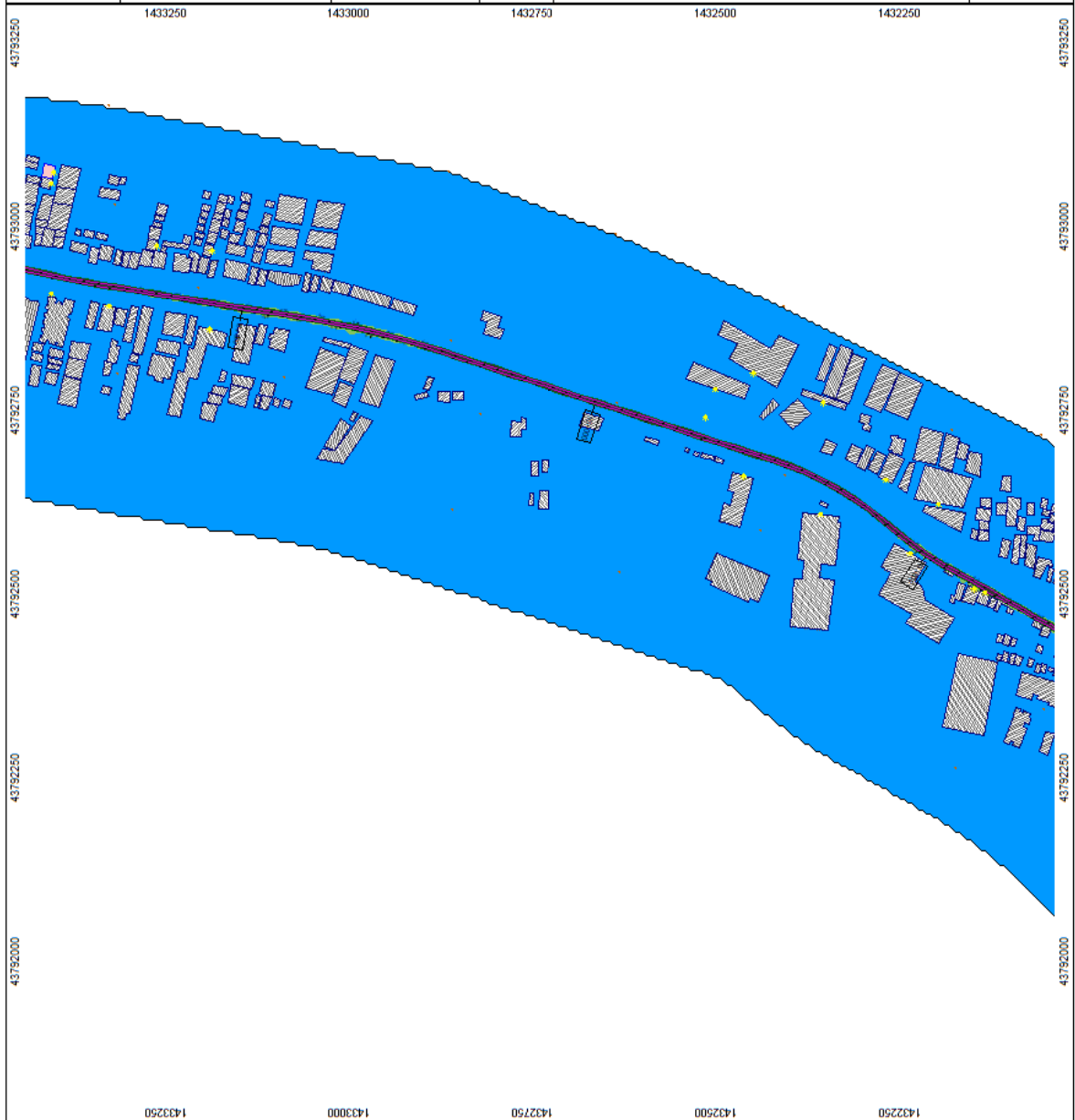
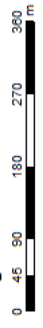
Signs and symbols

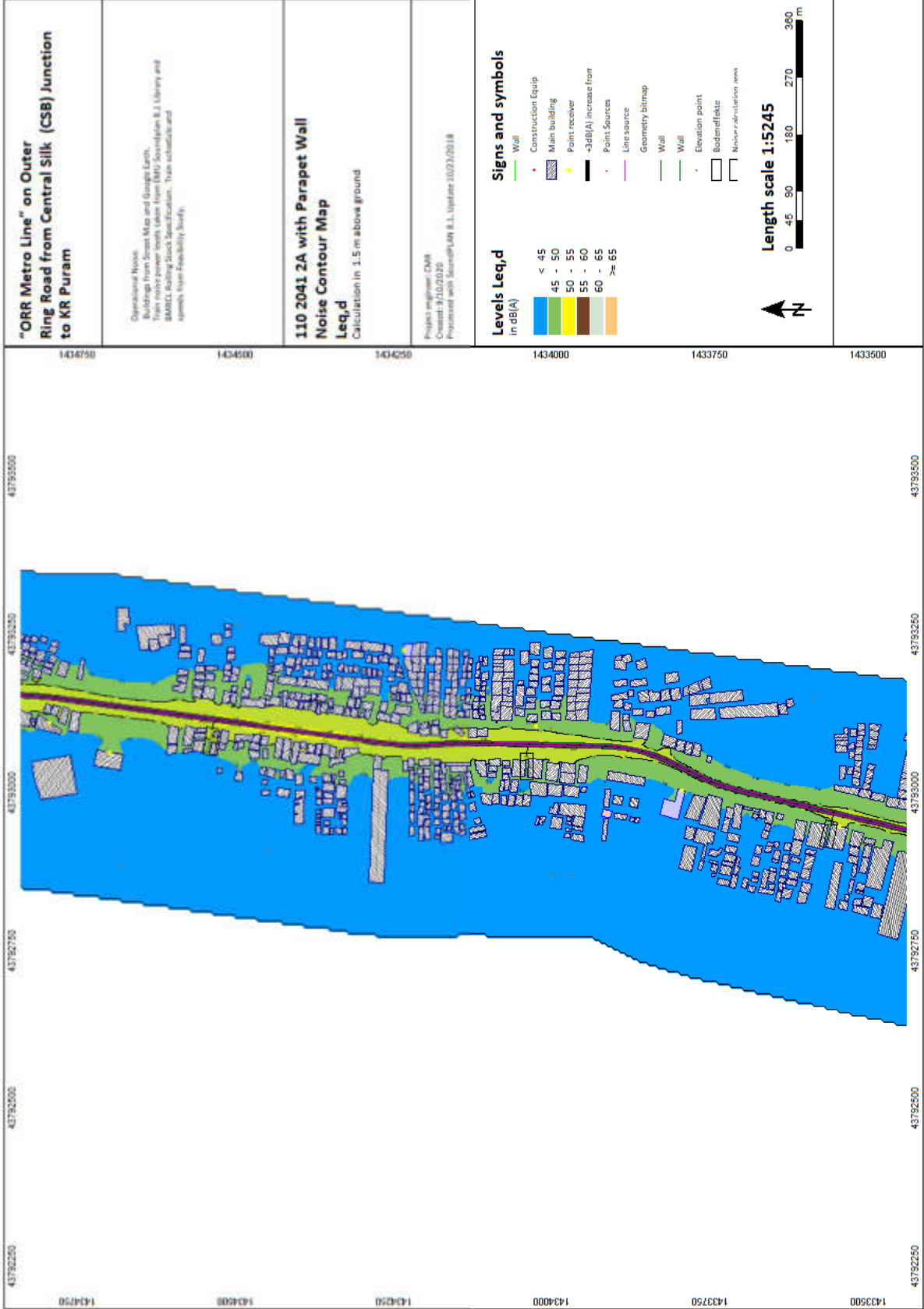
- Wall
- Construction Equip
- Main building
- Point receiver
- 3dB(A) increase from
- Point Sources
- Line source
- Geometry blimap
- Wall
- Wall
- Elevation point
- Borderfakte
- Noise calculation area

**Levels Leq,n
in dB(A)**

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Length scale 1:5245





"ORR Metro Line" on Outer Ring Road from Central Silk (CSB) Junction to KR Puram

Operational Noise
 Buildings from Street Map and Google Earth.
 Train noise power levels taken from IITM Surveyation 8.3. Library and
 BMRC Rolling Stock Specifications. Train schedule and
 speeds from Feasibility Study.

**110 2041 2A with Parapet Wall
 Noise Contour Map
 Leq,d**
 Calculation in 1.5 m above ground

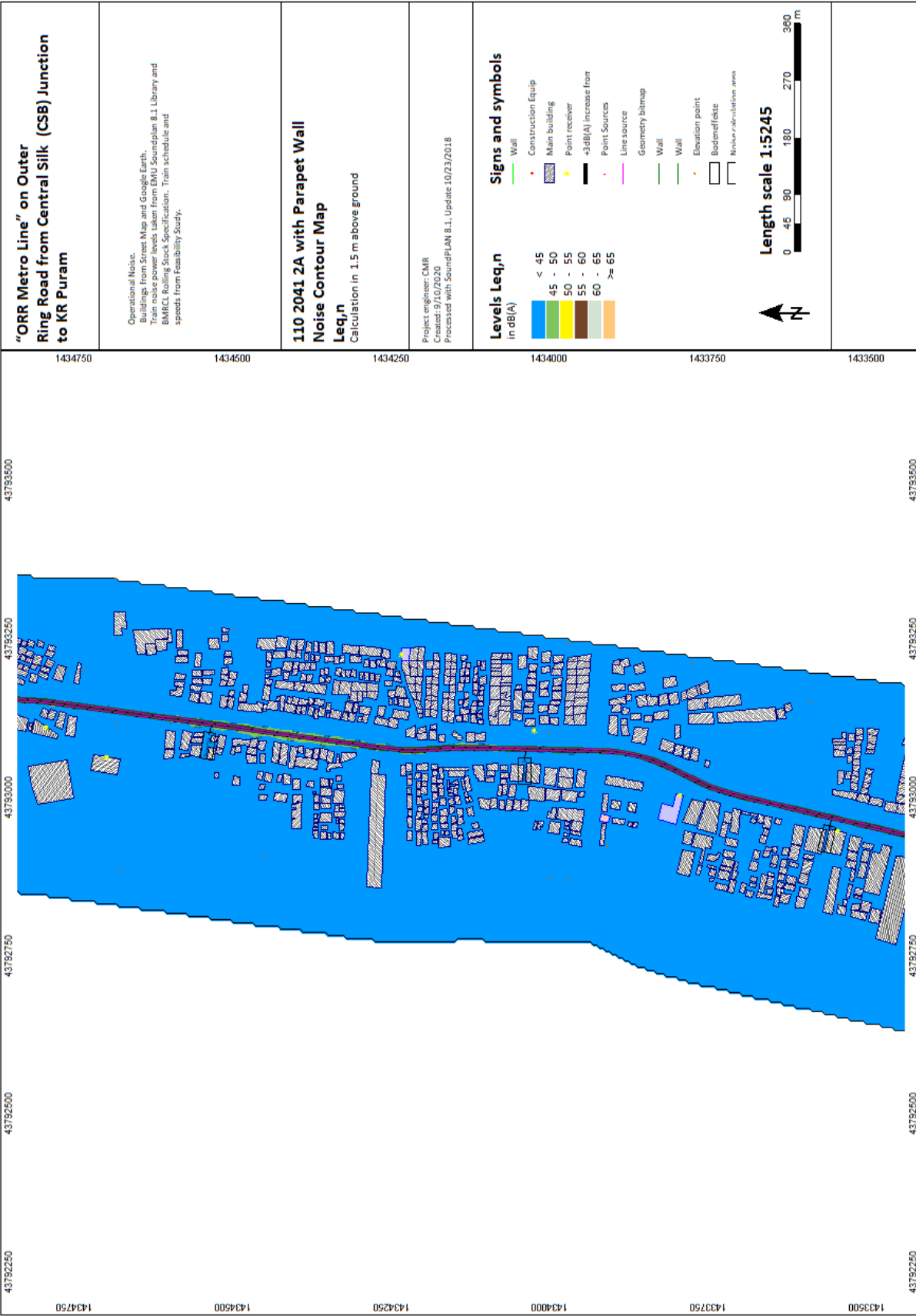
Project engineer: DMR
 Contact: 971070339
 Prepared with SurferMap 8.1.1, Update 30/03/2018

- Levels Leq,d**
 in dB(A)
- < 45
 - 45 - 50
 - 50 - 55
 - 55 - 60
 - 60 - 65
 - >= 65
- Signs and symbols**
- Construction Equip
 - Main building
 - Point receiver
 - +3dB(A) increase from
 - Point Sources
 - Line source
 - Geometry blimp
 - Wall
 - Wall
 - Elevation point
 - Bodenreflekt
 - Noise calculation area

Length scale 1:5245

0 45 90 180 270 360 m

↑



"ORR Metro Line" on Outer Ring Road from Central Silk (CSB) Junction to KR Puram

Operational Noise.
Buildings from Street Map and Google Earth.
Train noise power levels taken from DMU Soundplan 8.1 Library and BMIRCL Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

110 2041 2A with Parapet Wall Noise Contour Map
Leq,n
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update: 10/23/2018

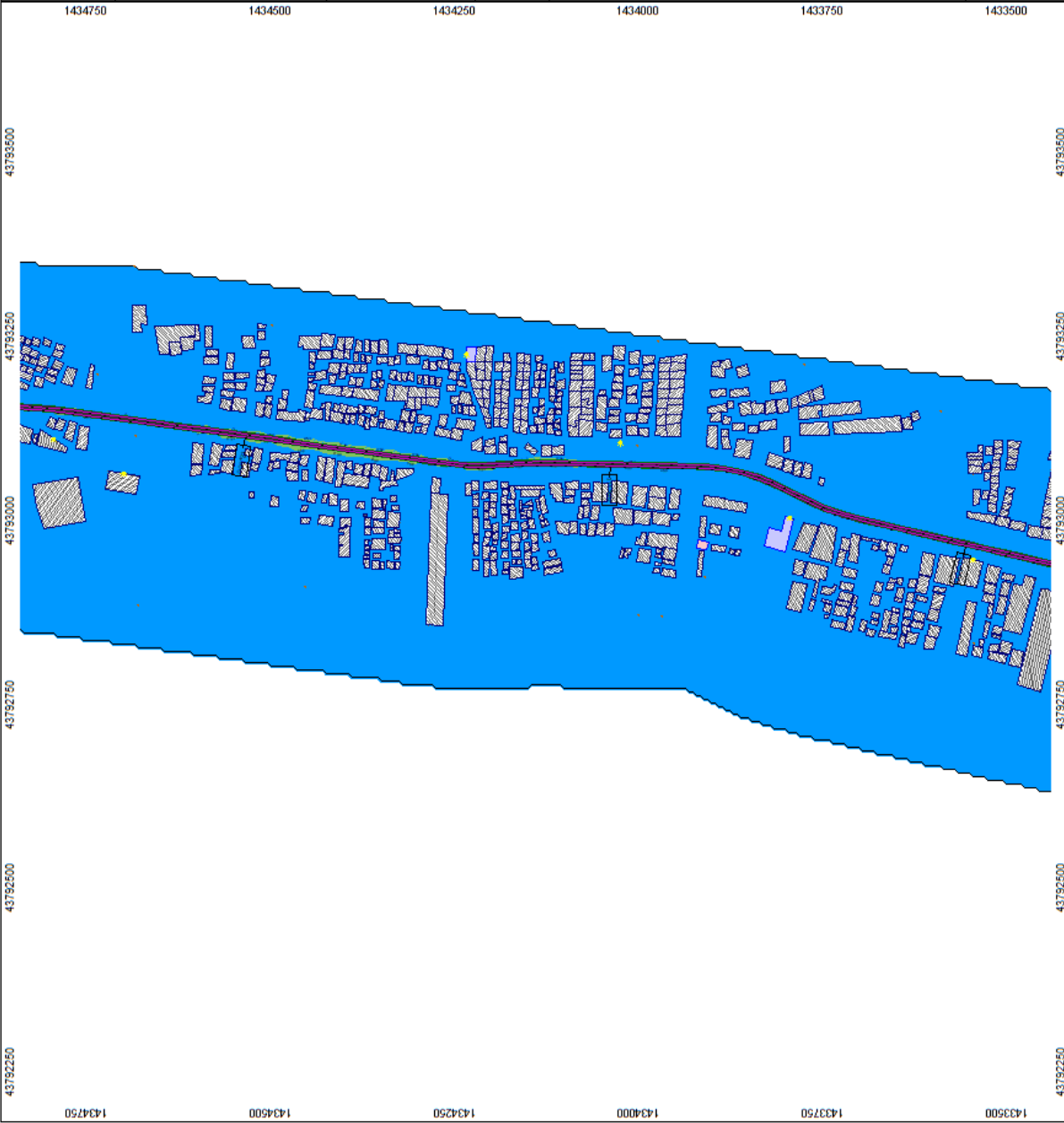
Levels Leq,n in dB(A)

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

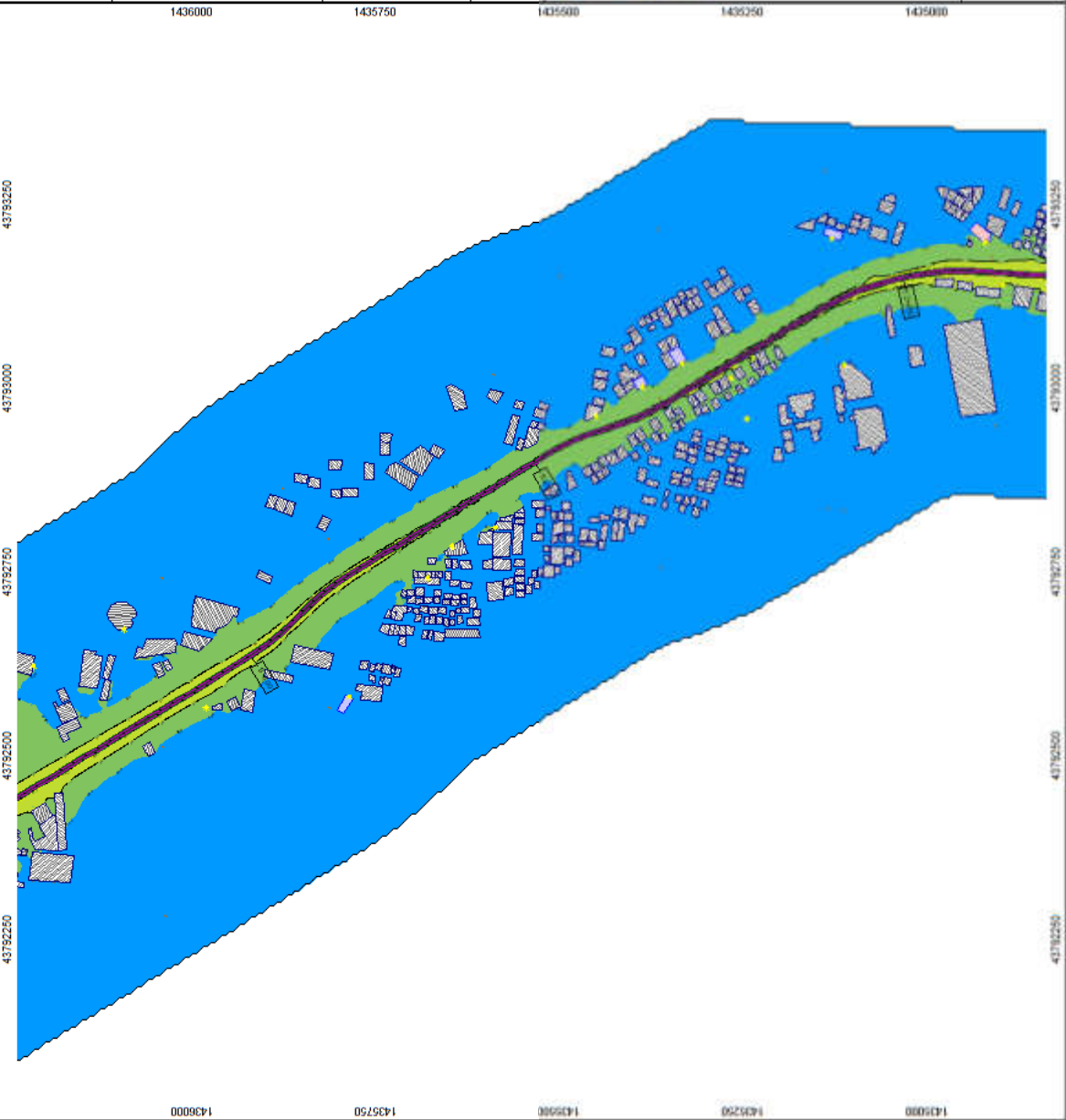
Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- 3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Wall
- Elevation point
- Bodeneffekte
- Notker calculation area

Length scale 1:5245



<p>"ORR Metro Line" on Outer Ring Road from Central Silk (CSB) Junction to KR Puram</p>	<p>Operational Noise Buildings from Street Map and Google Earth. Train noise power levels taken from BMU Soundplan 8.1 Library and BMRCL Rolling Stock Specification. Train schedule and speeds from Feasibility Study.</p>	<p>110 2041 2A with Parapet Wall Noise Contour Map Leq,d Calculation in 1.5 m above ground</p>	<p>Project engineer: OMR Created: 9/10/2020 Processed with SoundPLAN 8.1, Update: 10/23/2018</p>	<p>Levels Leq,d in dB(A)</p> <table border="1"> <tr><td>Blue</td><td>< 45</td></tr> <tr><td>Light Blue</td><td>45 - 50</td></tr> <tr><td>Yellow</td><td>50 - 55</td></tr> <tr><td>Orange</td><td>55 - 60</td></tr> <tr><td>Red</td><td>60 - 65</td></tr> <tr><td>Dark Red</td><td>>= 65</td></tr> </table> <p>Signs and symbols</p> <ul style="list-style-type: none"> Wall Construction Equip Main building Point receiver -20000 increase from Power Sources Line point Geometry setback Wall Wall Elevation point Backfillside Motorway relation area <p>Length scale 1:5245 0 45 90 180 270 360 m</p> <p>North arrow</p>	Blue	< 45	Light Blue	45 - 50	Yellow	50 - 55	Orange	55 - 60	Red	60 - 65	Dark Red	>= 65
Blue	< 45															
Light Blue	45 - 50															
Yellow	50 - 55															
Orange	55 - 60															
Red	60 - 65															
Dark Red	>= 65															



"ORR Metro Line" on Outer Ring Road from Central Silk (CSB) Junction to KR Puram

Operational Noise: Weighting from all levels and Grade's Earth. Train noise levels taken from EMU Soundplan 8.1 Library and BMRC Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

110 2041 2A with Parapet Wall Noise Contour Map
Leq,n
 Calculation in 1.5 m above ground

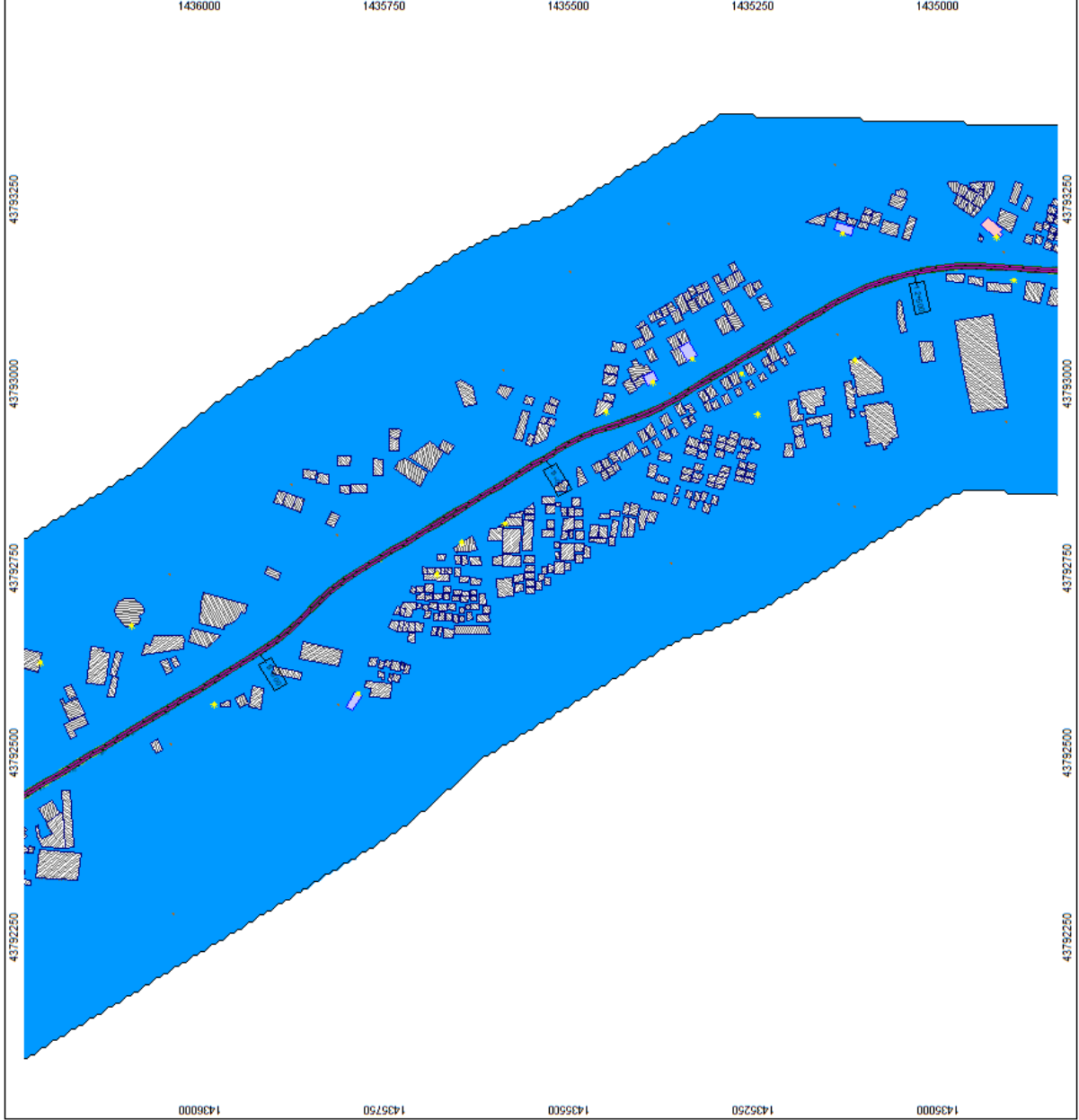
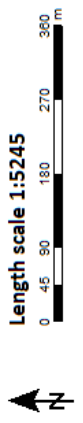
Project engineer: CMR
 Created: 9/10/2020
 Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall
Construction Equip
Main building
Point receiver
-3dB(A) increase from
Point Sources
Line source
Geometry blimp
Wall
Wall
Elevation point
Border/diote
Noise calculation area



"ORR Metro Line" on Outer Ring Road from Central Silk (CSB) Junction to KR Puram

Operational Noise:
 Buildings from Street Map and Google Earth.
 Train noise power levels taken from DMU Soundpower S.L. Library and
 BMBCL Building Stock Specifications. Train exhausts and
 signals from Feasibility Study.

**110 2041 2A with Parapet Wall
 Noise Contour Map
 Leq,d**

Calculation in 1.5 m above ground

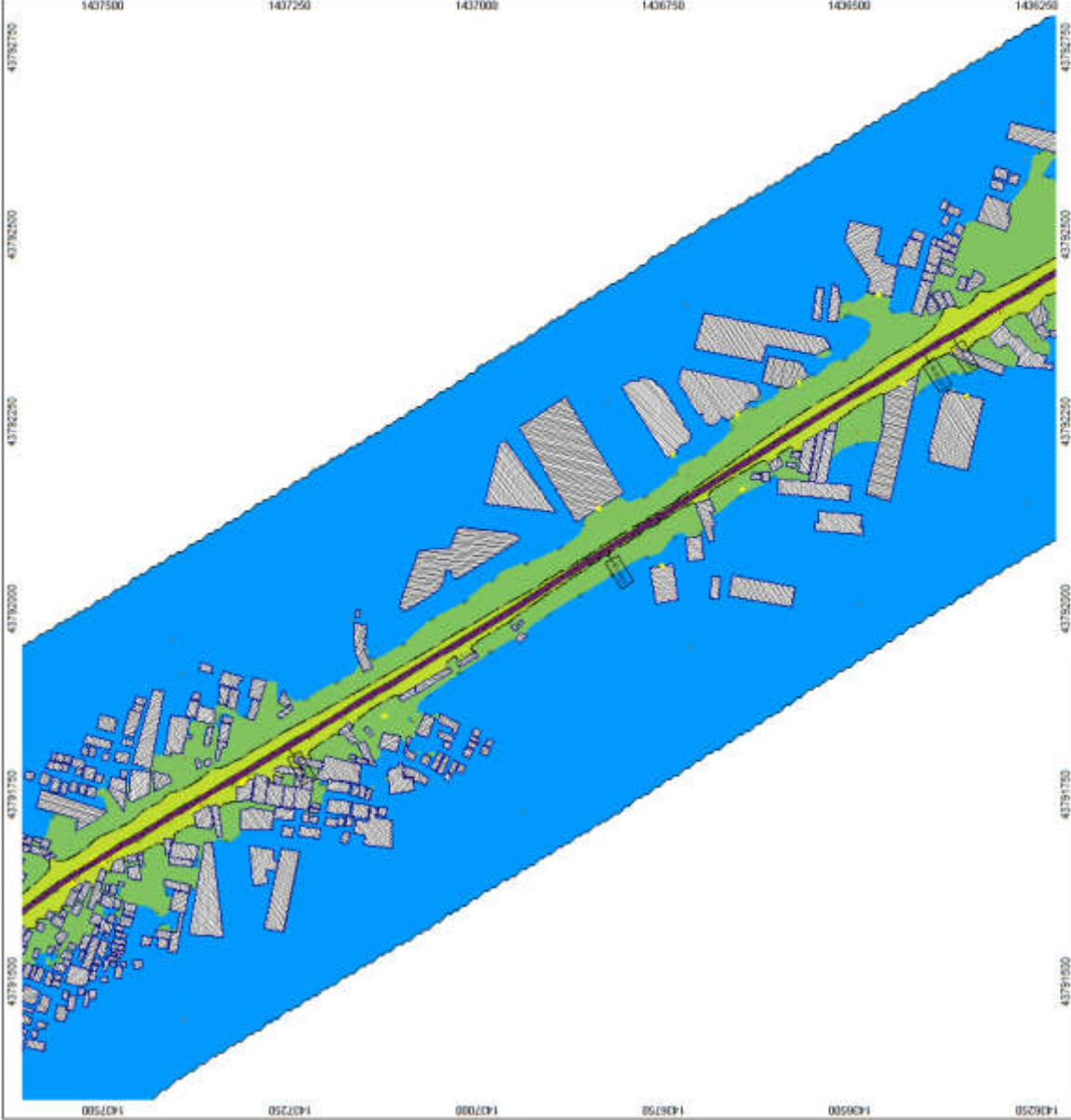
Project engineer: CMR
 Created: 8/15/2020
 Processed with: SWSOPLAN 8.1, Update 10/23/2018

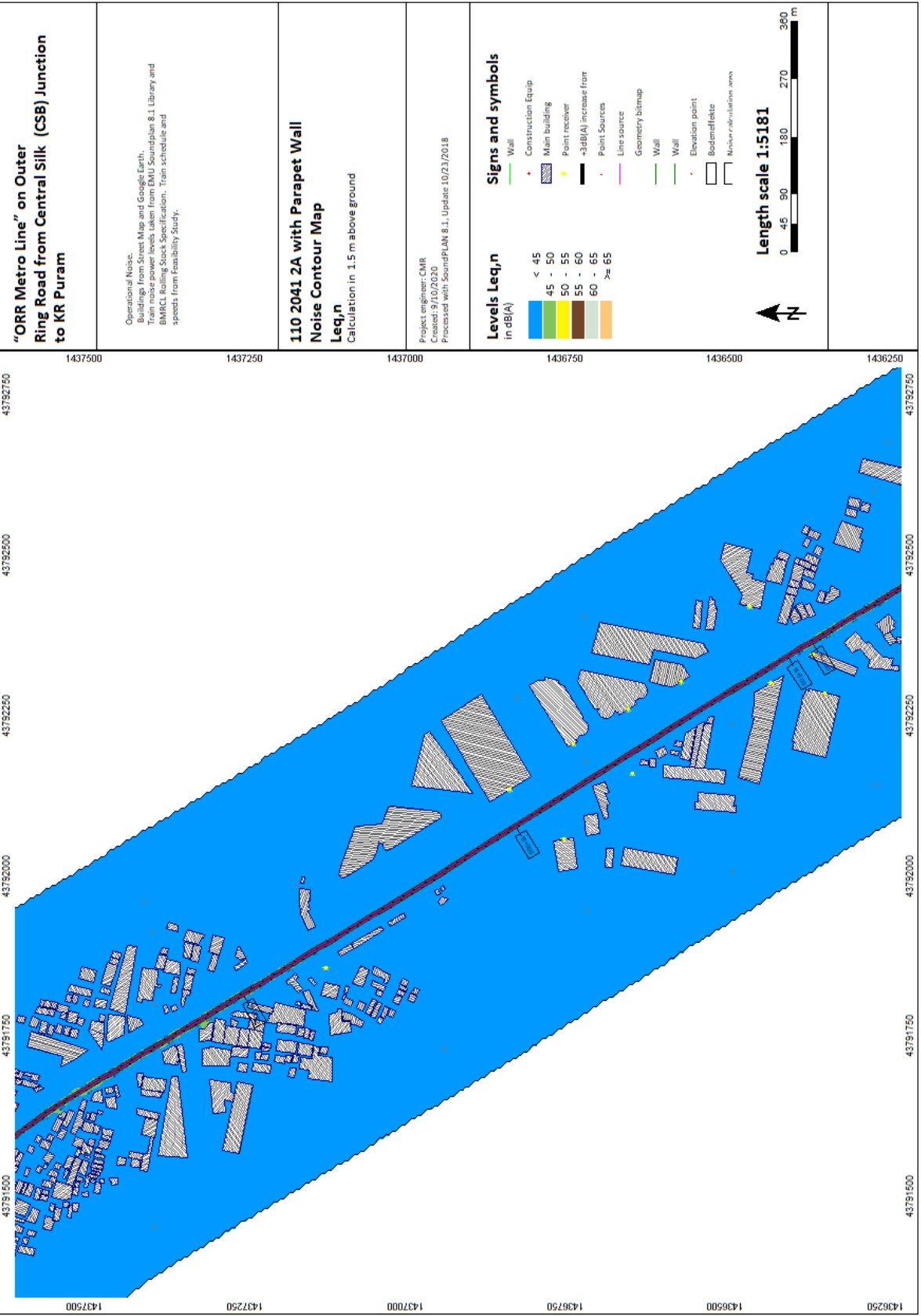
Levels Leq,d
 (in dBA)



Signs and symbols

- Wall
- Construction Equip
- Main Building
- Pipes (water)
- +10dB(A) increase floor
- Pipes (sewer)
- Line source
- Geometry (bridge)
- Wall
- Wall
- Structure point
- Bottom floor
- Bottom floor (with noise area)





"ORR Metro Line" on Outer Ring Road from Central Silk (CSB) Junction to KR Puram

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise power levels taken from EMU Soundplan 8.1. Library and BMRCL Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

110 2041 2A with Parapet Wall Noise Contour Map Leq,d

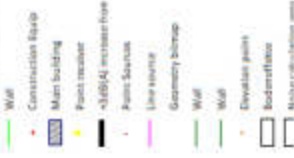
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update: 10/23/2018

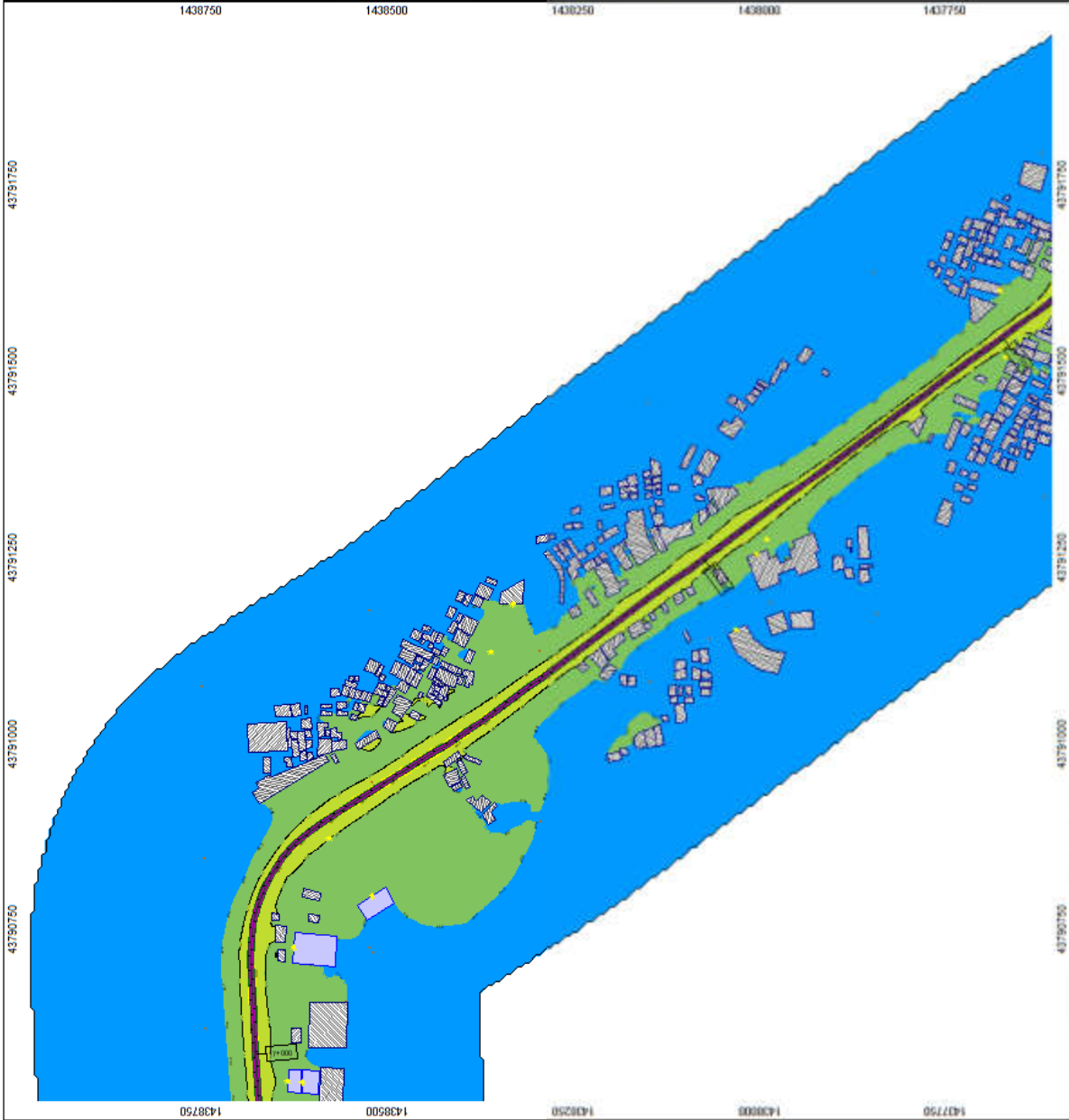
Levels Leq,d
(in dBA)



Signs and symbols



Length scale 1:5181



"ORR Metro Line" on Outer Ring Road from Central Silk (CSB) Junction to KR Puram

Operational Noise:
Buildings from Street Map and Google Earth.
Traffic sources: data from BMD Soundplan 8.1 Library and
BANCIL Building Stock Simulation. Train schedule and
speeds from Feasibility Study.

**110 2041 2A with Parapet Wall
Noise Contour Map
Leq,1n**

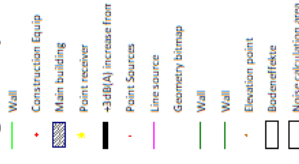
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with: SoundPLAN 8.1, Update: 10/23/2018

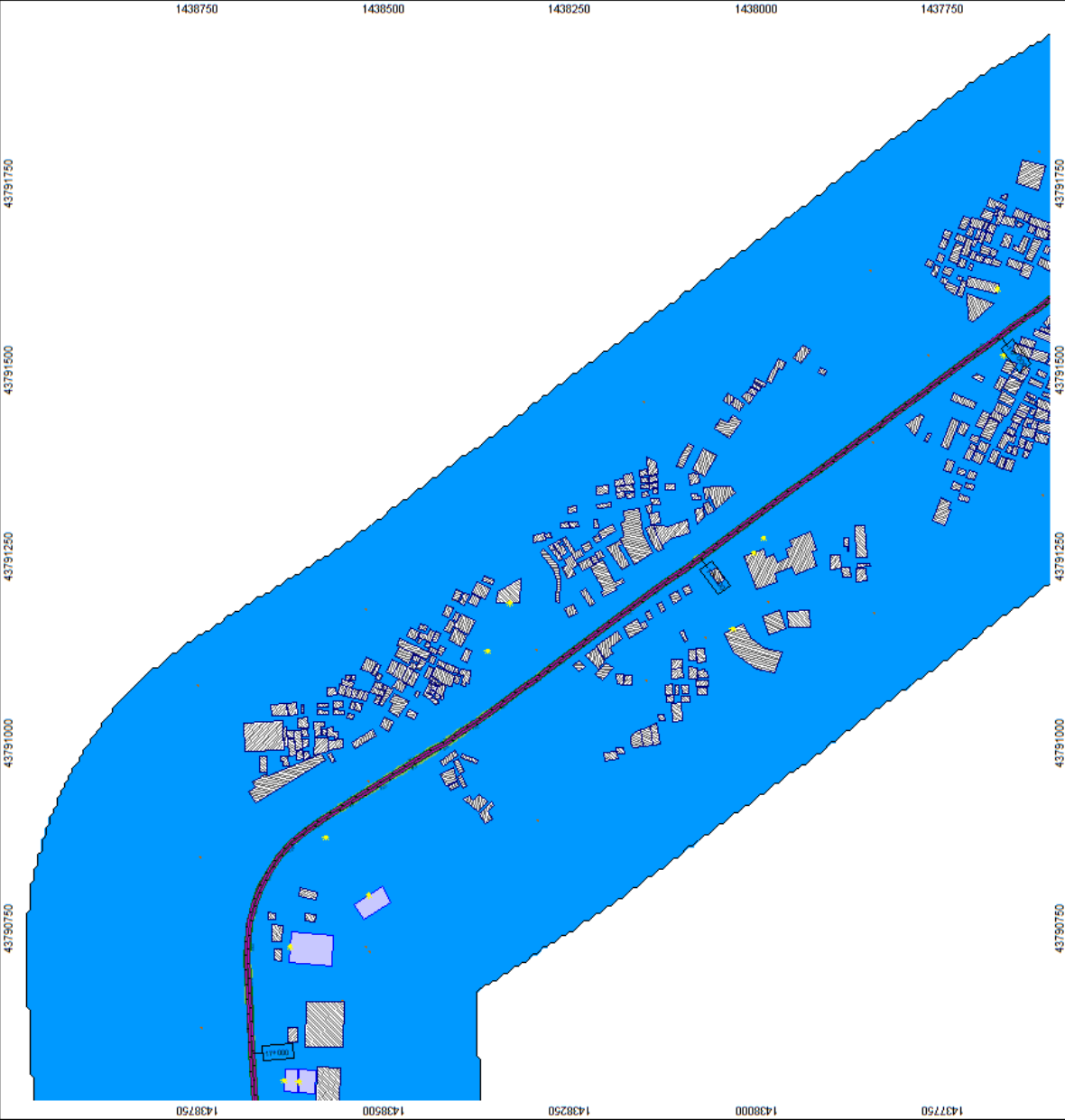
**Levels Leq,1n
in dB(A)**



Signs and symbols



Length scale 1:5181

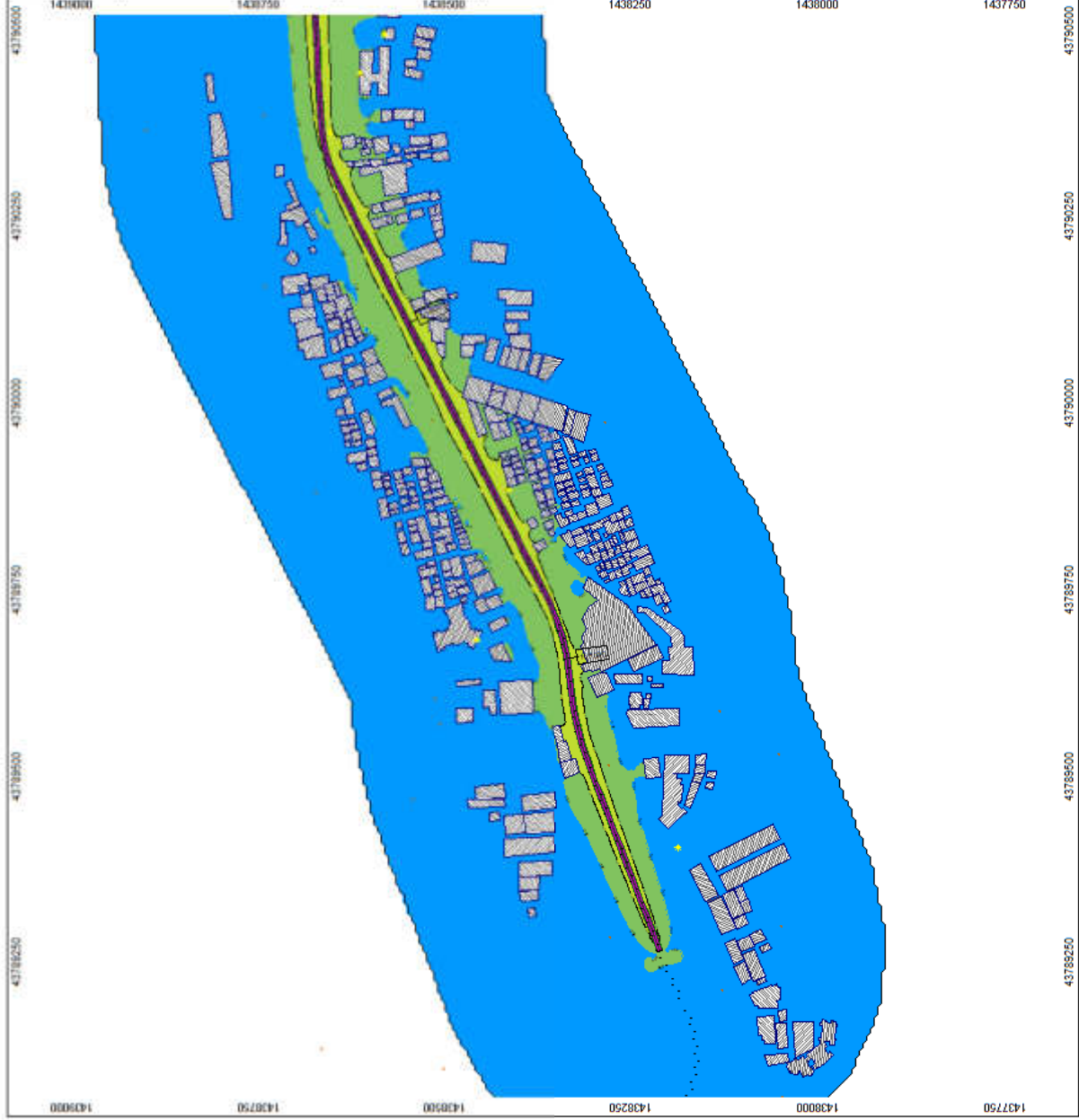


"ORR Metro Line" on Outer Ring Road from Central Silk (CSB) Junction to KR Puram

Operational Noise
Buildings from Street Map and Google Earth.
Noise contours are shown from ISO 9613-2:1997
BABC, Railway and Sound Sources: Train vehicle and
sounds from Feasibility Study.

**110 2041 2A with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

Project Engineer: CMR
Contract: 8/15/2020
Presented with SouthPLAN B.L. Update: 10/23/2018



KR Puram to Kempegowda International Airport

2024, 2031, 2041

KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Terrain from SRTM30 PLUS, updated from EMU Survey.
BMBCI Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

120 2024 2B with Parapet Wall Noise Contour Map Leq,d

Calculation in 1.5 m above ground

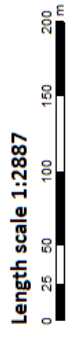
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update:10/23/2018

Levels Leq,d in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- 3dB(A) increase floor
- Point Sources
- Line source
- Geometry blimping
- Wall
- Wall
- Elevation point
- Bodenreflekt
- Noise calculation area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Elevations from BMLRT. Levels taken from BMLRT SoundPLAN 8.1. Library and BMLRT. Running speed and acceleration. Train schedule and speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map**

Leq,n
Calculation in 1.5 m above ground

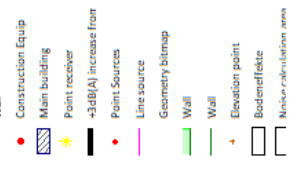
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1. Update 10/23/2018



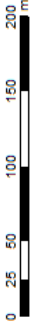
**Levels Leq,n
in dB(A)**



Signs and symbols



Length scale 1:2887



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Main receiver locations from BMU Soundplan 8.1. Library and
BANCIL Building locations from BMU Soundplan 8.1. Library and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,d in dB(A)

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- 3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodeneffekte
- Receiver distribution area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings: From Street Map and Google Earth.
Train noise-power levels: taken from DMU Soundplan 8.1. Library and
BMNL Rolling Stock Specification. Train schedule and
speeds from feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

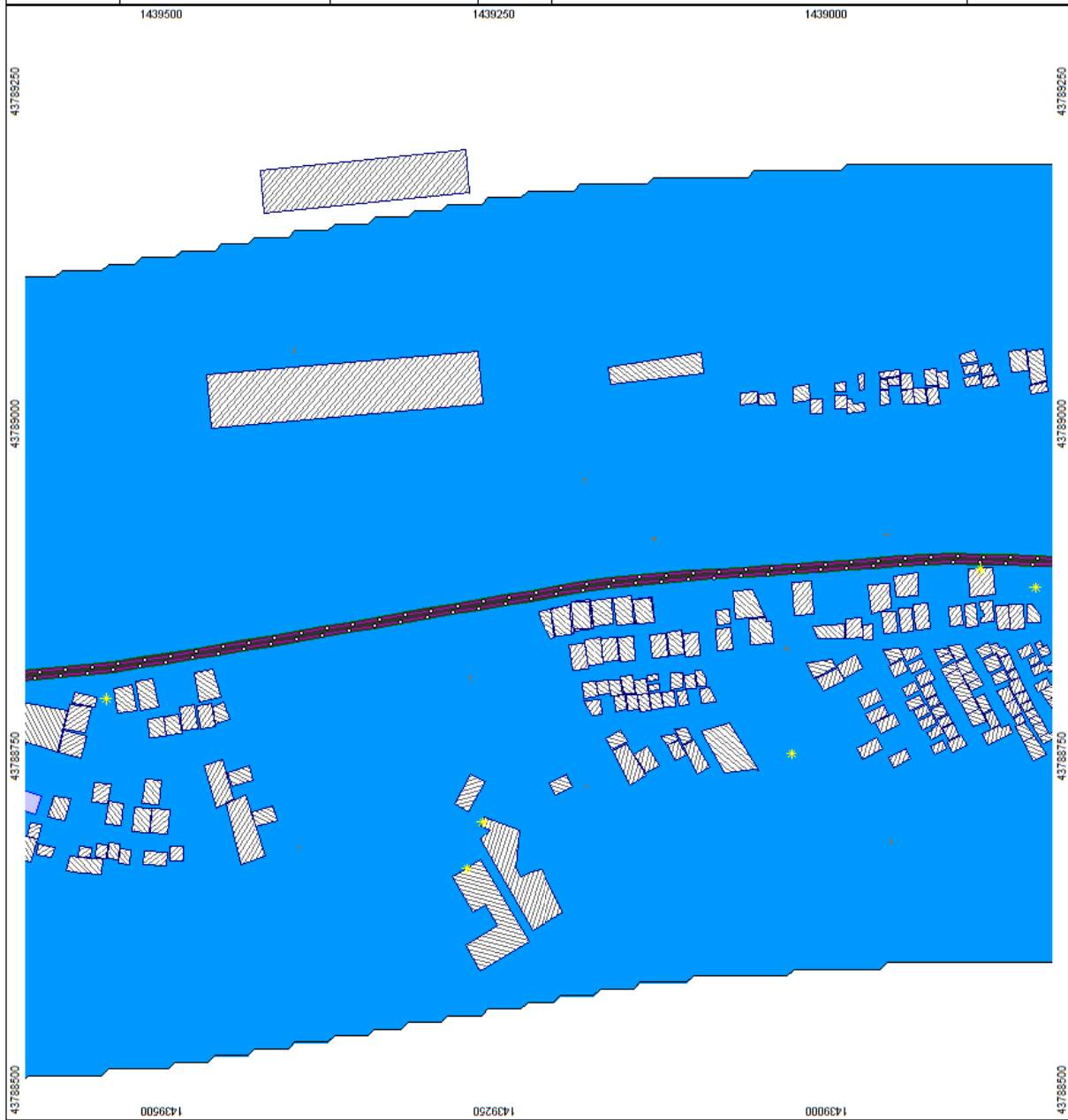
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq,n
in dB(A)

Blue	< 45
Light Blue	45 - 50
Yellow	50 - 55
Orange	55 - 60
Red	60 - 65
Dark Red	>= 65

Signs and symbols

- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point sources
- Line source
- Geometry blimp
- Wall
- Elevation point
- Barrier/edge
- Noise calculation area



KR Puram to Kempegowda International Airport

Operational Noise Buildings from Street Map and Google Earth. Train noise power levels taken from BMU Soundplan 8.1 Library and BMRL Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

120 2024 2B with Parapet Wall Noise Contour Map

Calculation in 1.5 m above ground

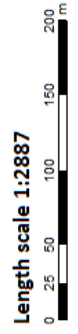
Project engineer: GMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- 3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Wall
- Elevation point
- Borderline
- Noise calculation area

Levels Leq,d in dB(A)

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings: From Street Map and Google Earth.
Train noise-power levels: Taken from DMU Soundplan 8.1. Library and BIMRC Rolling Stock Specification. Train schedule and speeds from feasibility study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

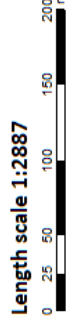
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1. Update 10/23/2018

Levels Leq,n
in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry blimp
- Wall
- Elevation point
- Bodenreflekt
- Noise reduction area



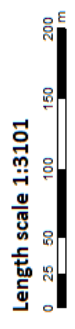
KR Puram to Kempegowda International Airport

Operational Noise:
 Operational Noise Map and Geograph Earth.
 Train noise power levels taken from EMU Soundplan 8.1 Library and
 BMBCI Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
 Noise Contour Map
 Leq,d**
 Calculation in 1.5 m above ground

Project engineer: CMR
 Created: 9/10/2020
 Processed with: SoundPLAN 8.1, Update: 10/23/2018

- Levels Leq,d**
 in dB(A)
- < 45
 - 45 - 50
 - 50 - 55
 - 55 - 60
 - 60 - 65
 - >= 65
- Signs and symbols**
- Wall
 - Construction Equip
 - Main building
 - Point receiver
 - 3dB(A) increase from
 - Point Sources
 - Line source
 - Geometry bimap
 - Wall
 - Wall
 - Elevation point
 - Bodenreflekt
 - Receiver calculation area



KR Puram to Kempegowda International Airport

Operational Noise:
 Leq,1h from Start Map and Goods Earth
 Train noise levels from BMU Soundplan 8.1 Library and
 BMRCI Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
 Noise Contour Map**
 Leq,1h
 Calculation in 1.5 m above ground

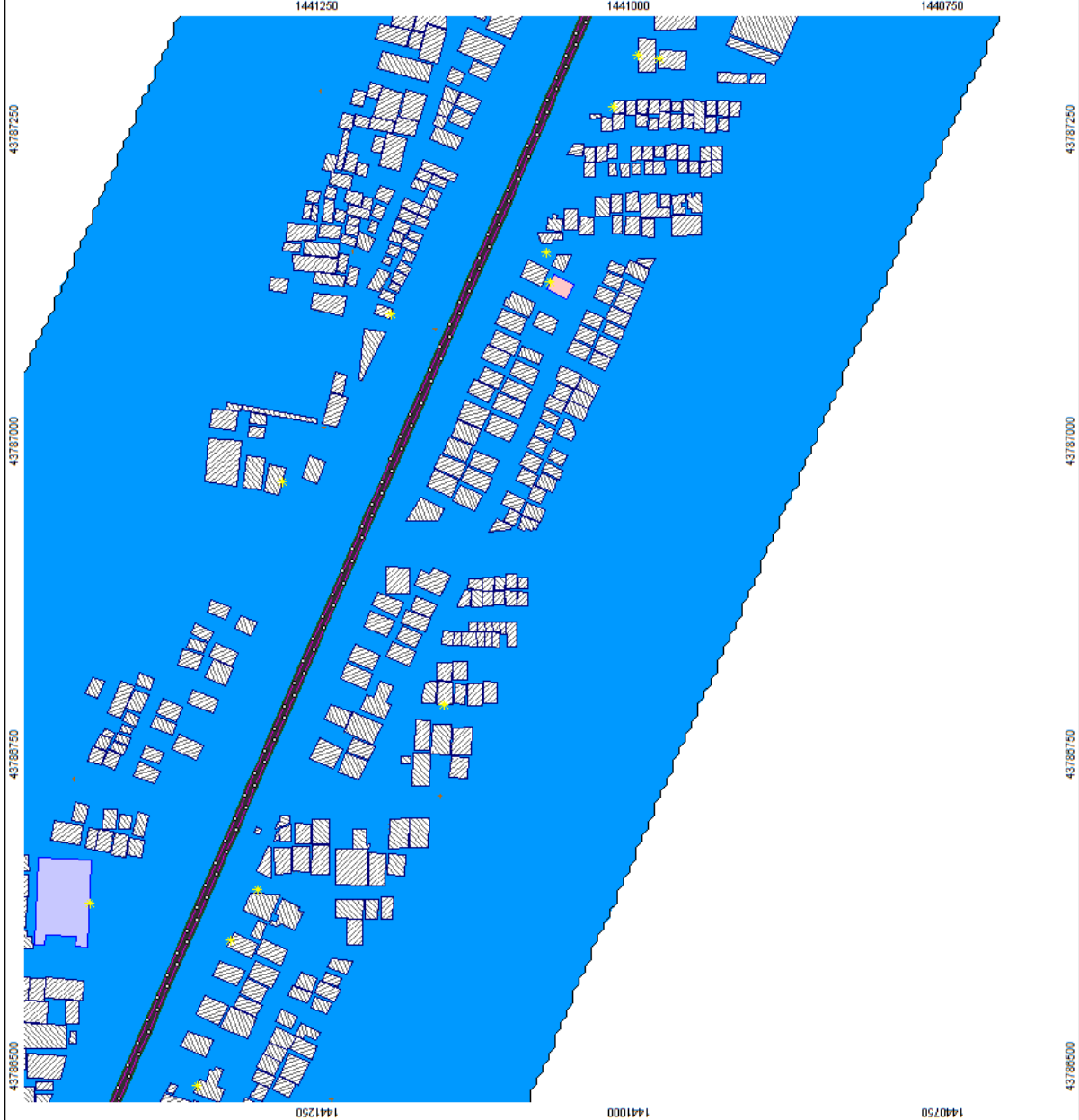
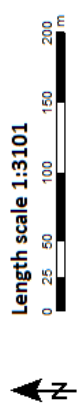
Project engineer: CMR
 Created: 9/10/2020
 Processed with SoundPLAN 8.1, Update:10/23/2018

Levels Leq,1h
 in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall	Construction Equip
Main building	Point receiver
+3dB(A) increase from	Point Sources
Line source	Geometry blimp
Wall	Wall
Elevation point	Bodenfalte
Necker calculation area	



KR Puram to Kempegowda International Airport

Operational Noise: Buildings from streets taken from EMI Surimadlan 8.1 Library and BMRC Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

120 2024 2B with Parapet Wall Noise Contour Map
 Leq,d
 Calculation in 1.5 m above ground

Project engineer: CMR
 Created: 9/10/2020
 Processed with SoundPLAN 8.1, Update 10/03/2018

Levels Leq,d in dB(A)

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry blimp
- Wall
- Elevation point
- Bodeneffekte
- Noise calculation area



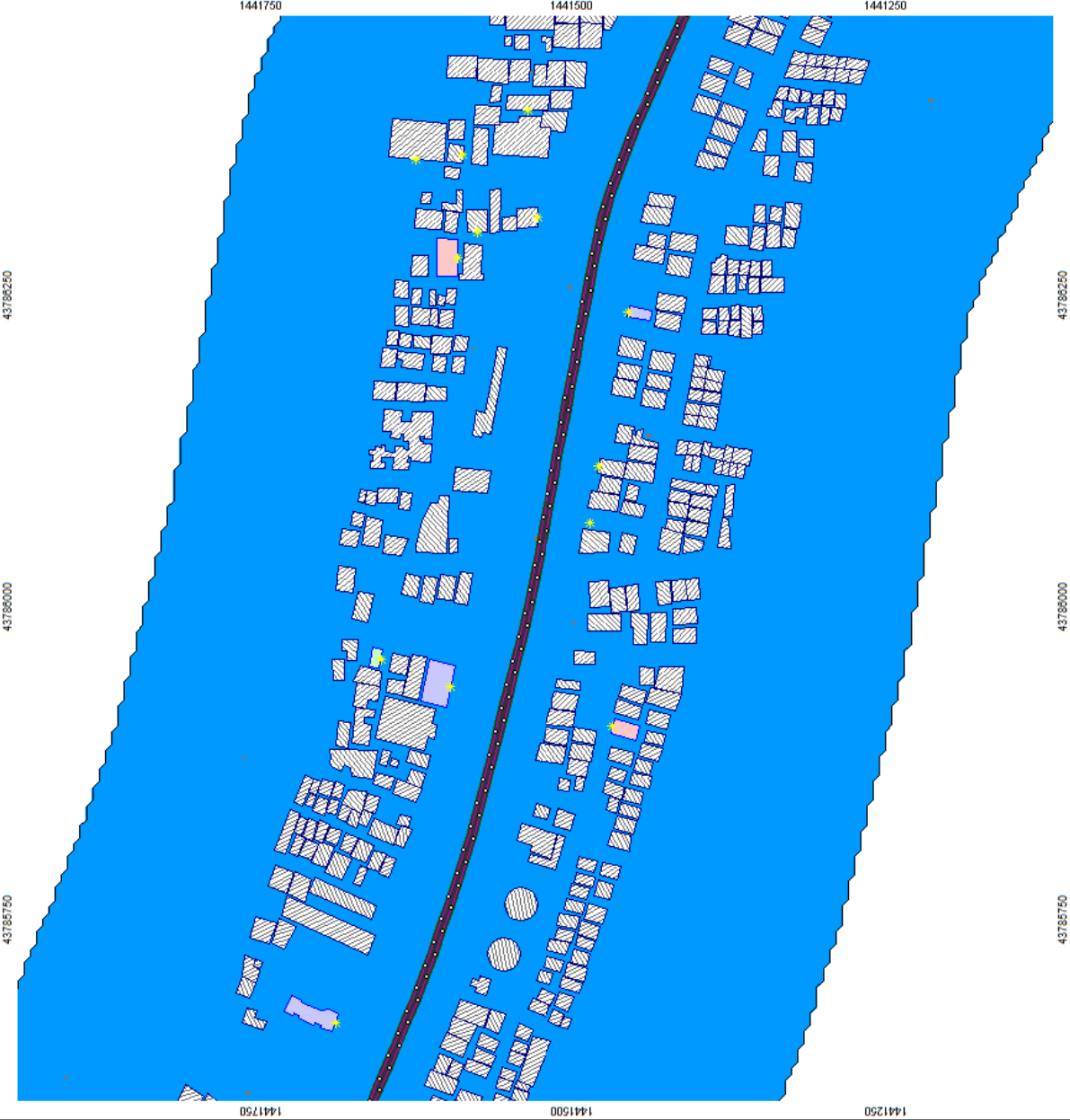
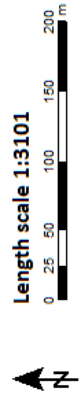
KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Traffic noise levels taken from ENV Soundplan 8.1 Library and
BIMUT using traffic speed calculation. From schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map**
Leq_n
Calculation in 1.5 m above ground

Project engineer: CMR
Created by: HOD/CMR
Processed with SoundPLAN 8.1, Update: 10/23/2018

- Levels Leq_n**
in dB(A)
- < 45
 - 45 - 50
 - 50 - 55
 - 55 - 60
 - 60 - 65
 - >= 65
- Signs and symbols**
- Wall
 - Construction Equip
 - Main building
 - Point receiver
 - 3dB(A) increase from
 - Point Sources
 - Line source
 - Geometry blimp
 - Wall
 - Wall
 - Elevation point
 - Border (lake)
 - Noise calculation area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise power levels taken from DMU Soundplan 8.1 Library and
BWRCC Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**

Calculation in 1.5 m above ground

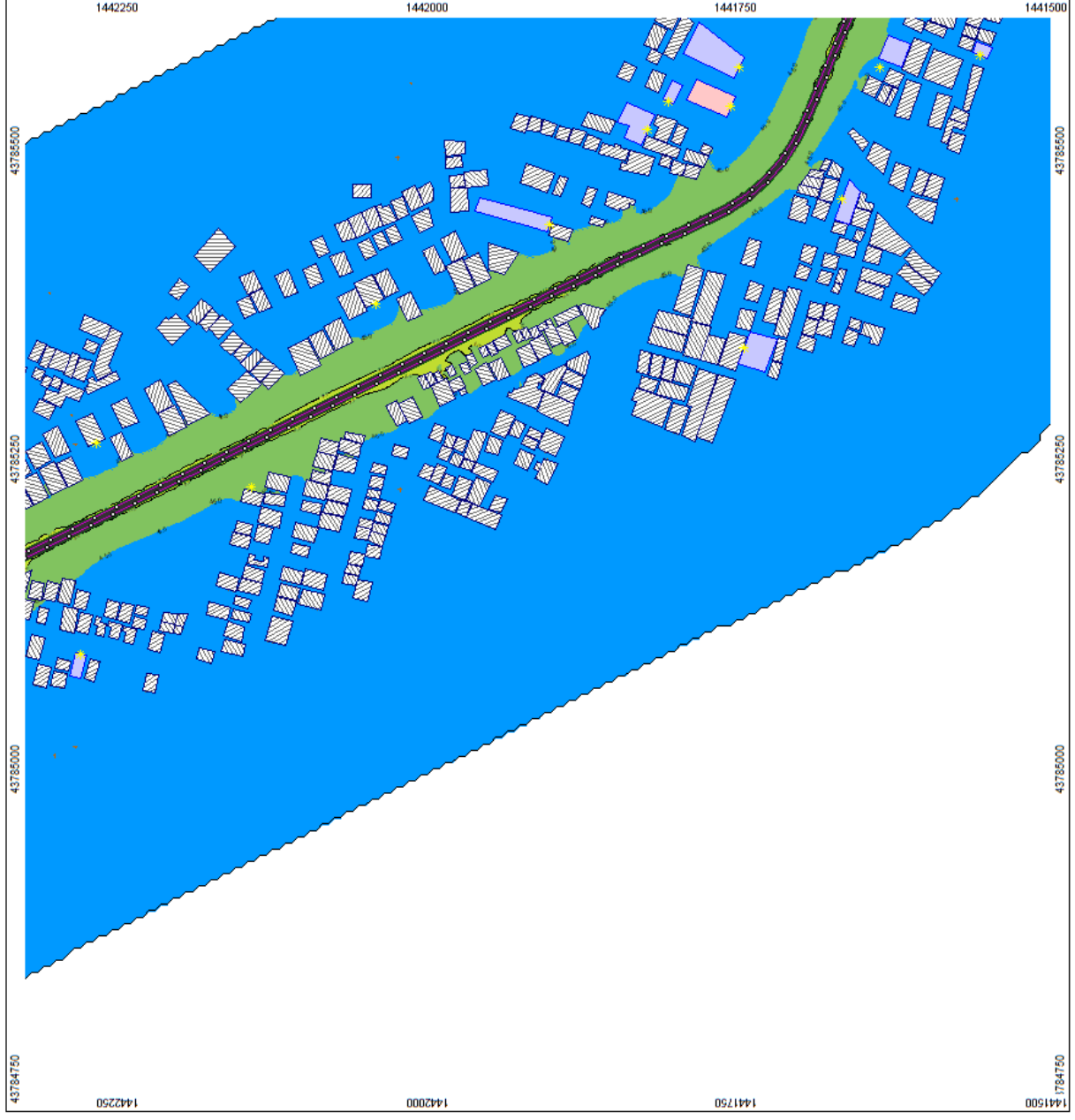
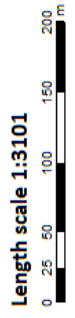
Project engineer: CHR
Creator: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

Signs and symbols

- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodenreflekte
- Noise calculation area

**Levels Leq,d
in dB(A)**

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Traffic noise from EMU Soundplan 8.1 Library and
BMBCL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

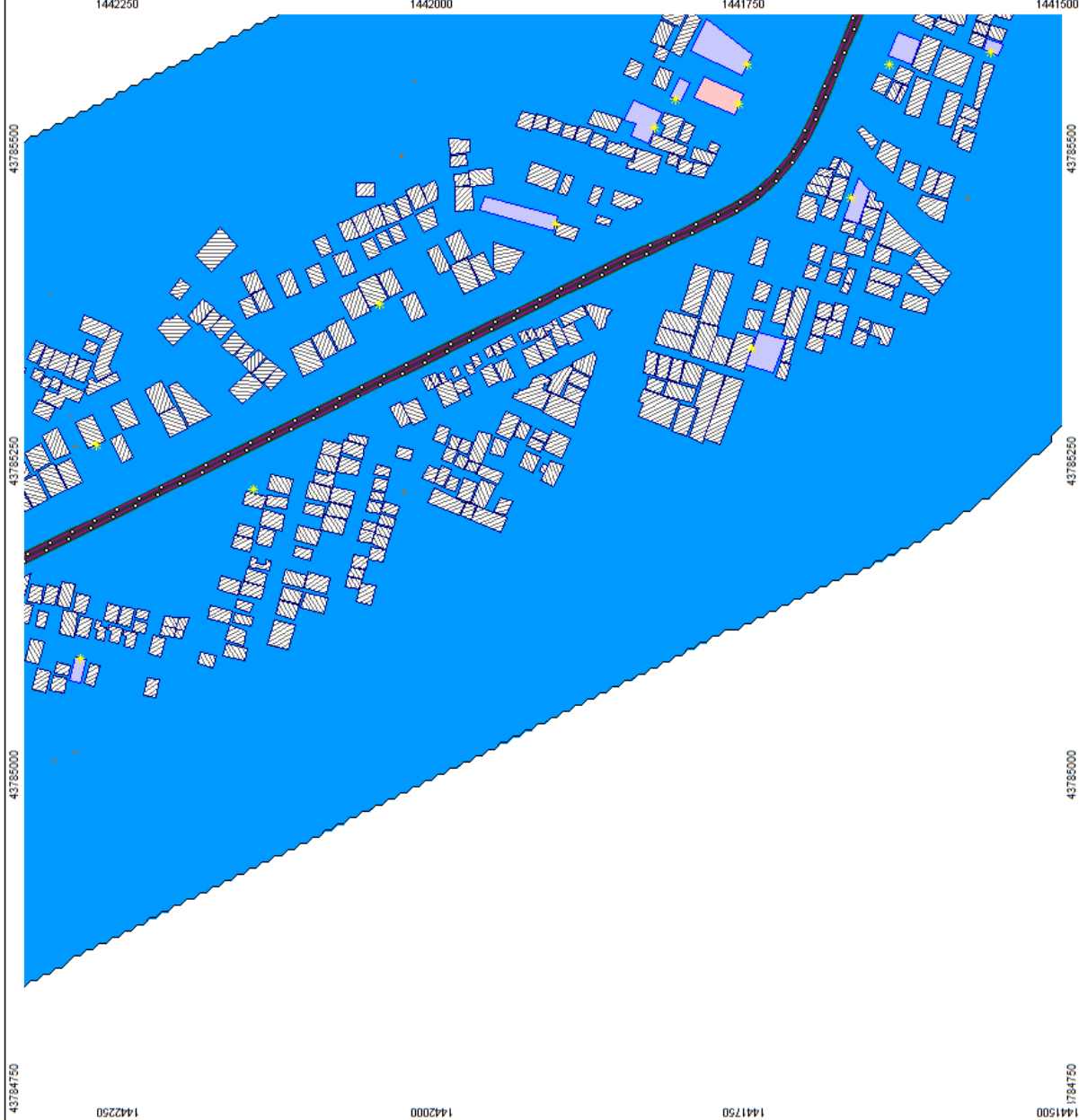
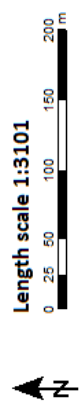
Project engineer: CMR
Contact: 91070030
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n
in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
≥ 65

Signs and symbols

Wall
Construction Equip
Main building
Point receiver
+dB(A) increase from
Point Sources
Line source
Geometry blurring
Wall
Wall
Elevation point
Bodenreflekt
Noise-reduction area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise power levels taken from DMU Soundplan 8.1 Library and
BMRLC Hoiling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq,d
in dB(A)

Blue	< 45
Light Blue	45 - 50
Yellow	50 - 55
Orange	55 - 60
Red	60 - 65
Dark Red	>= 65

Signs and symbols

- Construction type: Wall (red line), Main building (hatched area), Point receiver (yellow dot), -3dB(A) increase from Point Source (black line), Line source (purple line), Geometry change (green line), Wall (green line), Deviation point (orange dot), Rockerplate (white rectangle), Receiver elevation (white rectangle)



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Main noise power levels taken from DMU Soundplan 8.1 Library and
BIMBAC Noise-Stack application. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq_{1h}**
Calculation in 1.5 m above ground

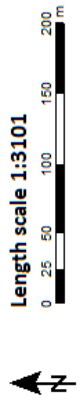
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq_{1h}
in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodenreflekt
- Noise-erhöhter Bereich



KR Puram to Kempegowda International Airport

Operational Noise.
Buildings from Street Map and Google Earth.
Train noise power levels taken from EMU Soundplan 8.1 Library and
BIMBCT Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

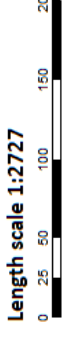
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq,d in dB(A)

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- 3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodeneffekte
- Noise calculation area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Topography from SRTM30 PLUS. Elevation in meters above sea level.
IMBCL Building Stock Specification, Train schedule and speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018



KR Puram to Kempgowda International Airport

Operational Noise:
 Buildings from Street Map and Google Earth.
 Elevation points from BMU Soundplan 8.1 Library and
 BMRG. Building Sources: Location, Train schedule and
 speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
 Noise Contour Map
 Leq,d**
 Calculation in 1.5 m above ground

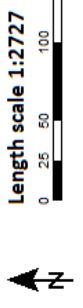
Project engineer: CMR
 Created: 9/10/2020
 Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,d
 in dB(A)

Blue	< 45
Light Blue	45 - 50
Yellow	50 - 55
Orange	55 - 60
Red	60 - 65
Dark Red	>= 65

Signs and symbols

Green line	Wall
Red dot	Construction Equip
Blue hatched box	Main building
Yellow star	Point receiver
Black line	+3dB(A) increase from
Black dot	Point Sources
Purple line	Line source
Green hatched box	Geometry bimap
Green line	Wall
Green line	Wall
Black dot	Elevation point
White box	Bodeneffekt
White box	Rechnerkriterien area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Noise contours from the SoundPLAN 8.1.1 Library and
BMBCL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

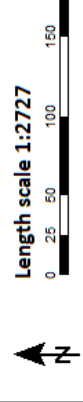
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n
in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall
Construction Equip
Main building
Point receiver
-3dB(A) increase from
Point Sources
Line source
Geometry bitmap
Wall
Wall
Elevation point
Bodeneffekte
Noise calculation area



43782500 43782550 43782600 43782650 43782700 43782750 43782800

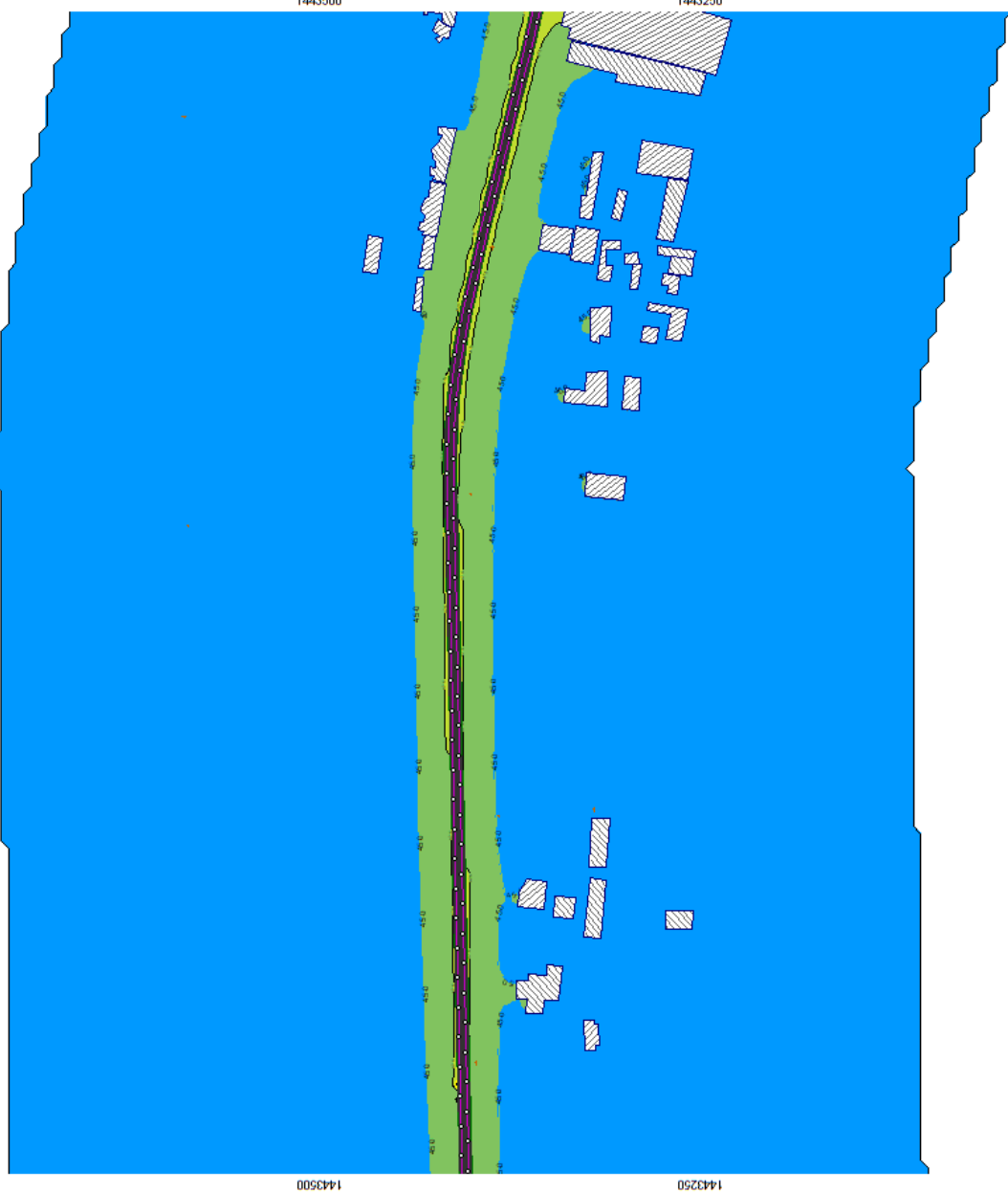
KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Road network from Open Street Map.
Railway network from Indian Railways & 1:50,000 scale maps.
BMRCL Rolling Stock Specification, Train schedule and speeds from Feasibility Study.

120 2024 2B with Parapet Wall Noise Contour Map Leq,d

Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1.1, Update 10/23/2018



Levels Leq,d in dB(A)

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodeneffekte
- Rechner-aktivierte areas

Length scale 1:2727



1443250 1443500 1443250 1443500

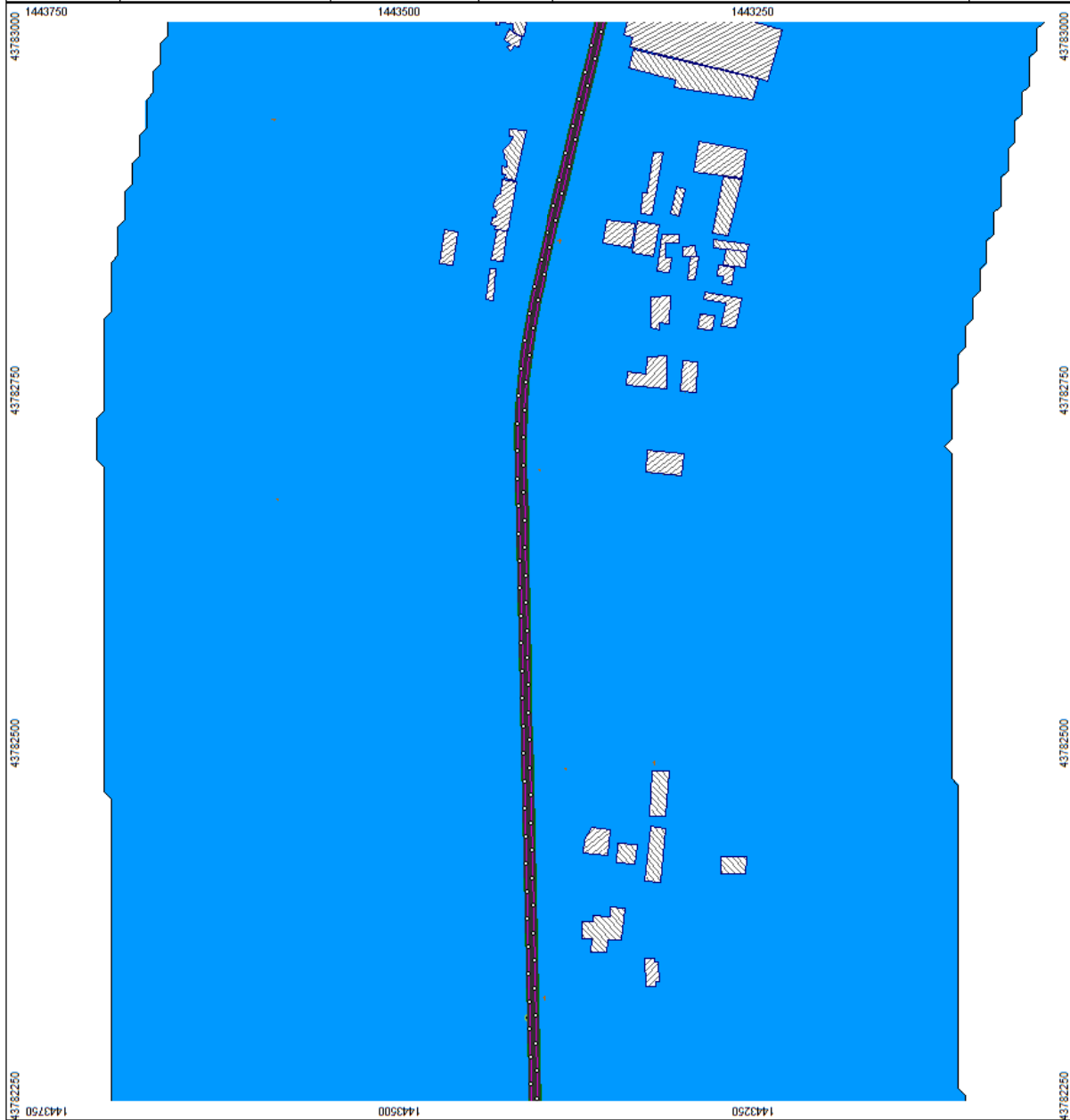
43782500 43782550 43782600 43782650 43782700 43782750 43782800

KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Line sources from ENU Soundplan 8.1 Library and
BMBCL Building Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 10/03/2024
Processed with SoundPLAN 8.1, Update: 10/23/2018



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise power levels taken from DMU SoundPLAN 8.1 Library and
BMRCL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**

Calculation in 1.5 m above ground

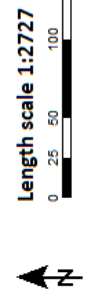
Project engineer: CMR
Creator: 9/10/2020
Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq,d
in dB(A)

Blue	< 45
Light Blue	45 - 50
Yellow	50 - 55
Orange	55 - 60
Red	60 - 65
Dark Red	>= 65

Signs and symbols

- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodenreflekt
- Noise calculation area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise power levels taken from EMU Soundplan 8.1. Library and BMRC Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with: SoundPLAN 8.1, Update: 10/23/2018

Levels Leq,n in dB(A)

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Construction Equip
- Main building
- Point receiver
- +dB(A) increase from
- Point Sources
- Line source
- Geometry Bitmap
- Wall
- Elevation point
- Boderfläche
- Nuclear calculations area



KR Puram to Kempgowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Main noise power levels taken from BMU SoundPLAN 8.1. Library and BMRC Rolling Stock Specifications. Train schedule and speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map**

Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1. Update: 10/23/2018

Levels Leq,d in dB(A)

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Wall
- Elevation point
- Bodemeffekte
- Rechnerkriterien

Length scale 1:2727



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Noise contours were generated from B10J Soundplan 8.1 Library and
BANCLE using SoundPLAN 8.1.1. The calculation was performed with
speeds from feasibility study.

**120 2024 2B with Parapet Wall
Noise Contour Map**

Leq_n
Calculation in 1.5 m above ground

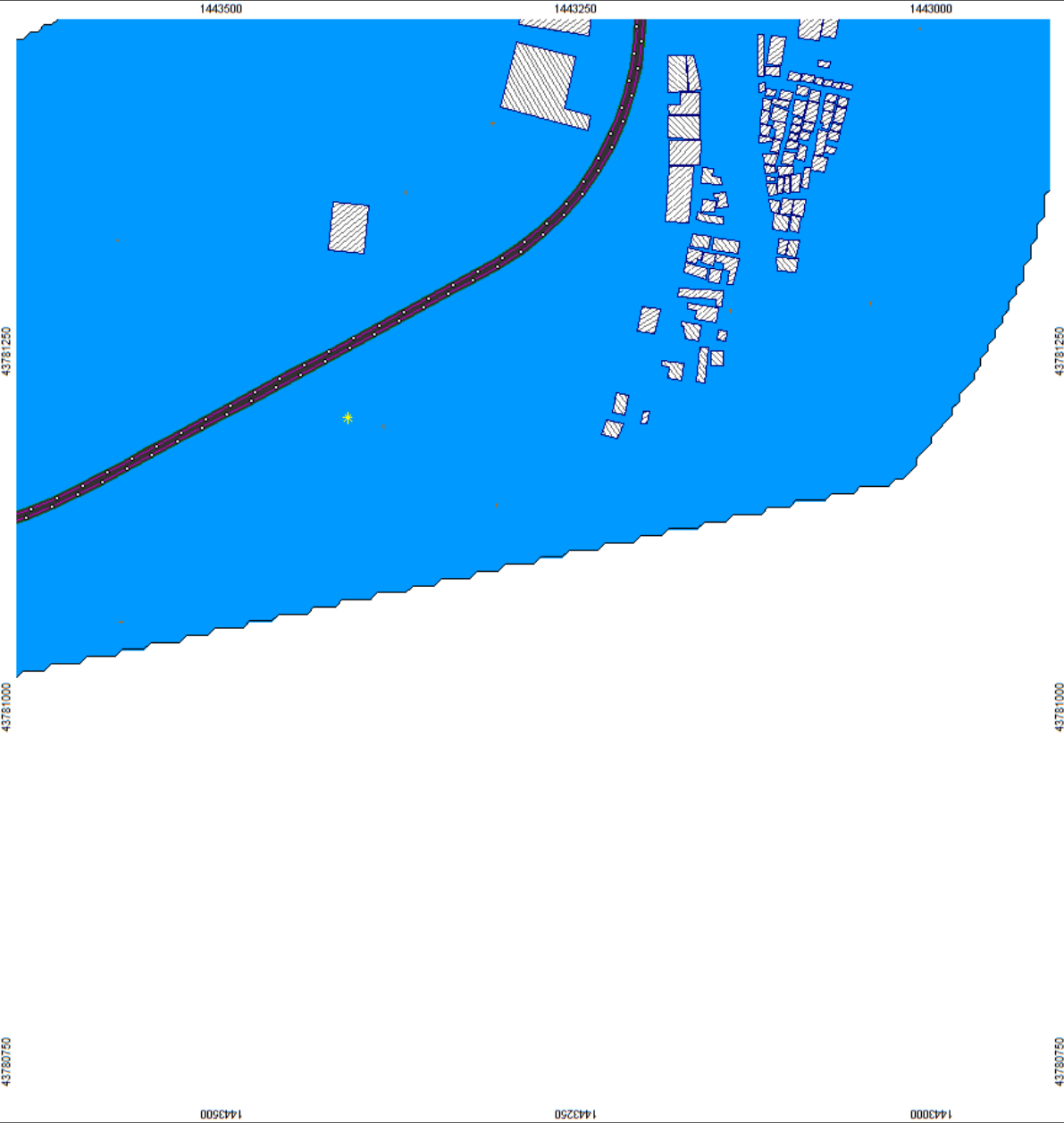
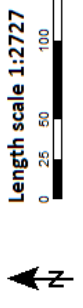
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq_n in dB(A)

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodemeffekte
- Notkerzählbereich area



KR Puram to Kempegowda International Airport

Operational Noise
Buildings from Street Map and Google Earth
Noise contour levels taken from DMU Soundplan 8.1 Library and
BANC, Building Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**

Calculation in 1.5 m above ground

Project engineer: CMB
Created: 9/7/2025
Processed with SoundPLAN 8.1, Update: 10/3/2025

Levels Leq,d
In dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Plant room
- 3dB(A) increase from
- Plant rooms
- Line source
- Geometry Storage
- Wall
- Wall
- Elevation point
- Building/obj
- Reference elevation point



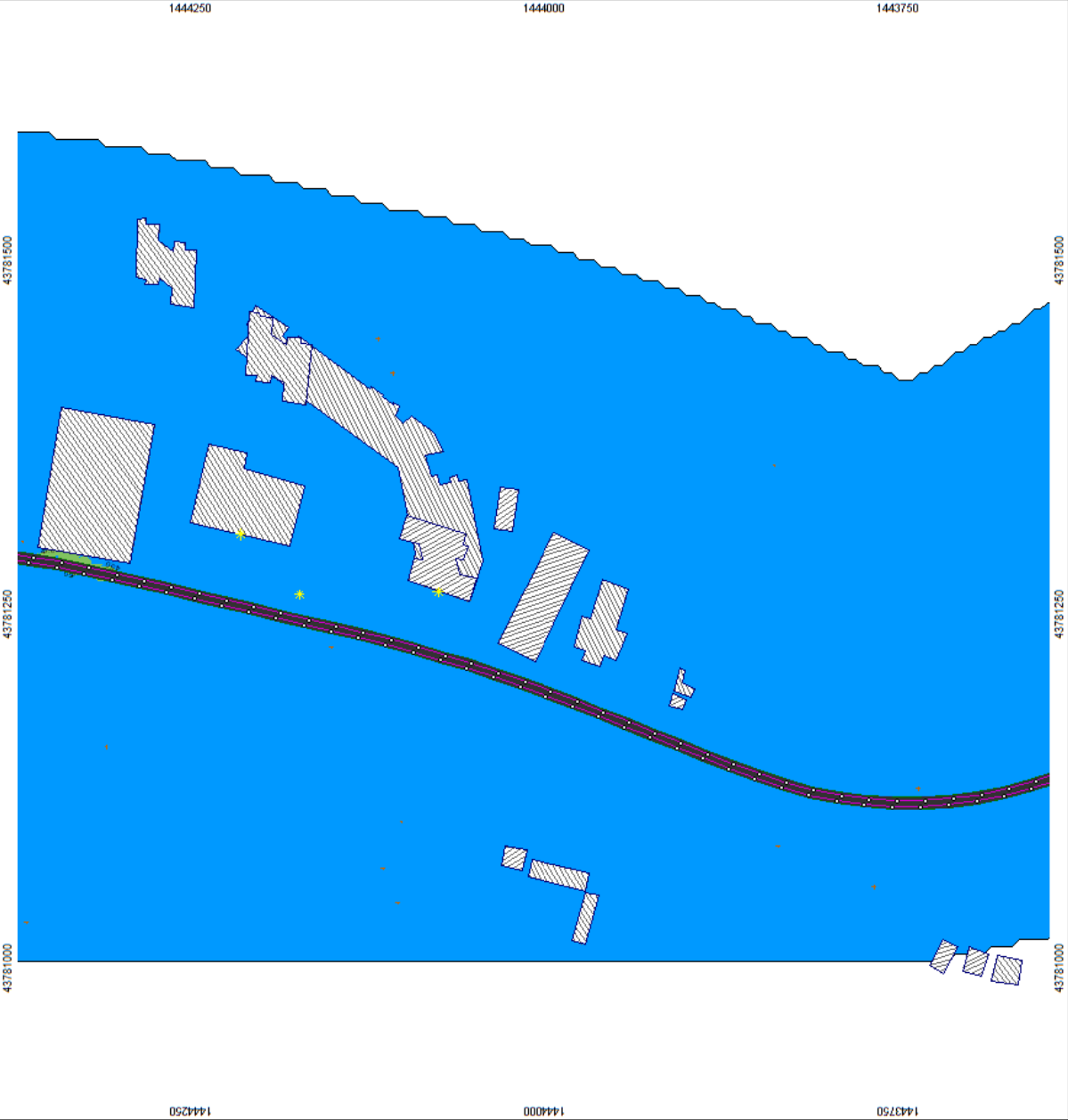
KR Puram to Kempegowda International Airport

Operational Noise.
Buildings from Street Map and Google Earth.
Train noise power levels taken from DMU Soundplan 8.1 Library and BIMRCL Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update: 10/23/2018

- Levels Leq,n**
in dB(A)
- < 45
 - 45 - 50
 - 50 - 55
 - 55 - 60
 - 60 - 65
 - ≥ 65
- Signs and symbols**
- Wall
 - Construction Equip
 - Main building
 - Point receiver
 - +3dB(A) increase from
 - Point Sources
 - Line source
 - Geometry bitmap
 - Wall
 - Wall
 - Elevation point
 - Bodeneffekte
 - Noise-erlaubniss areas



KR Puram to Kempegowda International Airport

Operational Noise:
 High from aeroblast Map and Google Earth.
 Train noise levels taken from BMU Soundplan 8.1 Library and
 BMRC Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
 Noise Contour Map**

Calculation in 1.5 m above ground

Project engineer: CMR
 Created: 9/10/2020
 Processed with SoundPLAN 8.1, Update 10/23/2018

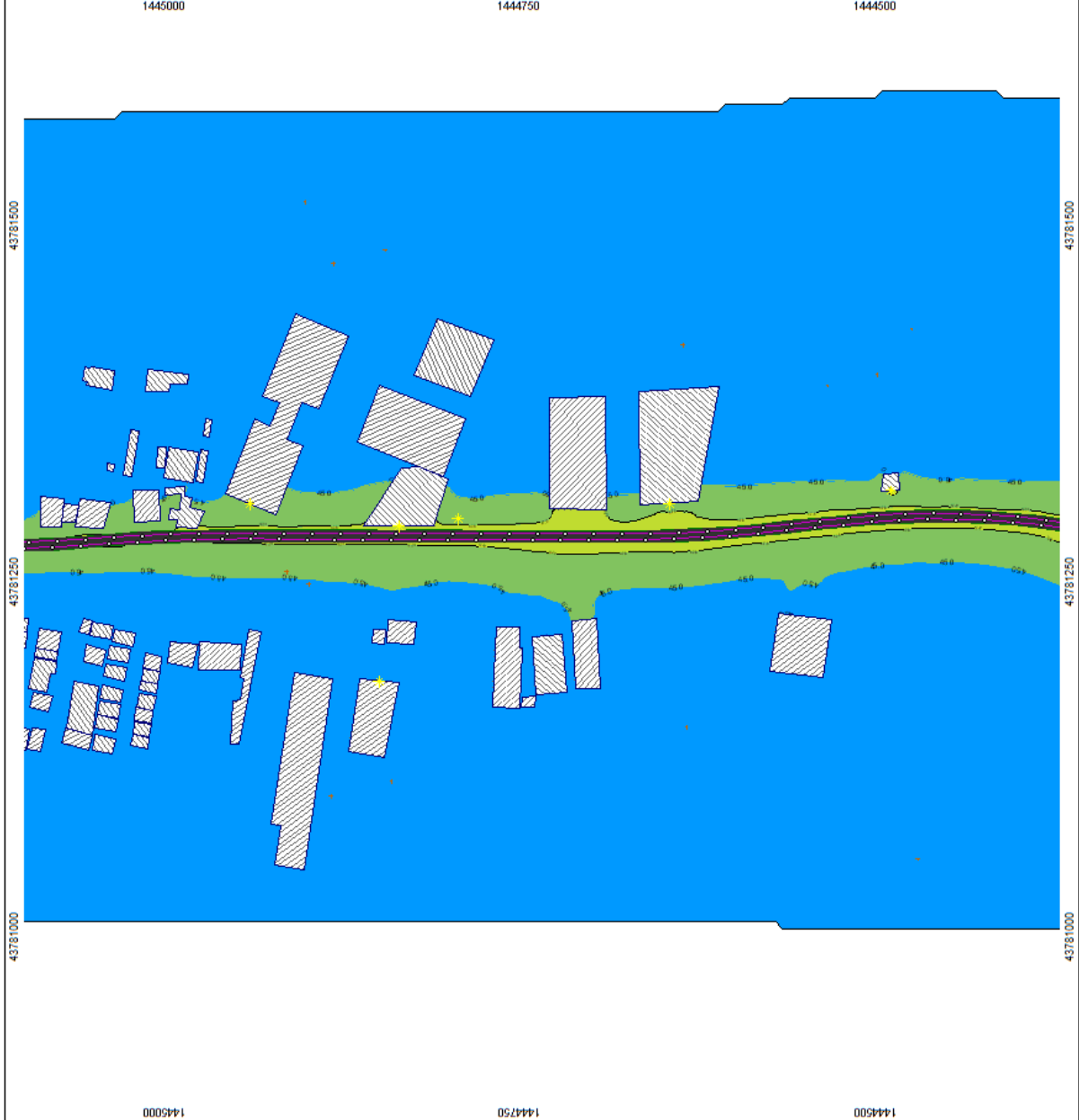
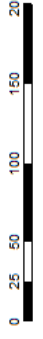
**Levels Leq,d
 in dB(A)**



Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- 3dB(A) increase from
- Point Sources
- Line source
- Geometry blimping
- Wall
- Wall
- Elevation point
- Bodenreflekt
- Noise calculation area

Length scale 1:2727



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Levels above receiver level from BIM10 Soundplan 8.1 Library and BIM10 Leq, Significance, Location, Train schedule and speeds from feasibility study.

120 2024 2B with Parapet Wall Noise Contour Map

Leq,n
Calculation in 1.5 m above ground

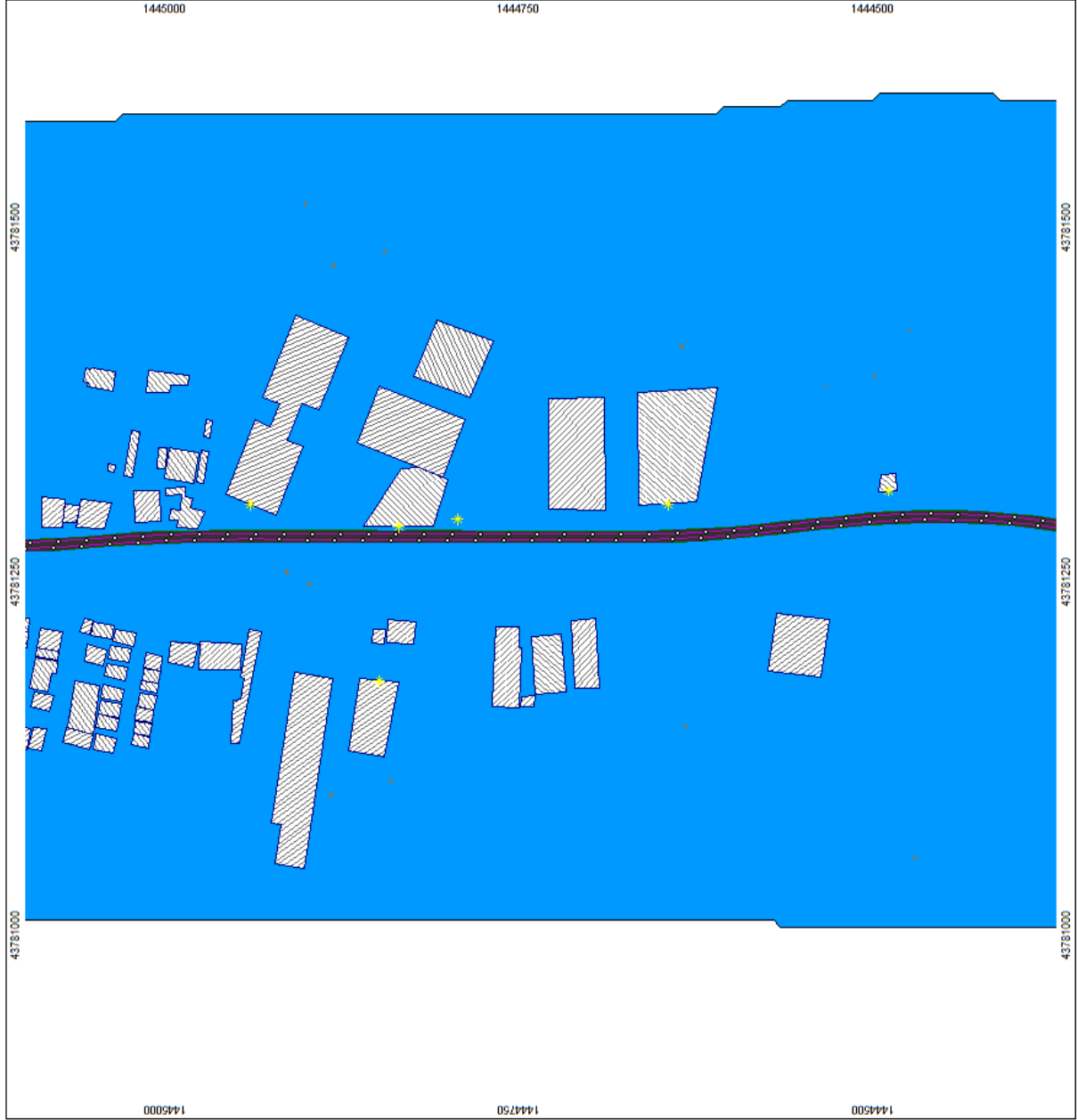
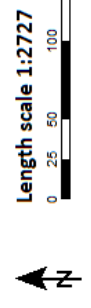
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n in dB(A)

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodemeffekte
- Rechneraktuelle noise area



43781000 43781250 43781500 14445000 14447500 14445000

KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Main receiver levels taken from BMU SoundPLAN 8.1. Library and BMU modelling SoundPLAN 8.1. Emission: Train schedule and speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1. Update: 10/23/2018

Levels Leq,d in dB(A)

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- 3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodeneffekte
- Interpretation area



KR Puram to Kempgowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Point sources from the BMU Soundplan 8.1 Library and
BMBCI Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

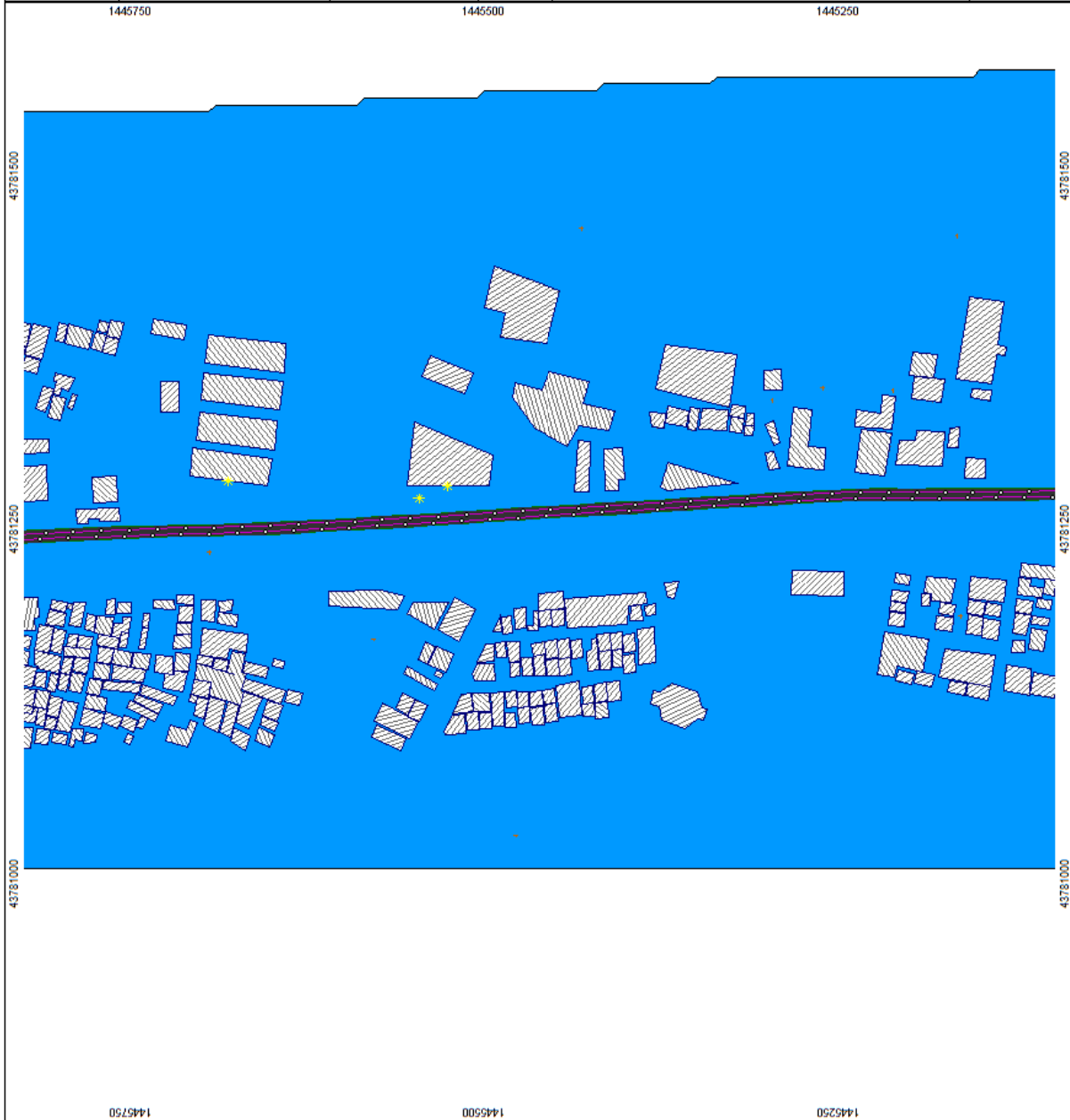
Project engineer: CMR
Created: 19.10.2020
Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq,n in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- 3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bottomeflake
- Noise calculation area

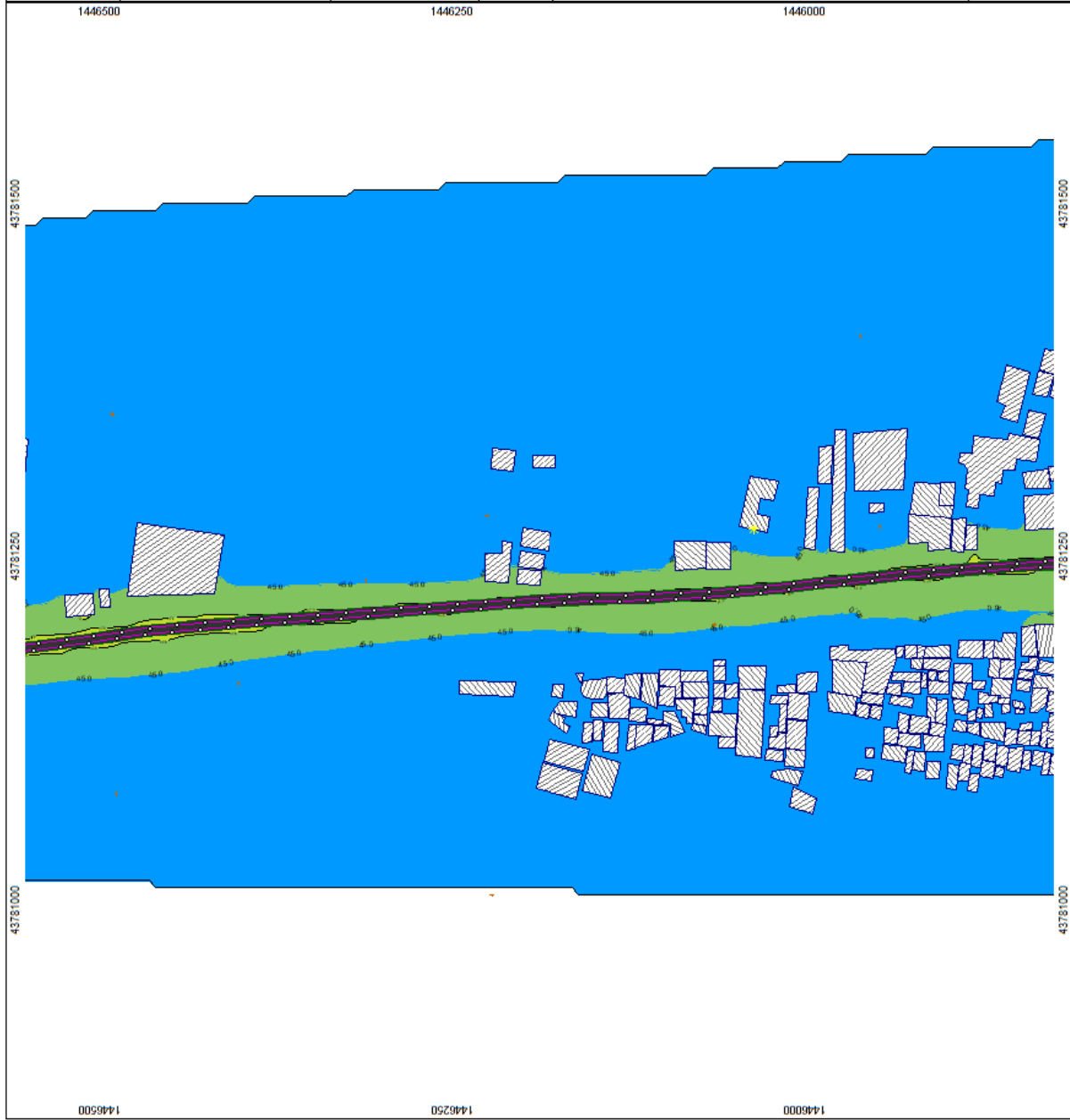


KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Contours from ENR Soundplan 8.1 Library and
BMBCL Real-time Sound Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018



**Levels Leq,d
in dB(A)**



Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- 3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodeneffekte
- Receiver calculation area



Length scale 1:2727



KR Puram to Kempegowda International Airport

Operational Noise:
 Buildings from Street Map and Google Earth.
 Proposed road network from BMU Co-ordination S.1 Library and
 BMRCI Balli Stock Specifications. Train schedule and
 speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
 Noise Contour Map
 Leq,n**
 Calculation in 1.5 m above ground

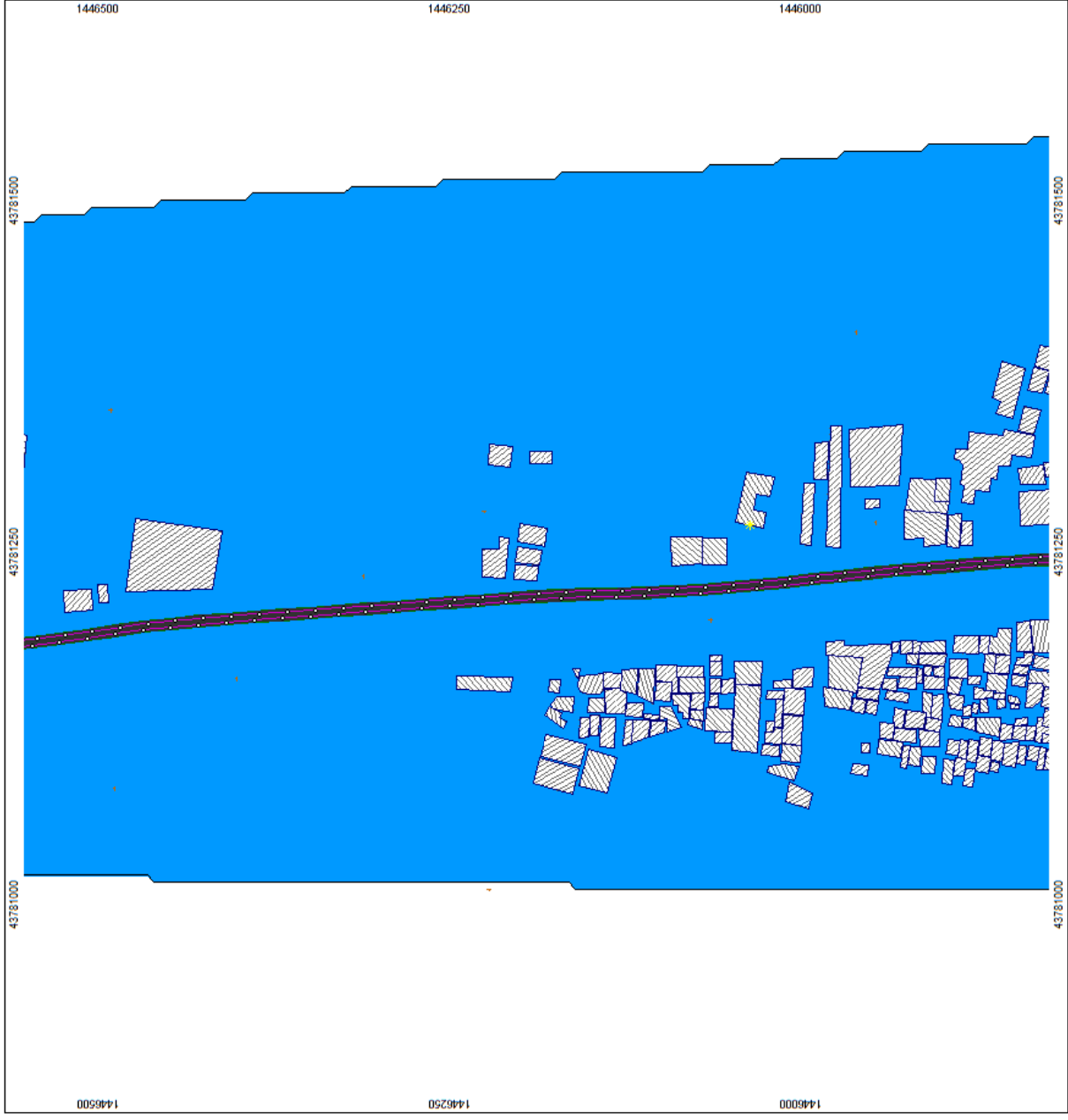
Project engineer: CMR
 Created: 9/10/2020
 Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n
 in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodeneffekte
- Mischstrahlungs area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Noise contours from the EMU Sound model.
BMRCL Rolling Stock Specification, Train schedule and speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

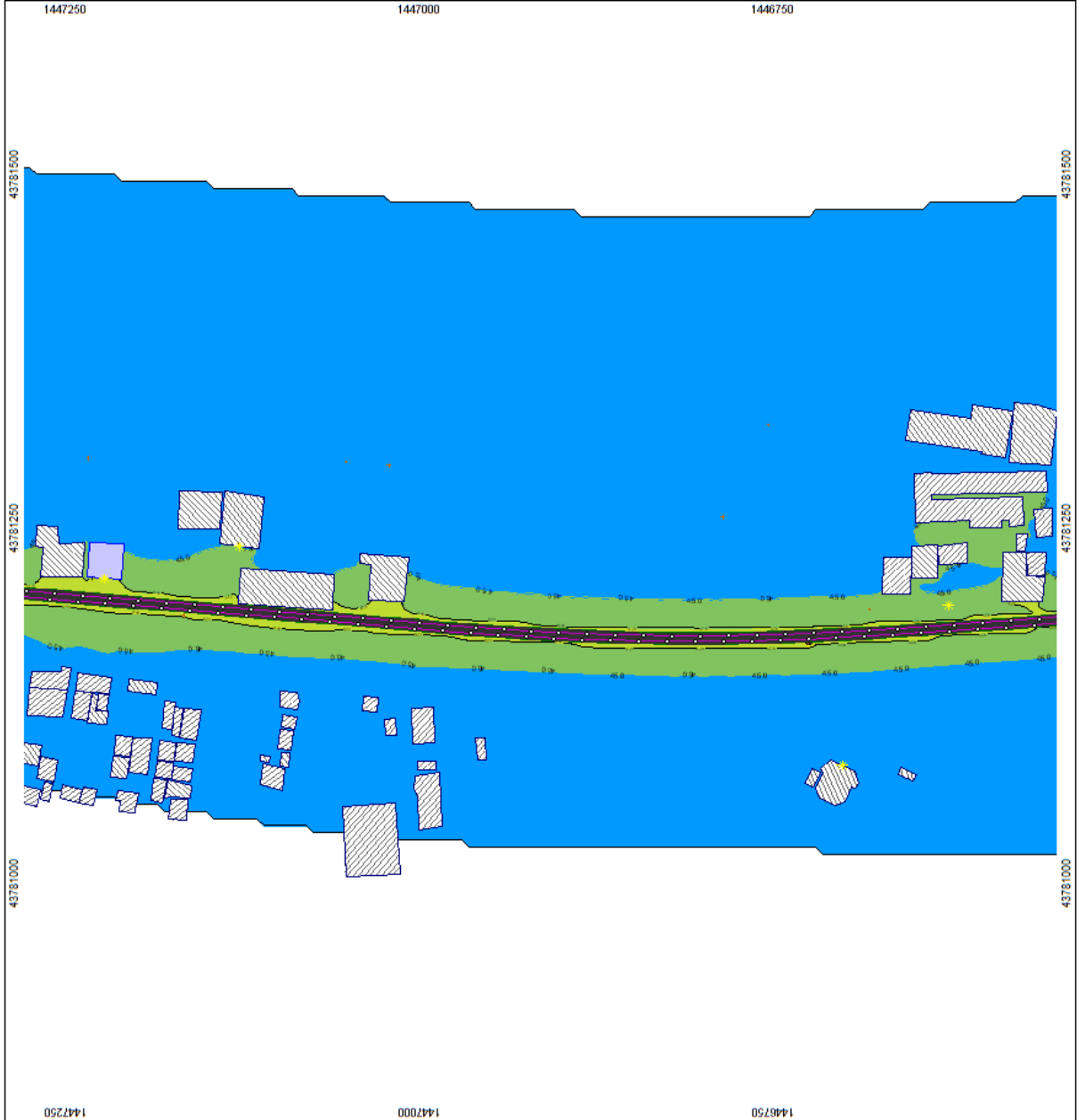
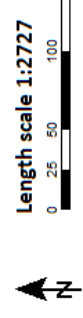
Project engineer: CMR
Created: 31/03/2024
Processed with SoundPLAN 8.1.1, Update 10/23/2018

Levels Leq,d in dB(A)

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Wall
- Elevation point
- Bodemeffekte
- Rechner-aktivierte areas



KR Puram to Kempegowda International Airport

Operational Noise
 Buildings from Street Map and Google Earth.
 Train noise levels taken from EMI Surmidhan 8.1 Library and
 BMRC Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
 Noise Contour Map
 Leq,n**

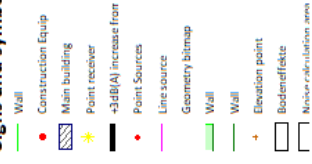
Calculation in 1.5 m above ground

Project engineer: CMR
 Created: 9/10/2024
 Processed with SoundPLAN 8.1, Update 10/03/2018

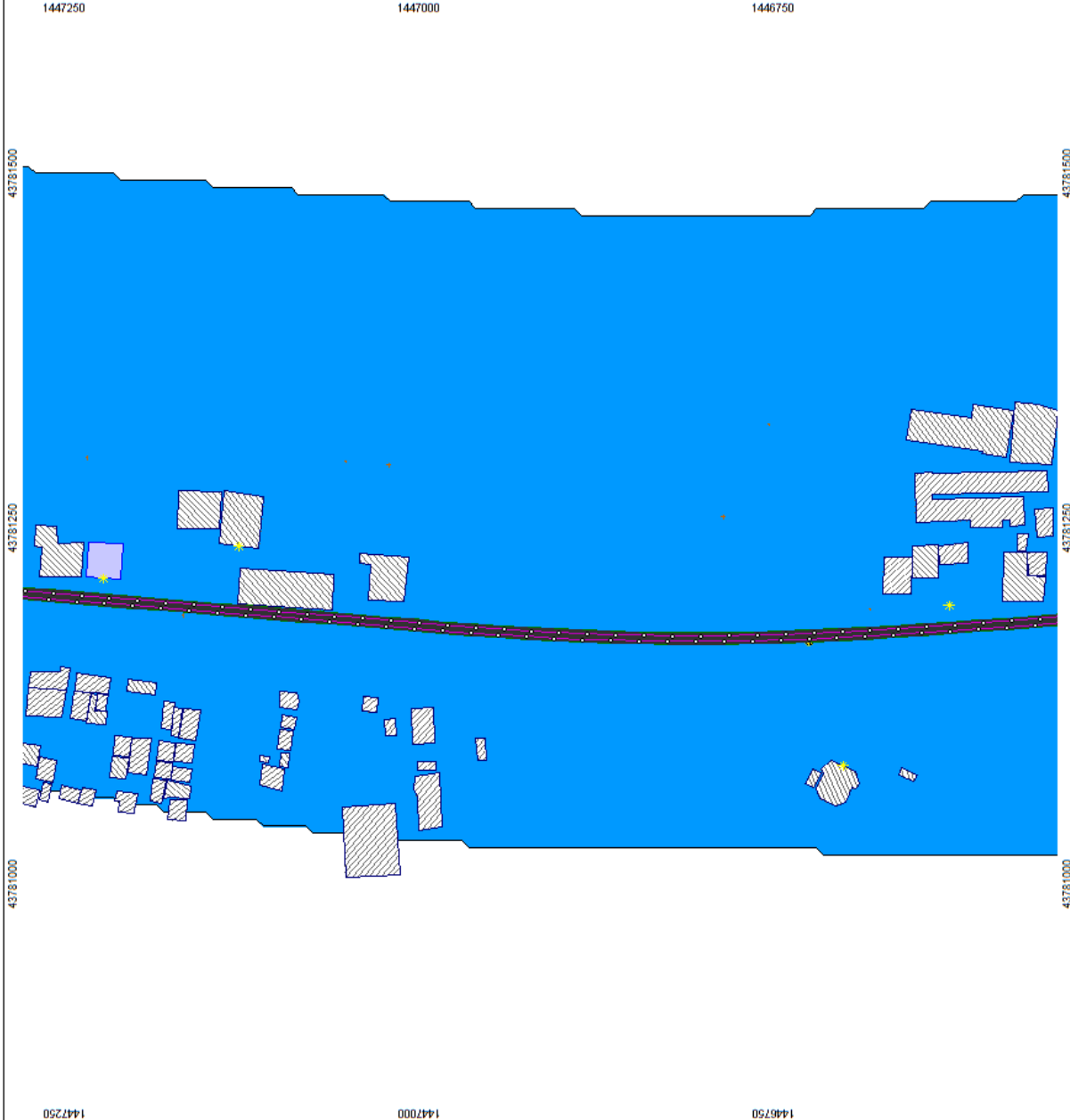
Levels Leq,n
 in dB(A)



Signs and symbols



Length scale 1:2727



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Noise contours from the BAAU SoundPLAN 8.1.1 Library and
BMBCL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

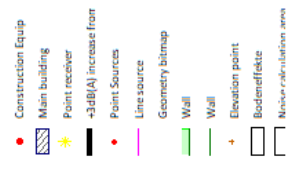
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1. Update: 10/23/2018



**Levels Leq,d
in dB(A)**



Signs and symbols



Length scale 1:2727

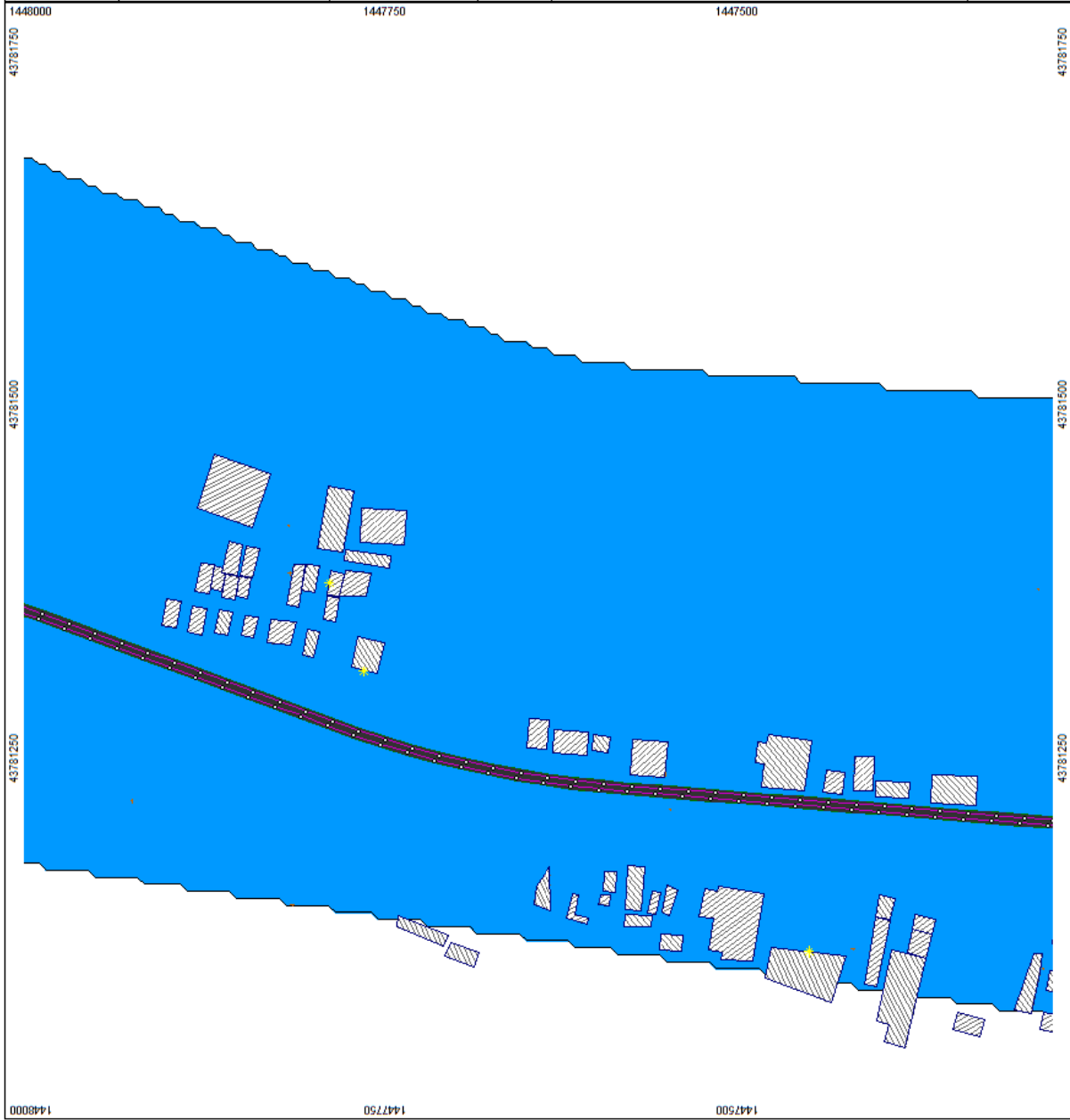


KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Train tracks, buildings from EMU Soundplan 8.1, Library and
BMBCI Rolling Stock Specification, Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update: 10/23/2018



1448000 1447750 1447500 1447250 43781750 43781500 43781250 43781000

KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise power levels taken from DMU SoundPLAN 8.1 Library and
BMRCC Rolling Stock Specifications. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

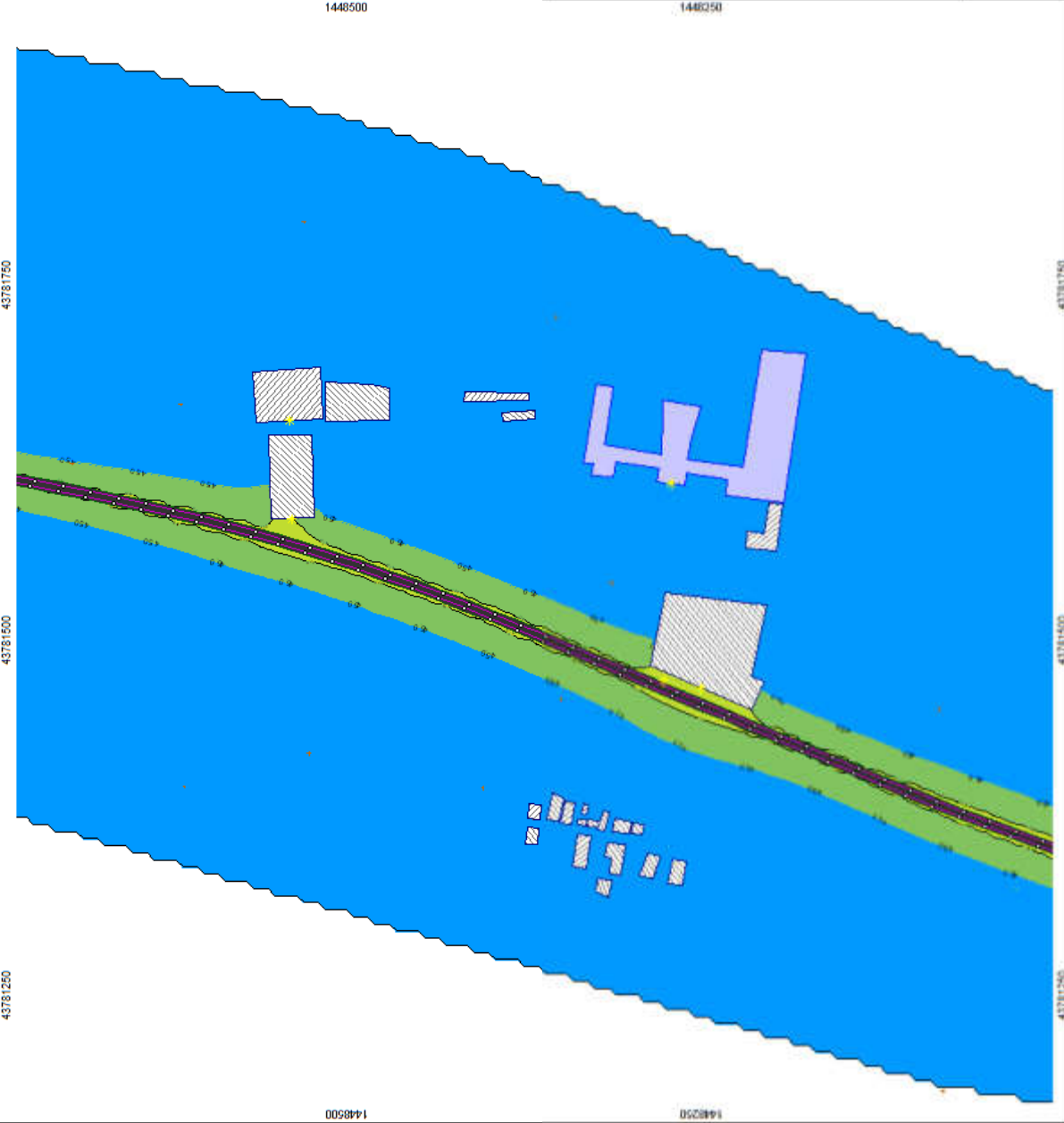
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,d (in dBA)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
65 - 65

Signs and symbols

Construction Equity
Main building
Point receiver
-3dB(A) Attenuated Edge
Point Sources
Line source
Geometry kitmap
Wall
Wall
Direction point
Border offset
Noise sensitive areas



KR Puram to Kempgowda International Airport

Operational Noise.
Buildings from Street Map and Google Earth.
Train noise power levels taken from EMU Soundplan 8.1 Library and BIRAC. Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map**
Leq,n
Calculation in 1.5 m above ground

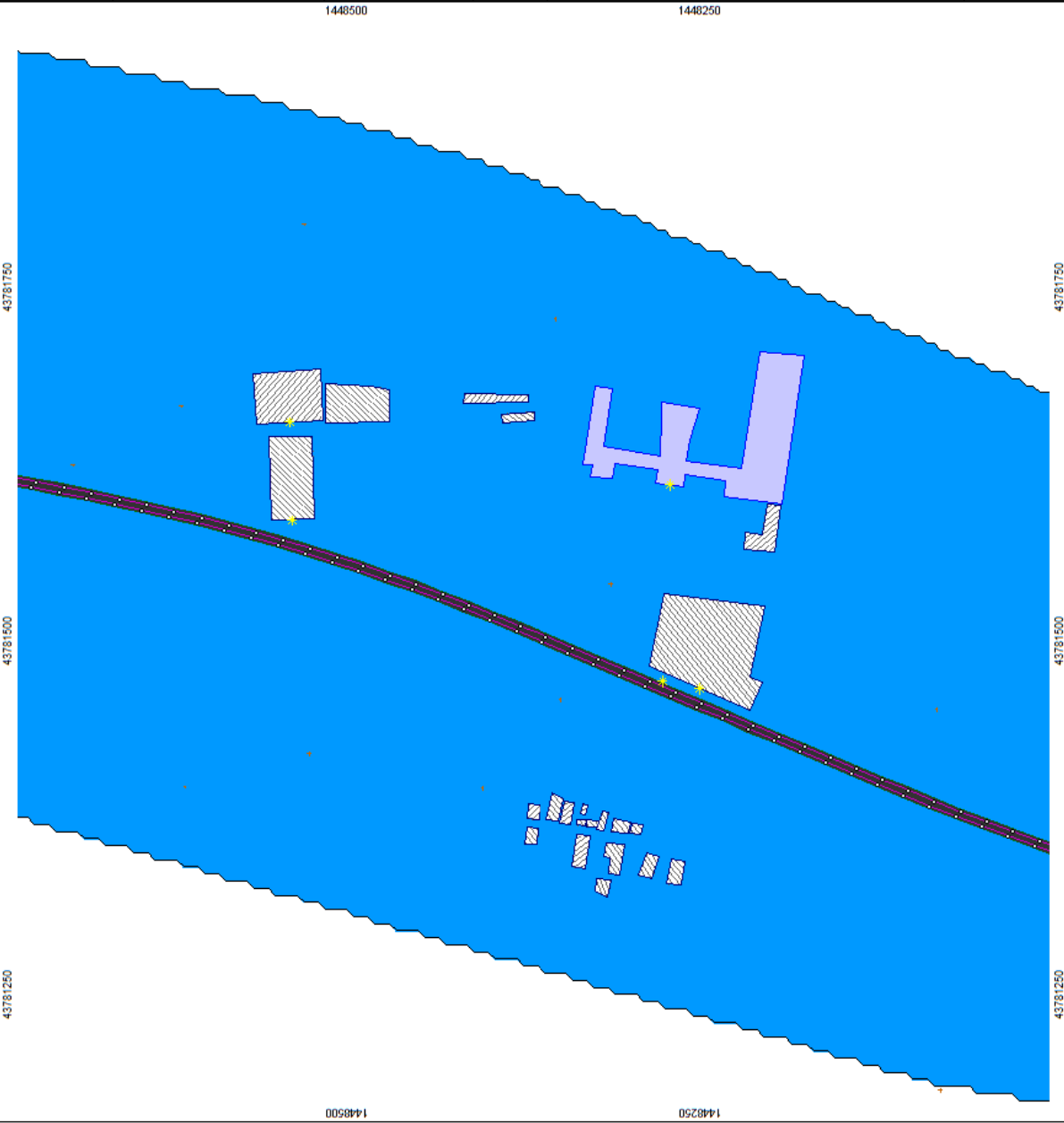
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1. Update: 10/23/2018

Levels Leq,n in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall
Construction Equip
Main building
Point receiver
+3dB(A) increase from
Point Sources
Line source
Geometry bitmap
Wall
Wall
Elevation point
Bodeneffekte
Noise calculation area



KR Puram to Kempgowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Noise contours from the model. The model is based on the
BANCIL Rolling Stock Specification, Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

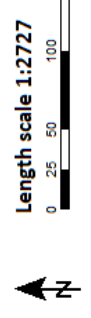
Project engineer: CMR
Created: 31/03/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,d in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodemeffekte
- Noise calculation area



KR Puram to Kempgowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Noise contours from BMU Soundplan 8.1 Library and
BMBCI Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

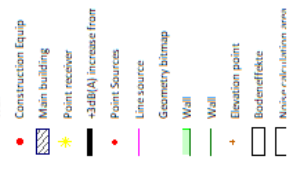
**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n
Calculation in 1.5 m above ground**

Project engineer: CMR
Created: 31/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

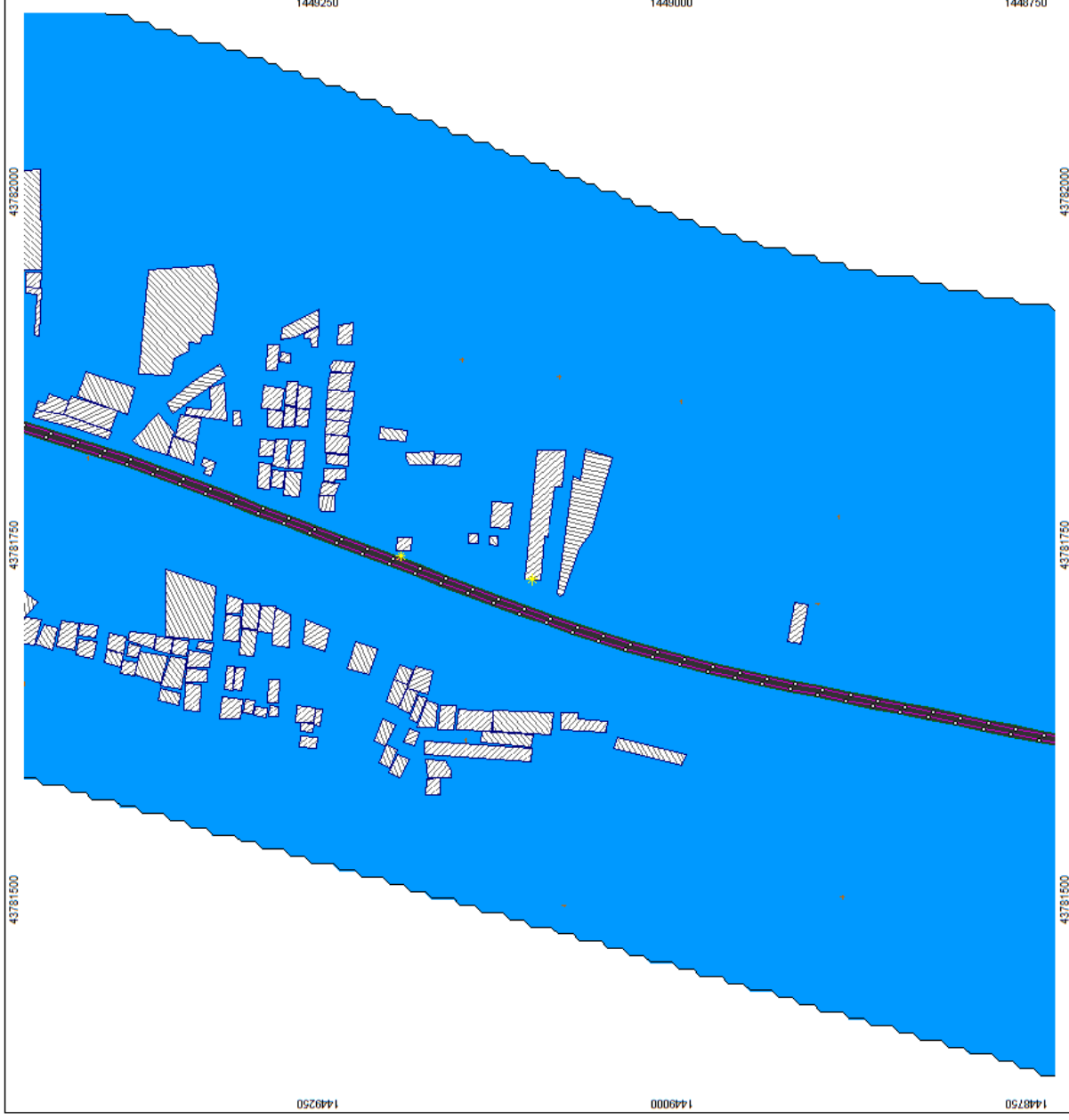
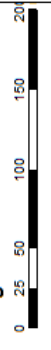
**Levels Leq,n
in dB(A)**



Signs and symbols



Length scale 1:2727



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Topography from SRTM 30m DEM, SoundPLAN 8.1 Library and
IMBCL Building Sound Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

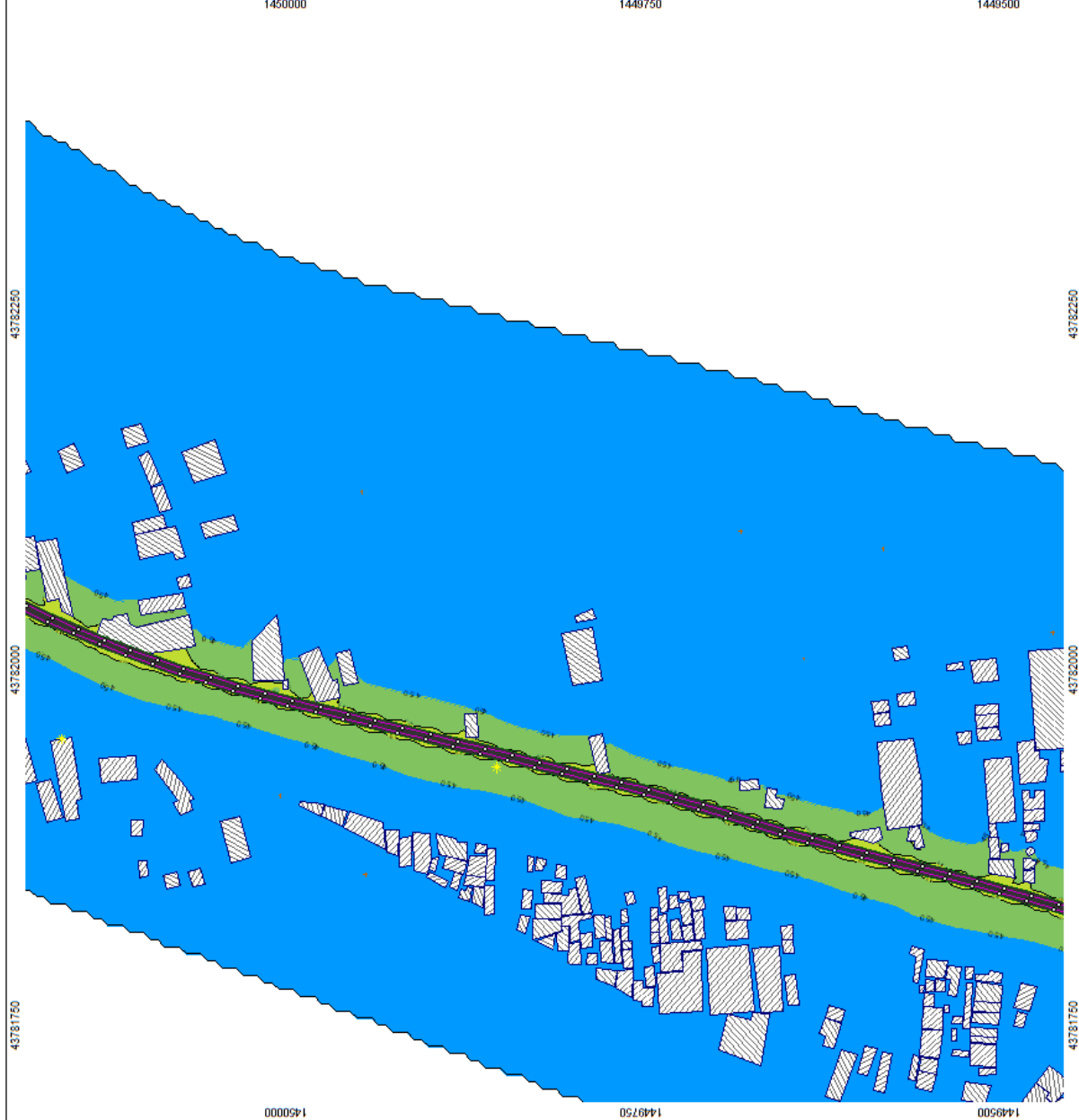
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq,d in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall	Construction Equip
Main building	Point receiver
+3dB(A) increase from Point Sources	Line source
Geometry blimpap	Wall
Elevation point	Bodendefekte
Noise calculation area	

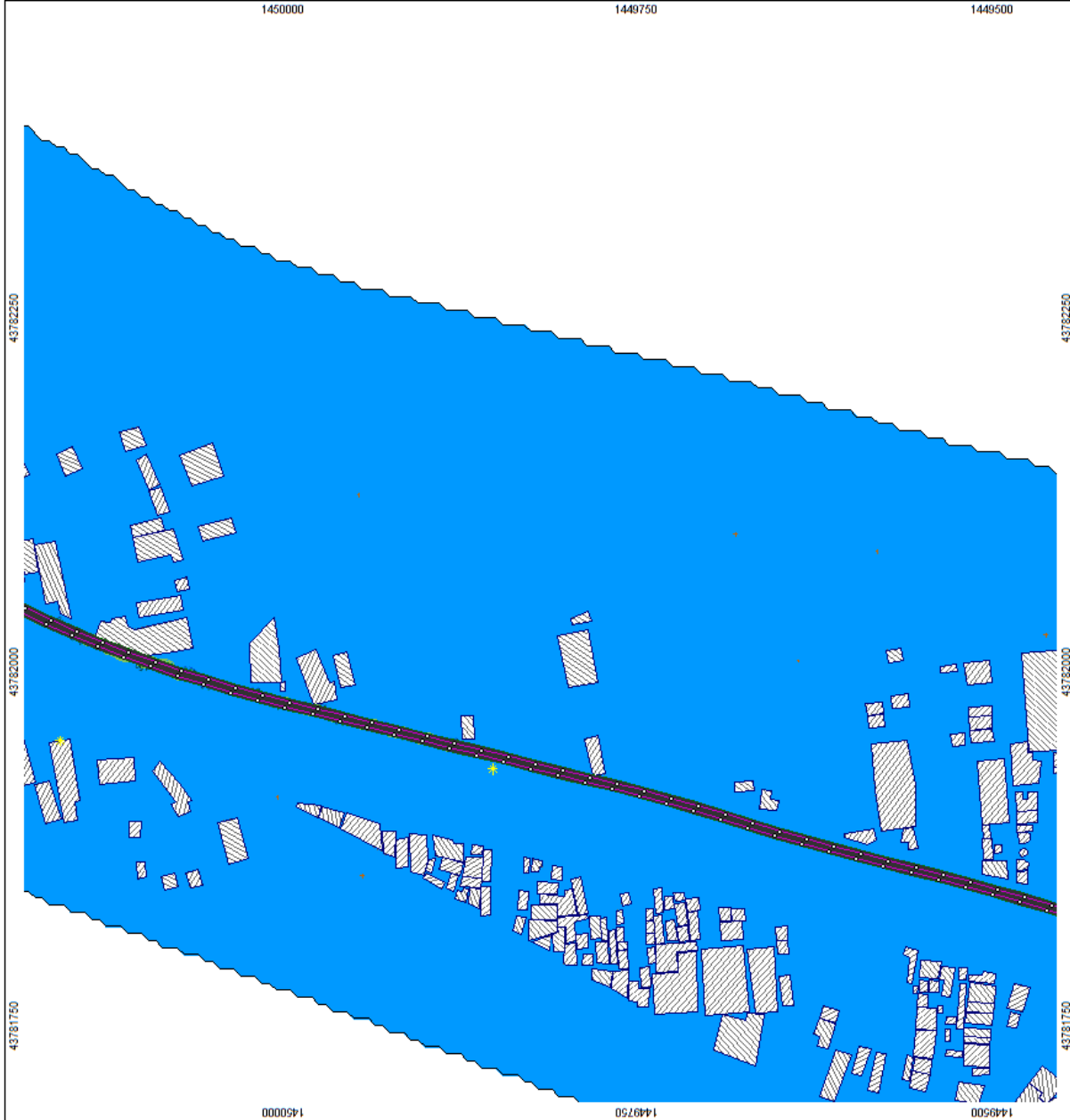


KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Ground level from SRTM30 PLUS and
BMRCL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

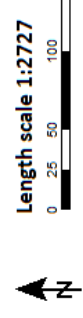
**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Proceeded with SoundPLAN 8.1.1, Update 10/23/2018



- Levels Leq,n**
in dB(A)
- < 45
 - 45 - 50
 - 50 - 55
 - 55 - 60
 - 60 - 65
 - >= 65

- Signs and symbols**
- Wall
 - Construction Equip
 - Main building
 - Point receiver
 - +3dB(A) increase from
 - Point Sources
 - Line source
 - Geometry bitmap
 - Wall
 - Wall
 - Elevation point
 - Bodeneffekte
 - Rechnererhaltene areas



KR Puram to Kempegowda International Airport

Operational Noise:
 Train map from Street Map and Google Earth.
 Train map from Street Map and Google Earth.
 BMRC Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

120 2024 2B with Parapet Wall Noise Contour Map
 Leq,d
 Calculation in 1.5 m above ground

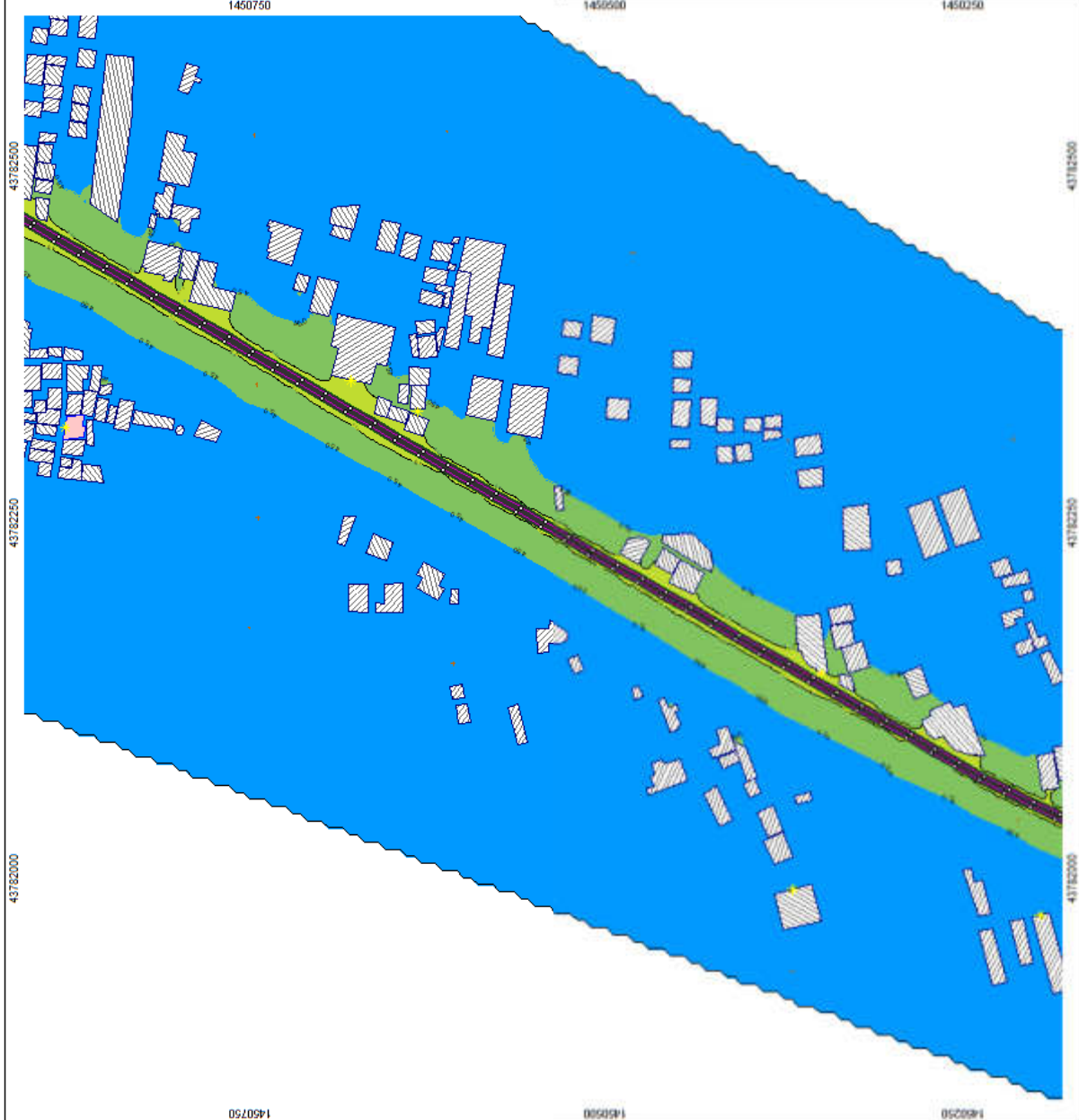
Project engineer: CMR
 Contact: 9/10/2020
 Processed with SoundPLAN 8.1, Update:10/23/2018

Levels Leq,d
 In dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

- Walt
- Construction Equip
- Map building
- Point number
- 10dB(A) increase fove
- Point Source
- Line source
- Geometry blocking
- Walt
- Walt
- Elevation point
- Hydrofactor
- Noise propagation barrier



KR Puram to Kempegowda International Airport

Operational Noise.
Buildings from Street Map and Google Earth.
Topography from SRTM 30m DEM and SoundPLAN 8.1 Library and
BMRCL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

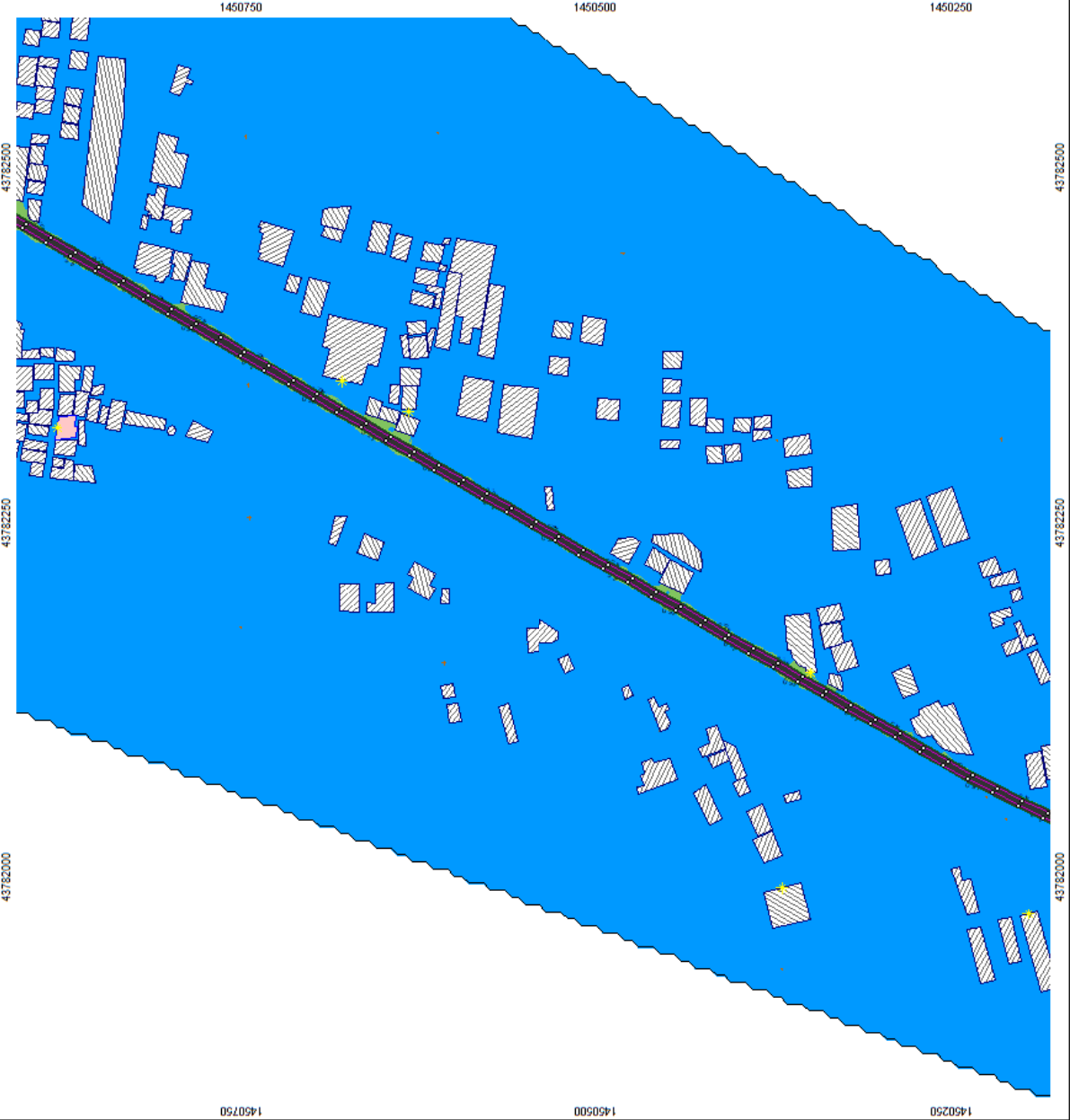
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n
in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall	Construction Equip
Main building	Main building
Point receiver	Point receiver
-3dB(A) increase floor	-3dB(A) increase floor
Point Sources	Point Sources
Line source	Line source
Geometry blimap	Geometry blimap
Wall	Wall
Wall	Wall
Elevation point	Elevation point
Bodemreflekte	Bodemreflekte
Noise calculation area	Noise calculation area



KR Puram to Kempegowda International Airport

Operational Noise.
Buildings from Street Map and Google Earth.
Train noise power levels taken from EMU Soundplan 8.1 Library and BMRCL Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**

Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,d
(in dB(A))

4 - 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall
Construction Edge
Main building
Point source
-3 dB(A) increase type
Point Source
Line Source
Secondary barrier
Wall
Wall
Division point
Background
Micro-terrain

Length scale 1:2727



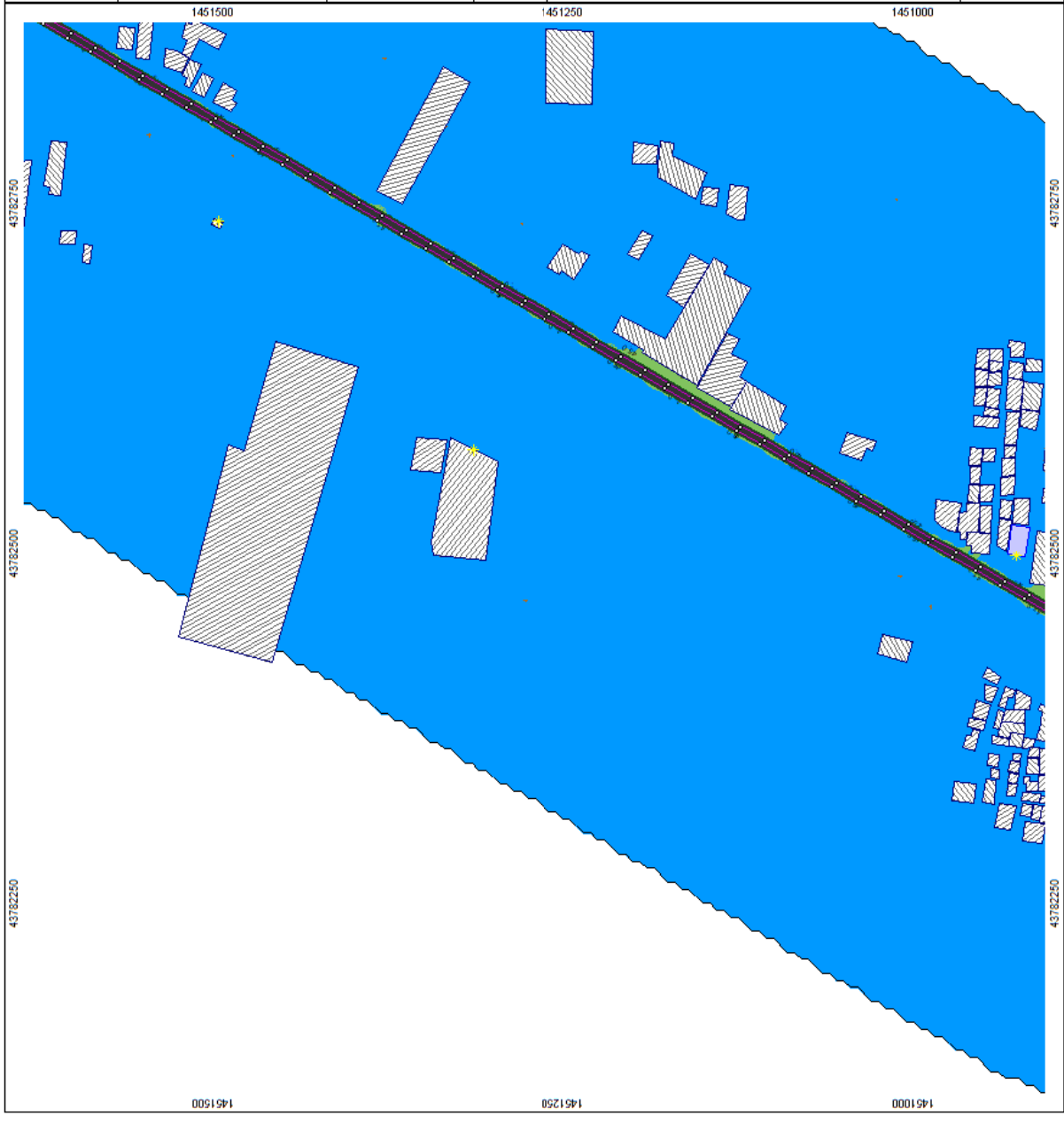
KR Puram to Kempegowda International Airport

Operational Noise:
 Night curfew Map and Graphs/Earth
 Train noise levels taken from EMU Soundplan 8.1 Library and
 BMBCI Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
 Noise Contour Map
 Leq,n**
 Calculation in 1.5 m above ground

Project engineer: CMR
 Created: 9/10/2020
 Processed with: SoundPLAN 8.1, Update: 10/23/2018

- Levels Leq,n in dB(A)**
- < 45
 - 45 - 50
 - 50 - 55
 - 55 - 60
 - 60 - 65
 - ≥ 65
- Signs and symbols**
- Wall
 - Construction Equip
 - Main building
 - Point receiver
 - 3dB(A) increase from
 - Point Sources
 - Line source
 - Geometry bitmap
 - Wall
 - Wall
 - Elevation point
 - Bodenreflekt
 - Noise calculation area



KR Puram to Kempegowda International Airport

Operational Noise Building from Street Map and Google Earth. Train noise power levels taken from EMU Soundplan 8.1 Library and BMIRCL Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

120 2024 2B with Parapet Wall Noise Contour Map

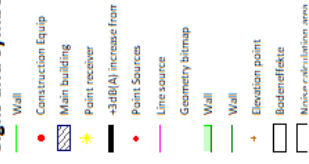
Leq,d
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

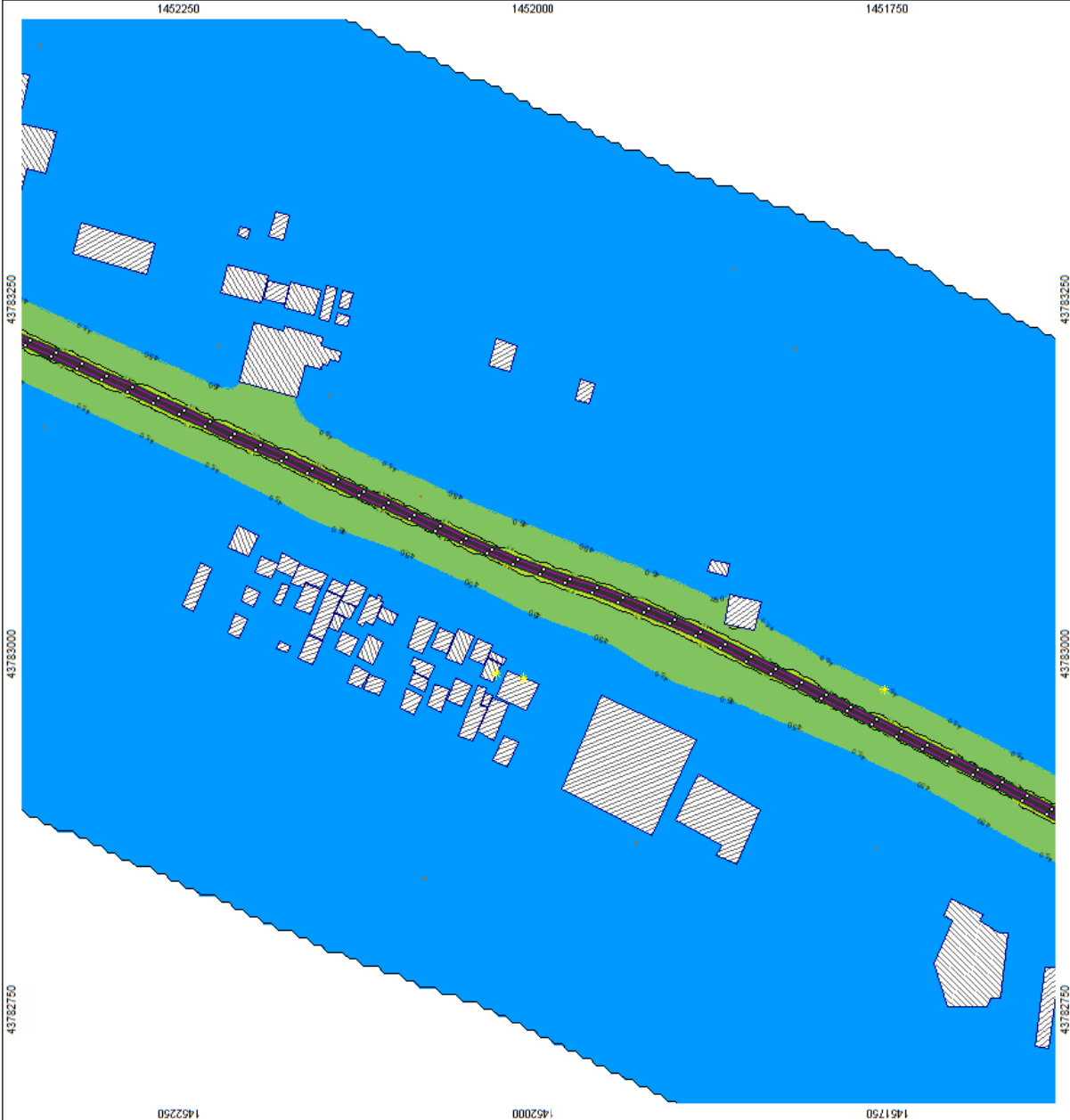
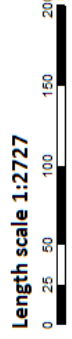
Levels Leq,d
in dB(A)



Signs and symbols



Length scale 1:2727



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise power levels taken from EMU Soundplan 8.1 Library and BIMBL Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map**
Leq,n
Calculation in 1.5 m above ground

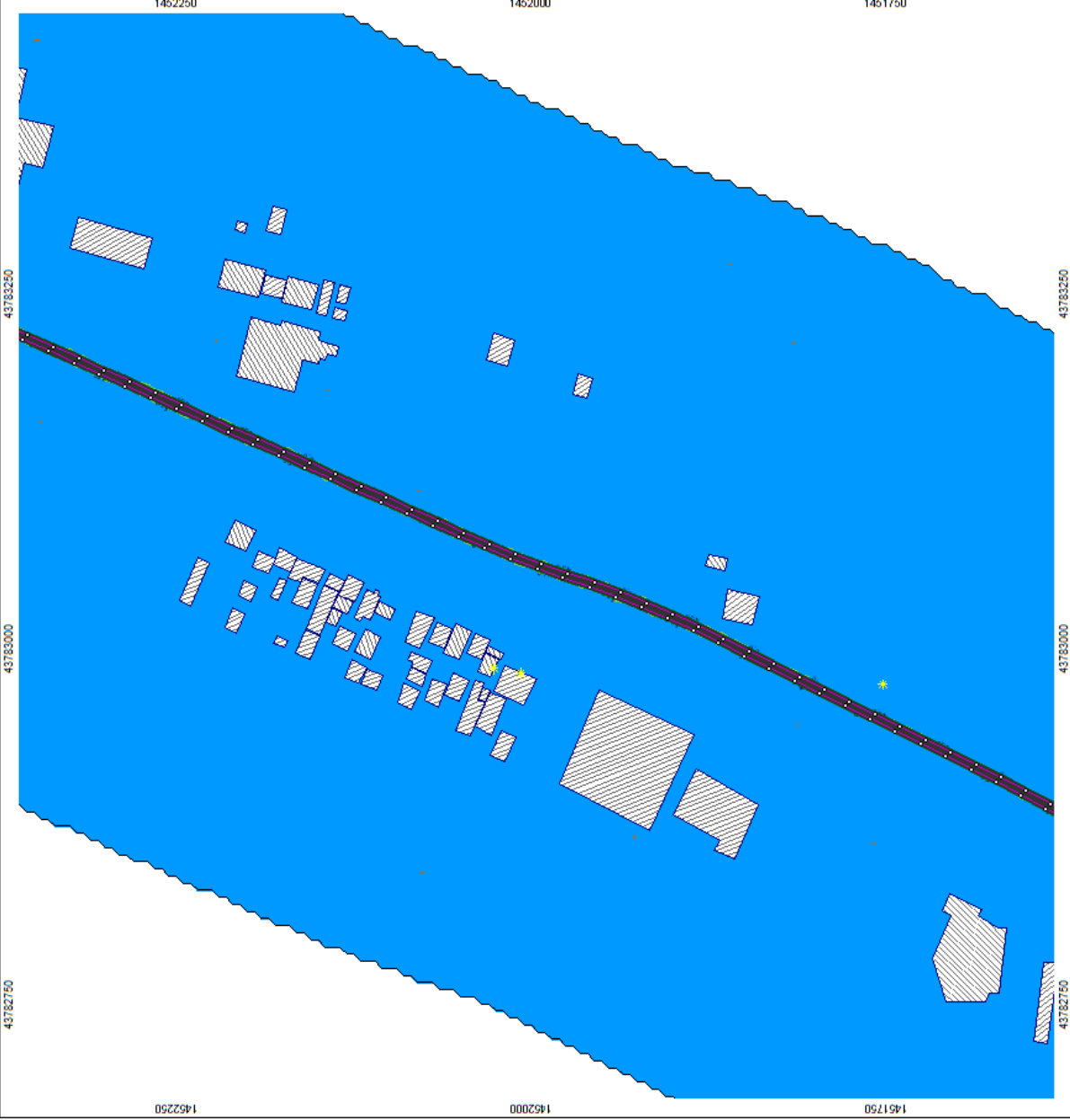
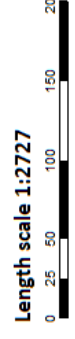
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq,n in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall	Construction Equip
Main building	Point receiver
-3dB(A) increase from Point Sources	Line source
Geometry bitmap	Wall
Elevation point	Bodeneffekte
Mixer calculation area	



KR Puram to Kempgowda International Airport

Operational Noise:
 Buildings from Street Maps and Google Earth.
 Train noise from BUU Soundplan 8.1 Library and
 BMRC Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
 Noise Contour Map**
 Leq,d
 Calculation in 1.5 m above ground

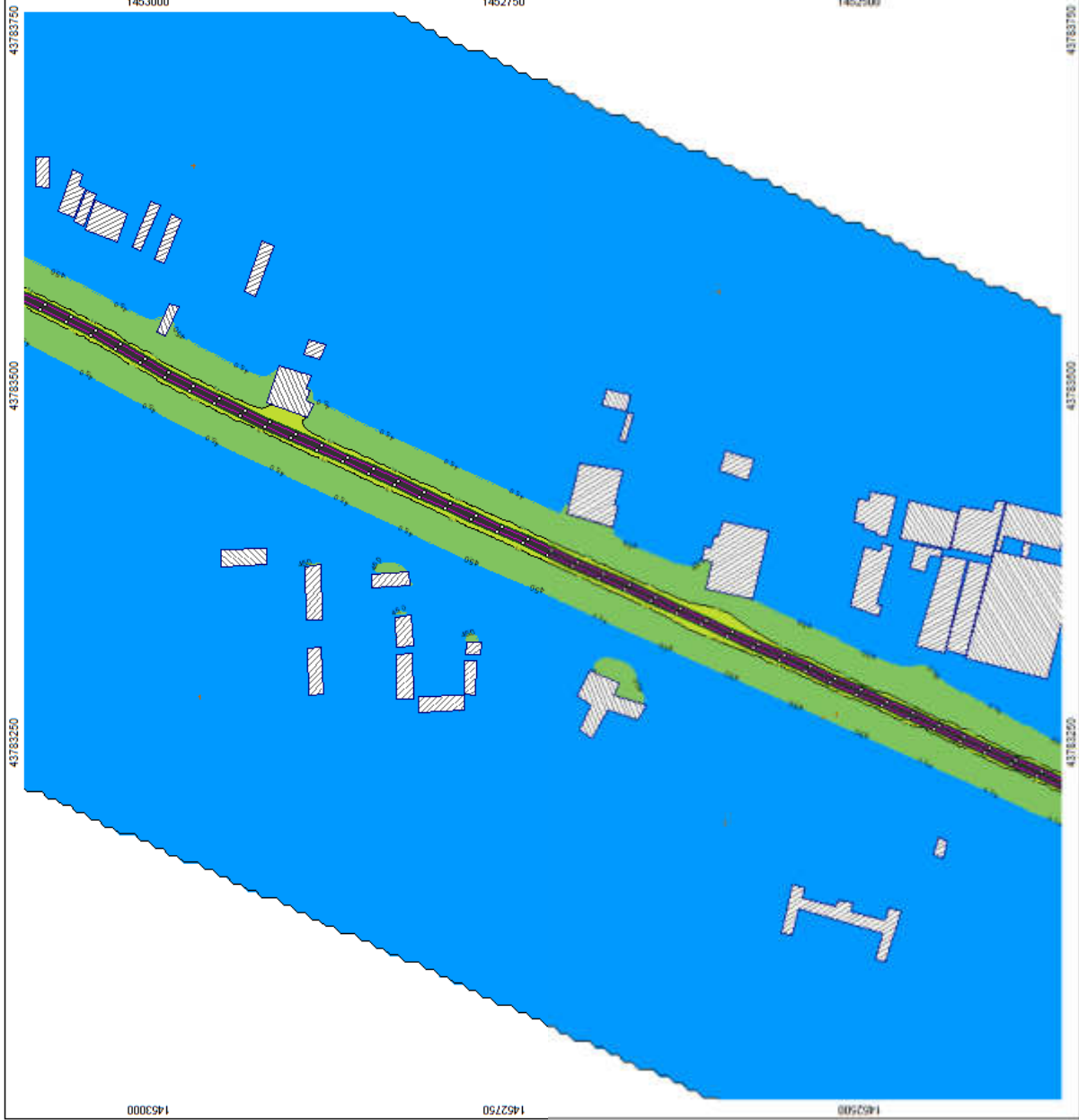
Project engineer: CMR
 Created: 9/10/2020
 Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq,d
 in dB(A)

≤ 45
45 - 50
50 - 55
55 - 60
60 - 65
≥ 65

Signs and symbols

Wall
Construction Equip.
Main building
Parapet receiver
-10dB(A) increase track
Parapet Source
Line source
Geometry distance
Wall
Wall
Elevation point
Bottomreflctc:
Receiv-reflctc: none



KR Puram to Kempegowda International Airport

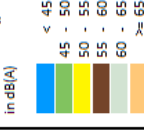
Operational Noise:
 The background noise levels taken from EMU Soundplan 8.1 Library and
 BMRC Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
 Noise Contour Map**

Leq_n
 Calculation in 1.5 m above ground

Project engineer: CMR
 Contact: 910,0000
 Processed with SoundPLAN 8.1, Update 10/23/2018

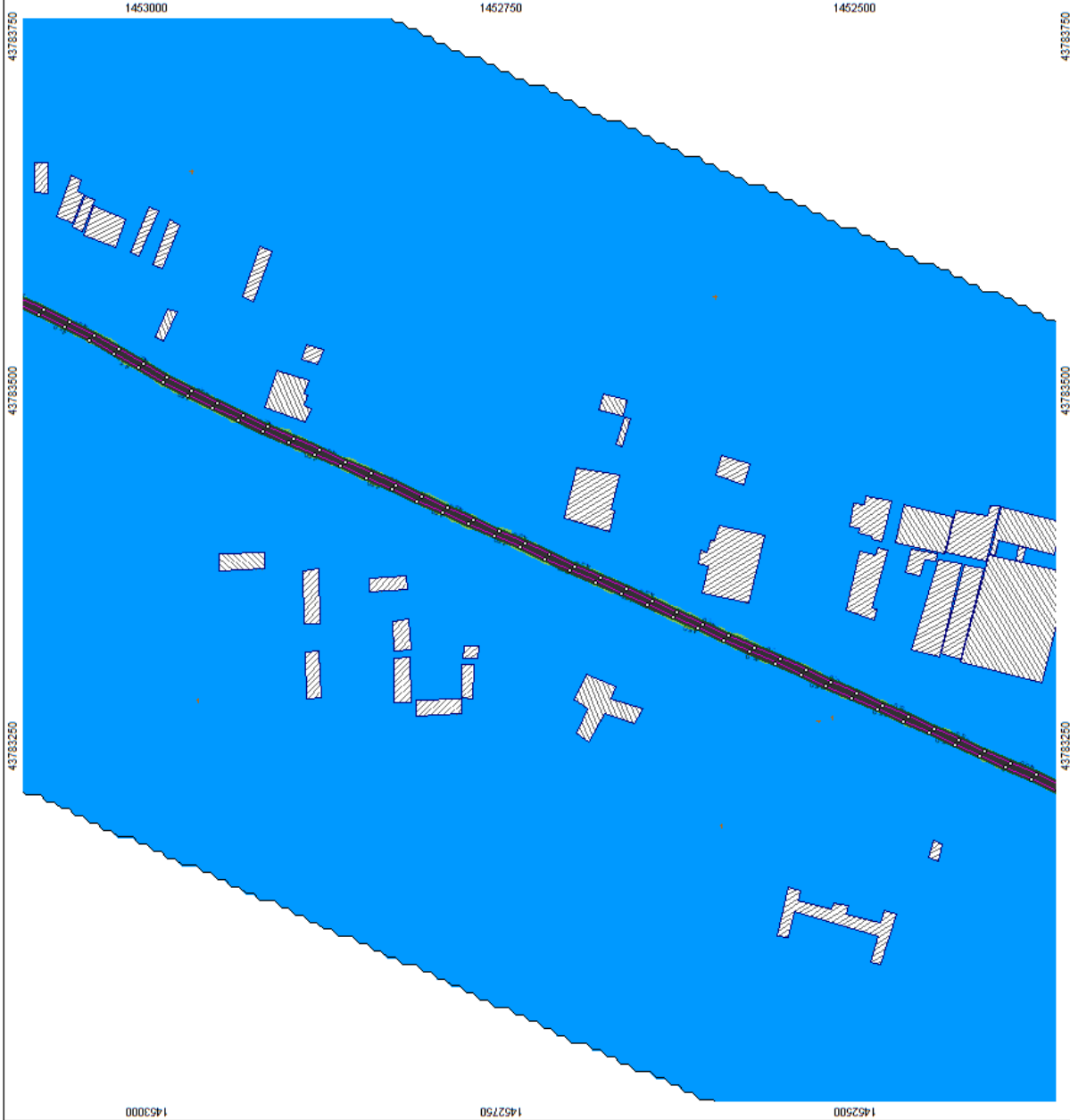
**Levels Leq_n
 in dB(A)**



Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- 3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodeneffekte
- Noise calculation area

Length scale 1:2727



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Main building levels from BMU Soundplan 8.1. Library and
BANCIL Reading Society. Station: Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map**
Leq,n
Calculation in 1.5 m above ground

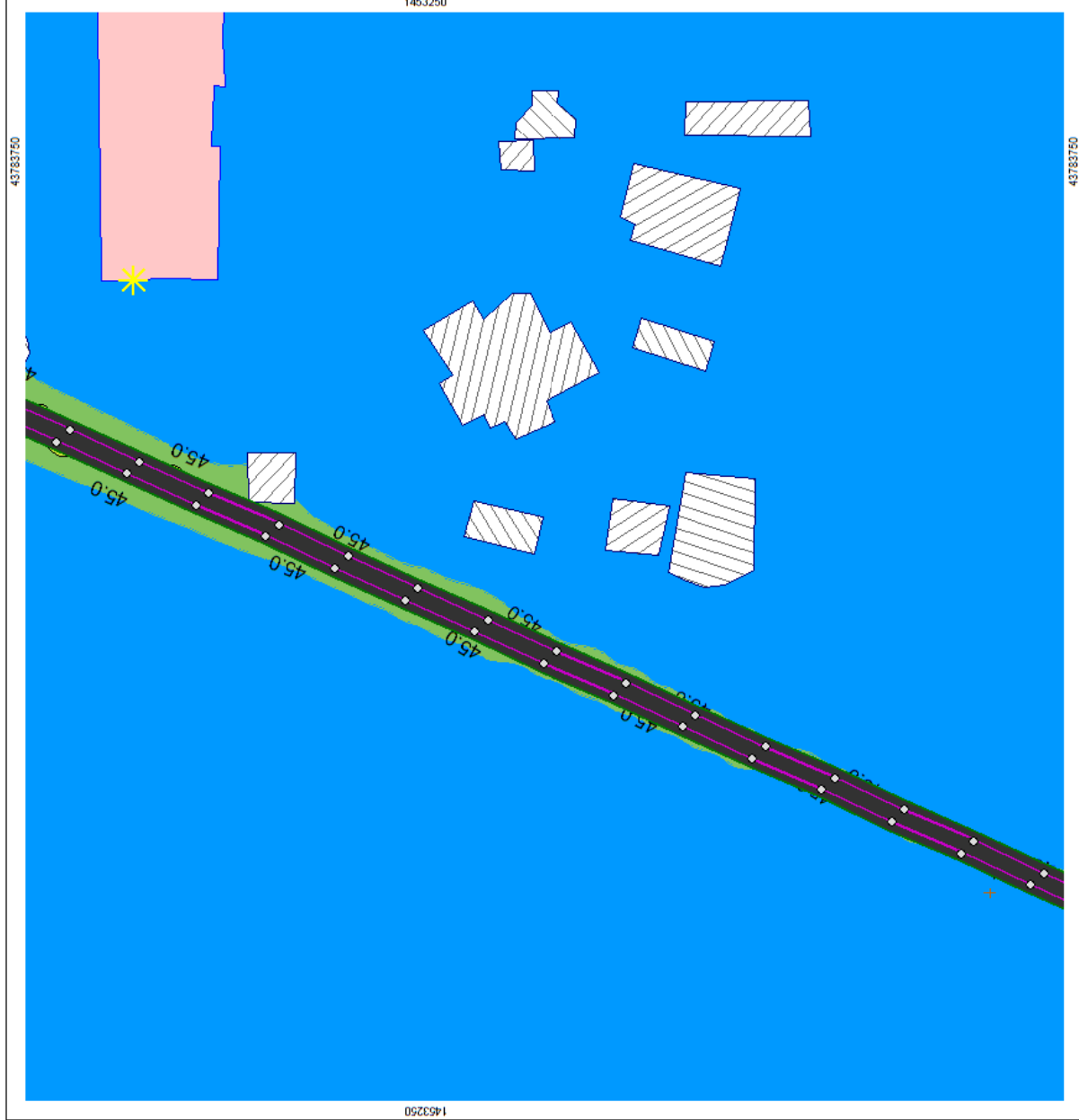
Project engineer: CMR
Created: 9/11/2020
Processed with SoundPLAN 8.1. Update 10/23/2018

Levels Leq,n in dB(A)

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- 3dB(A) increase from
- Point Sources
- Line source
- Geometry bimap
- Wall
- Elevation point
- Bodenniveau
- Noise calculation area



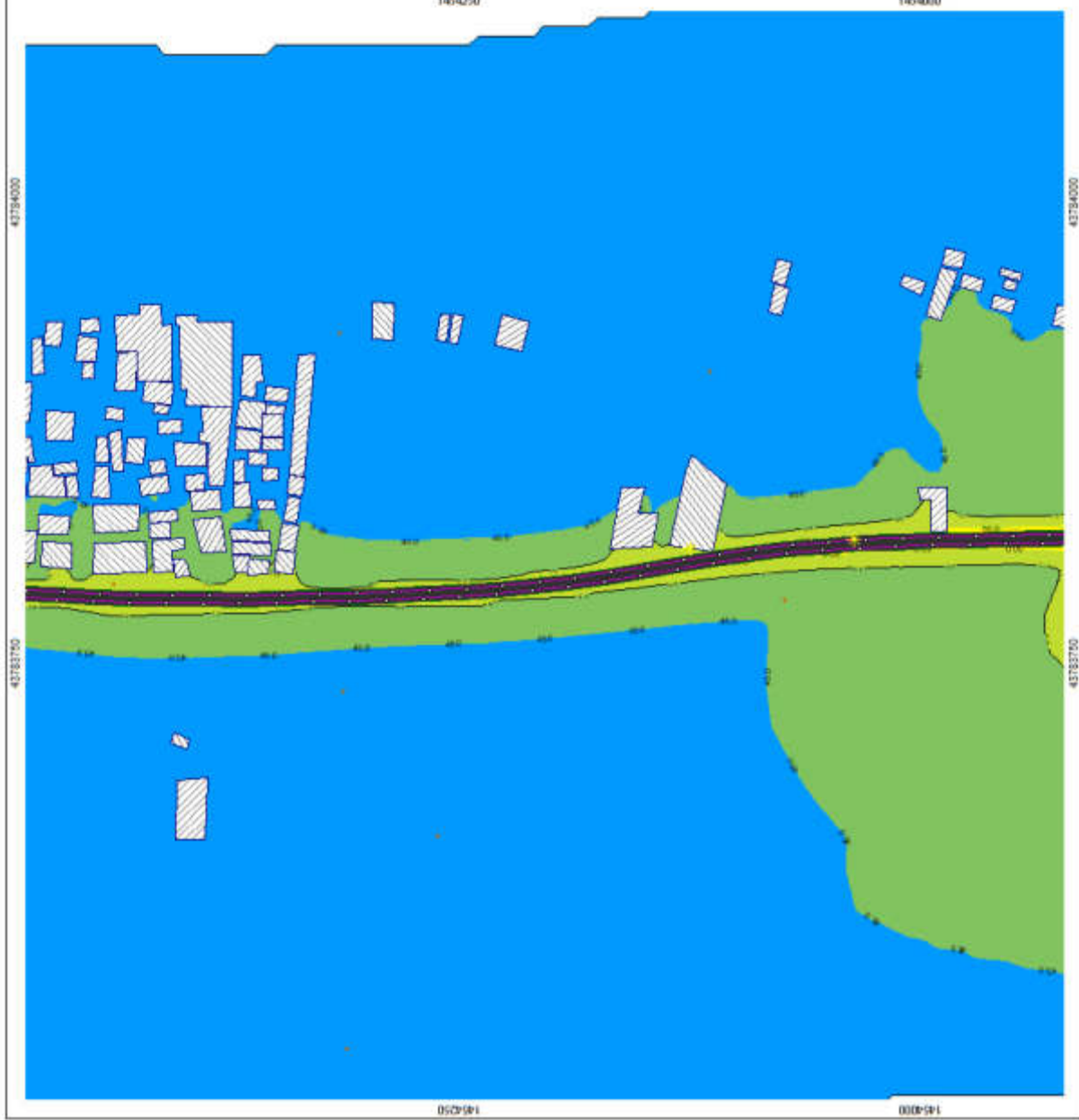
KR Puram to Kempegowda International Airport

Operational Noise
Buildings from Street Map and Google Earth.
Proposed 120 2024 2B with Parapet Wall
MARC, Building with noise barrier, 120 2024 2B
south from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**

Calculation in 1.5 m above ground

Project engineer: OMR
Created: 31/03/2024
Revised with Revise: 04/04/2024 Update: 16/03/2024



**Levels Leq,d
in dB(A)**

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Construction Equip
- Main building
- Point receiver
- +3 dB(A) increase from
- Point Source
- Line source
- Emergency storage
- Wall
- Elevation point
- Bottom of floor
- Noise measurement area



KR Puram to Kempgowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise power levels taken from BMU Soundplan 8.1 Library and
BRIEF. Hoisting Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map**

Leq,n
Calculation in 1.5 m above ground

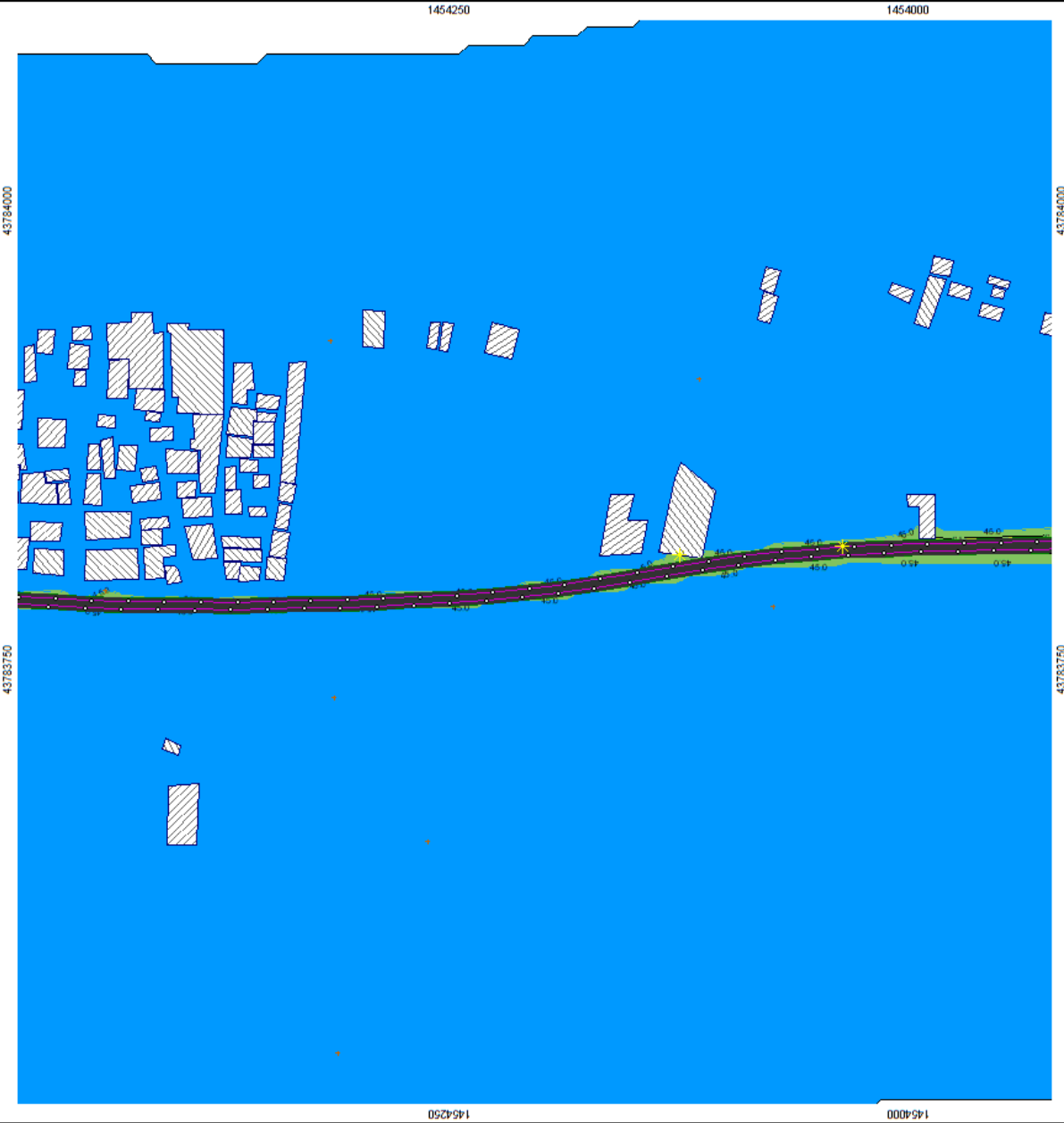
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq,n
in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Construction Equip
Main building
Point receiver
+3dB(A) increase from
Point Sources
Line source
Geometry binnmap
Wall
Wall
Elevation point
Bodenniveau
Rechnerkennlinien area



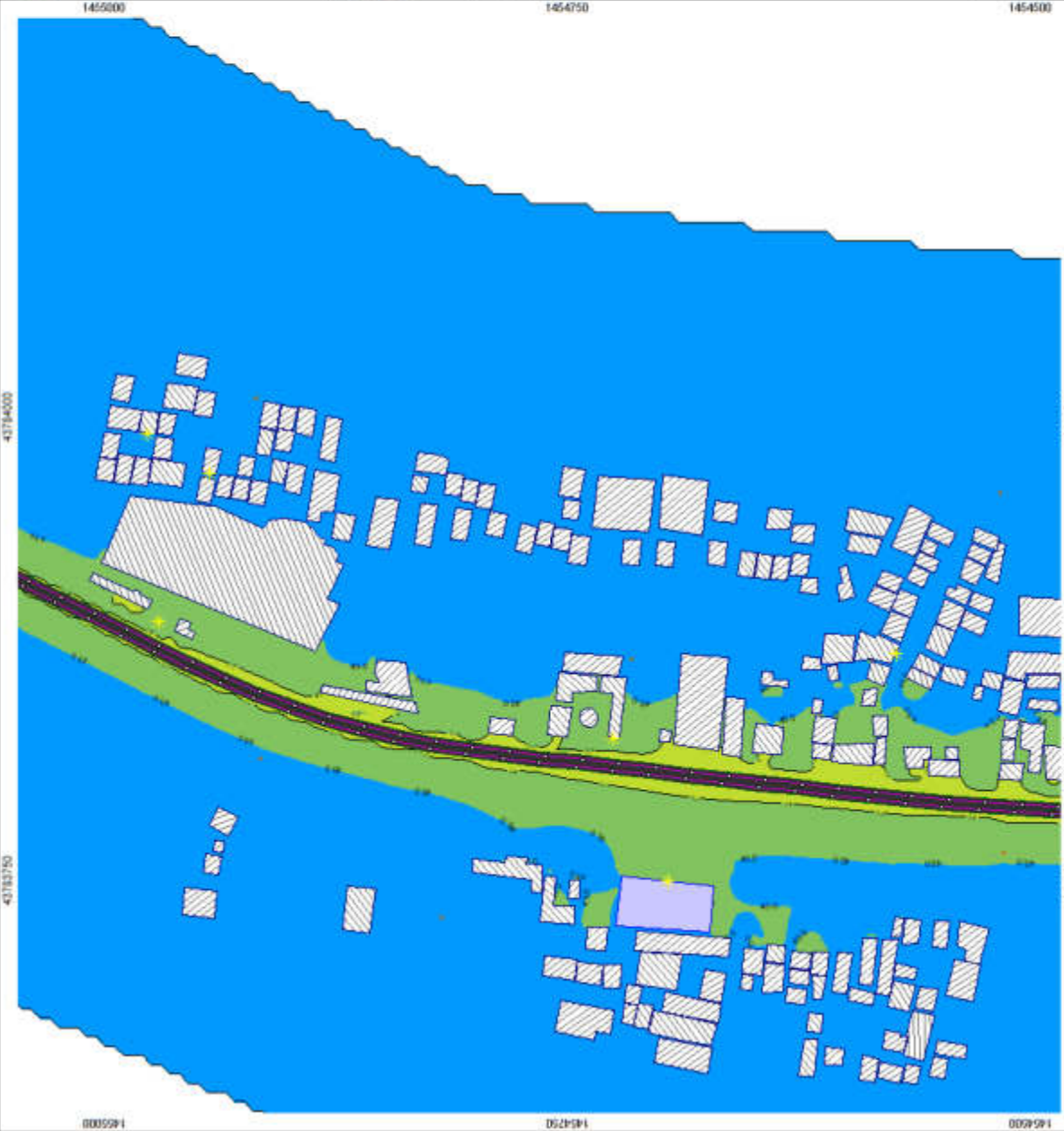
KR Puram to Kempegowda International Airport

Operations of Noise:
 Buildings from Street Map and Google Earth.
 Train noise power levels taken from DMU Soundmap & L Library and
 IIR/CI Rating Book Specification. Train schedule and
 speeds from feasibility study.

**120 2024 2B with Parapet Wall
 Noise Contour Map
 Leq,d**
 Calculation in 1.5 m above ground.

Project engineer: CMR
 Created: 9/10/2020
 Proposed with SoundPLAN 8.1. Update: 10/21/2018

- Levels Leq,d**
 in dBA)
- < 45
 - 45 - 50
 - 50 - 55
 - 55 - 60
 - 60 - 65
 - >= 65
- Signs and symbols**
- Wall
 - Construction fence
 - Main building
 - Field receiver
 - 3dB(A) isosound front
 - Point Source
 - Line source
 - Geometry sketch
 - Wall
 - Wall
 - Elevation point
 - Receiver
 - Microphone location area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Sources from MUJ (update 8.1, Library and
BMBCL Rolling Stock Specification, Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n
Calculation in 1.5 m above ground**

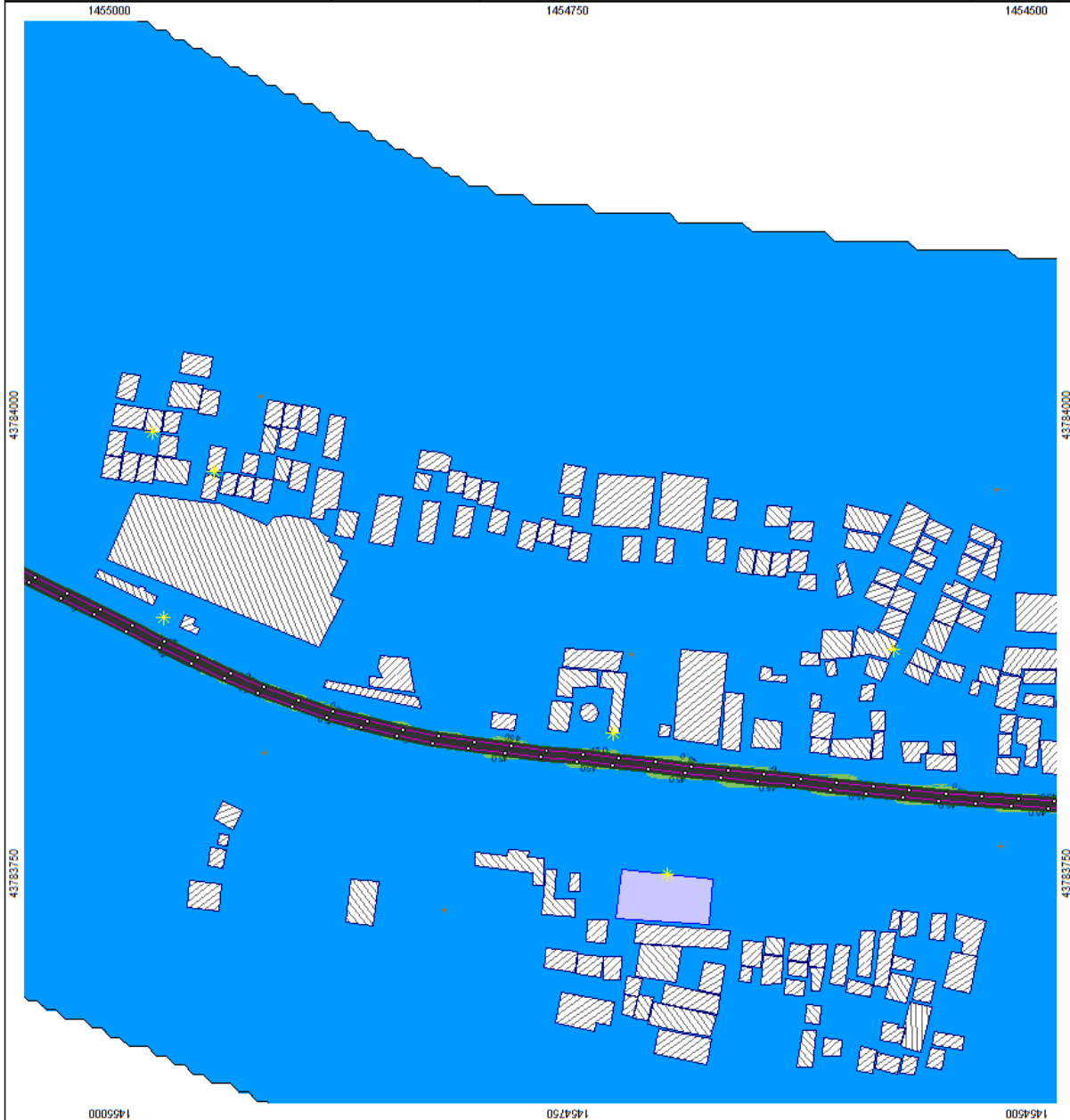
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1.1, Update 10/23/2018

**Levels Leq,n
in dB(A)**

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Wall
- Elevation point
- Bodeneffekte
- Receiver calculation area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise power levels taken from EMU Soundplan 8.1 Library and
BIMC Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

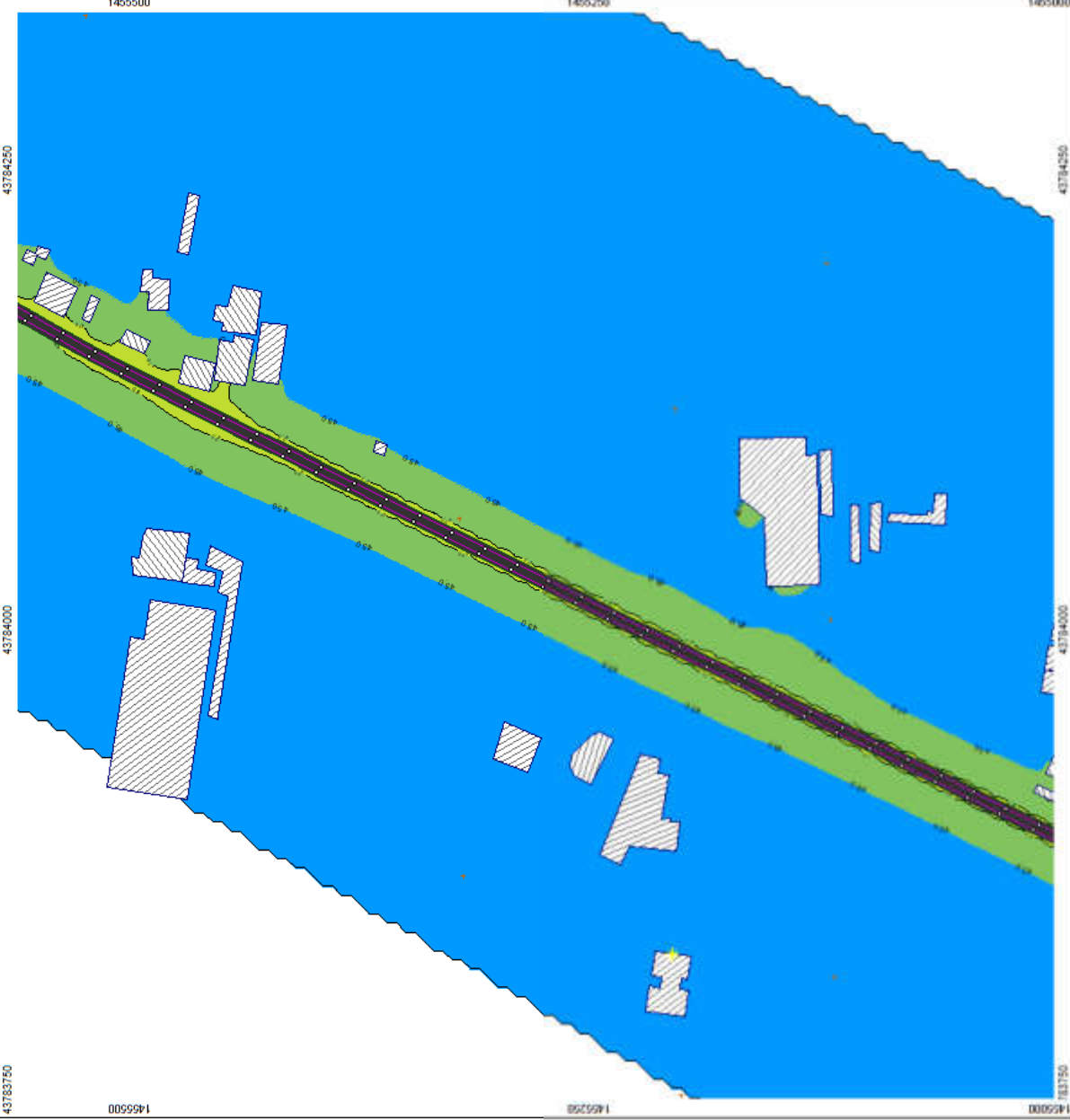
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq,d
in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall
Construction Equip
Main building
Point receiver
-3dB(A) increase from
Point Source
Line source
Geometry building
Wall
Wall
Elevation point
Building/line
Receiver elevation area



KR Puram to Kempgowda International Airport

Operational Noise.
Buildings from Street Map and Google Earth.
Train noise power levels taken from DMU Soundplan 8.1 Library and
BMRC Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

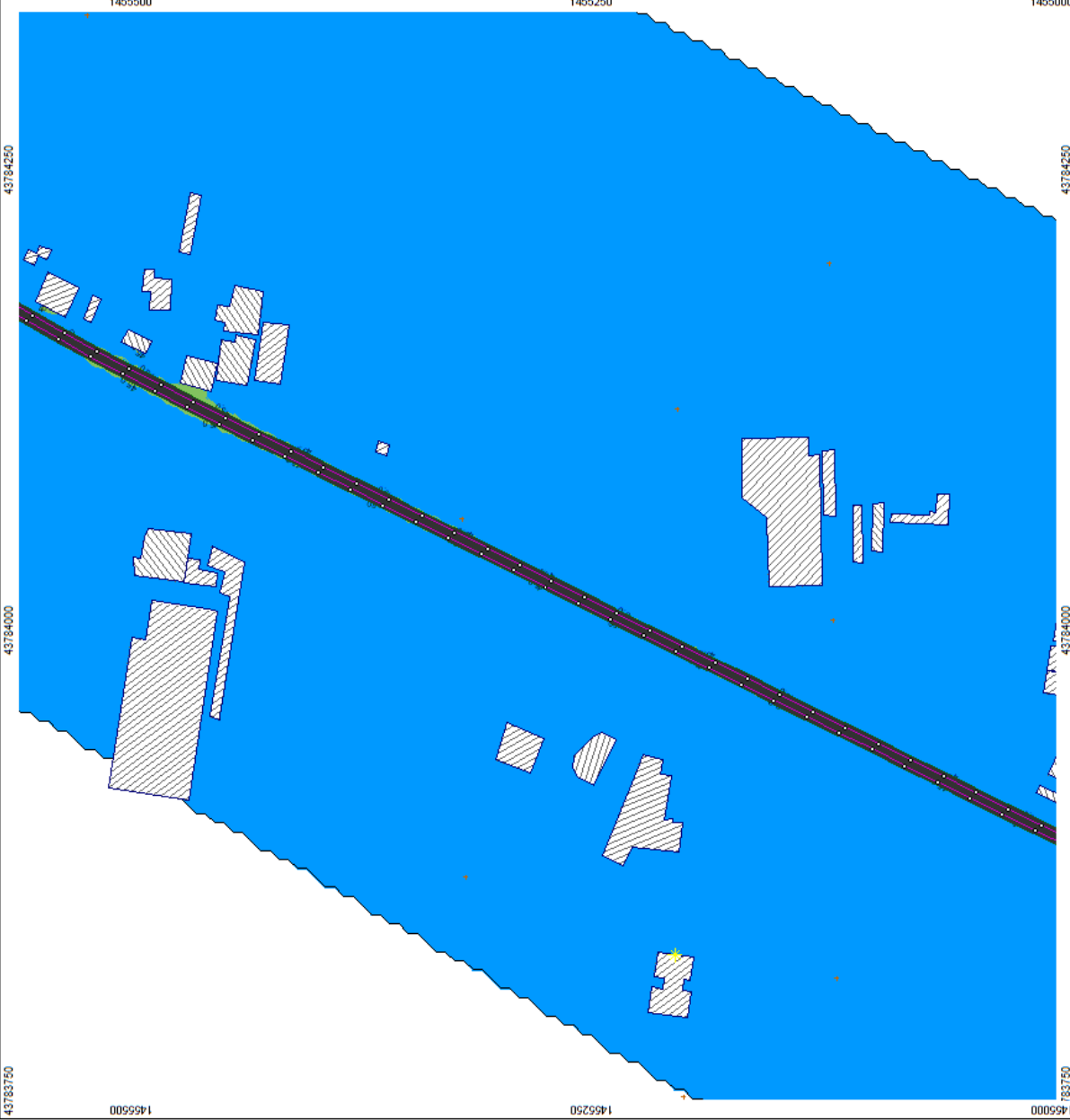
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1. Update: 10/23/2018

Levels Leq,n
in dB(A)

Blue	< 45
Light Blue	45 - 50
Yellow	50 - 55
Orange	55 - 60
Red	60 - 65
Dark Red	>= 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- 3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Badreflekte
- Noise calculation area



KR Puram to Kemp Gowda International Airport

Operational Noise:
 Buildings from Street Map and Google Earth
 Topography from SRTM30 PLUS
 WMO3 Building Stock Specification: train, standards and
 symbols from feasibility study.

**120 2024 2B with Parapet Wall
 Noise Contour Map
 Leq,d**
 Calculation in: 1.5 m above ground

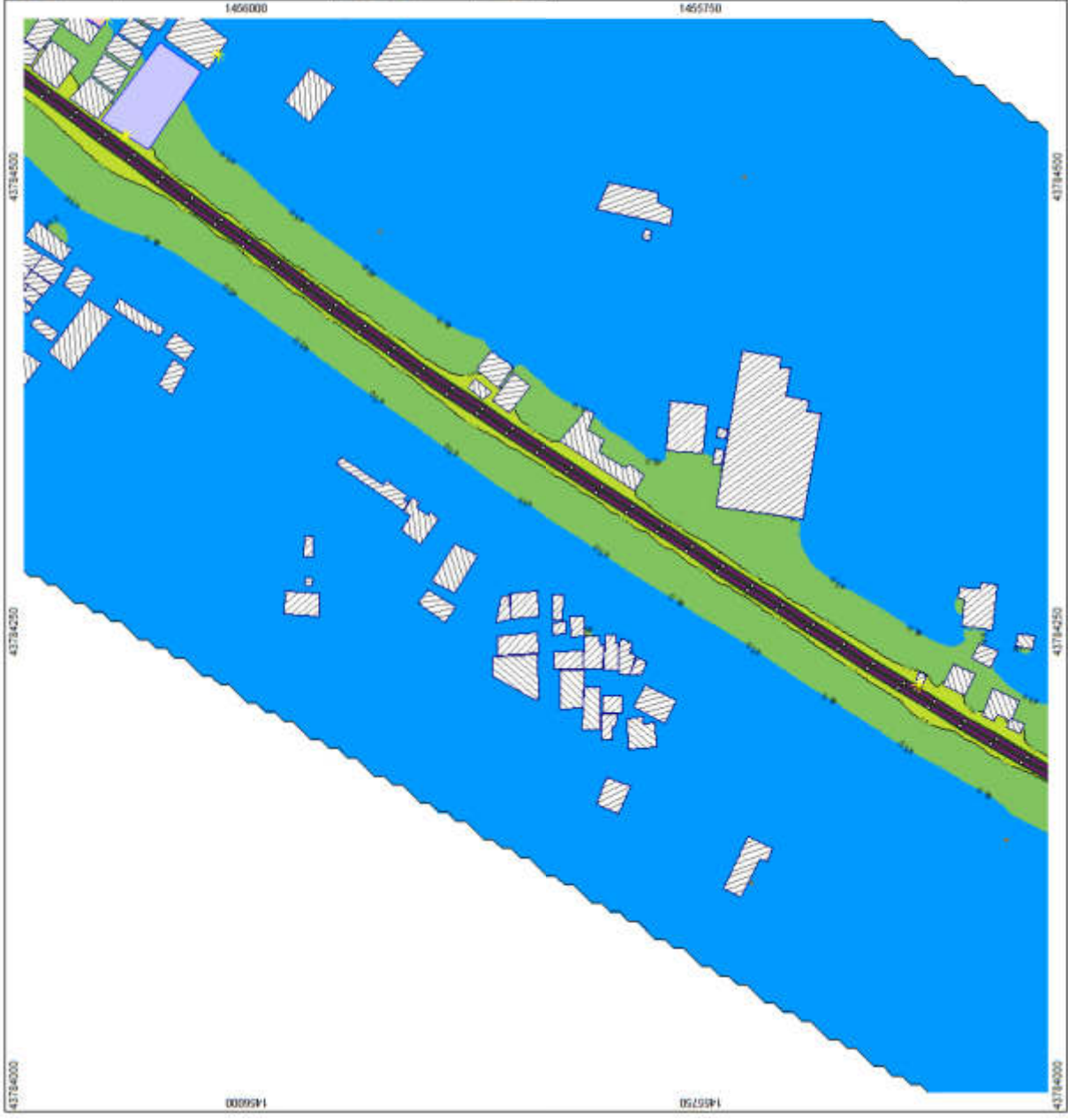
Project engineer: OMR
 Created: 30/10/2023
 Processed with: soundPLAN 8.1. Update 100310018

Levels Leq,d
 in dB(A)

≤ 45
45 - 50
50 - 55
55 - 60
60 - 65
≥ 65

Signs and symbols

Wall
Construction Equip
Main building
Plain receiver
+3dB(A) increase from
Plain Source
Line source
Geometry shape
Wall
Wall
Elevation point
Receivable
Receiver (distance from noise)



KR Puram to Kempgowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Noise contours from CMU SoundPLAN 8.1. Library and
BMRCL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

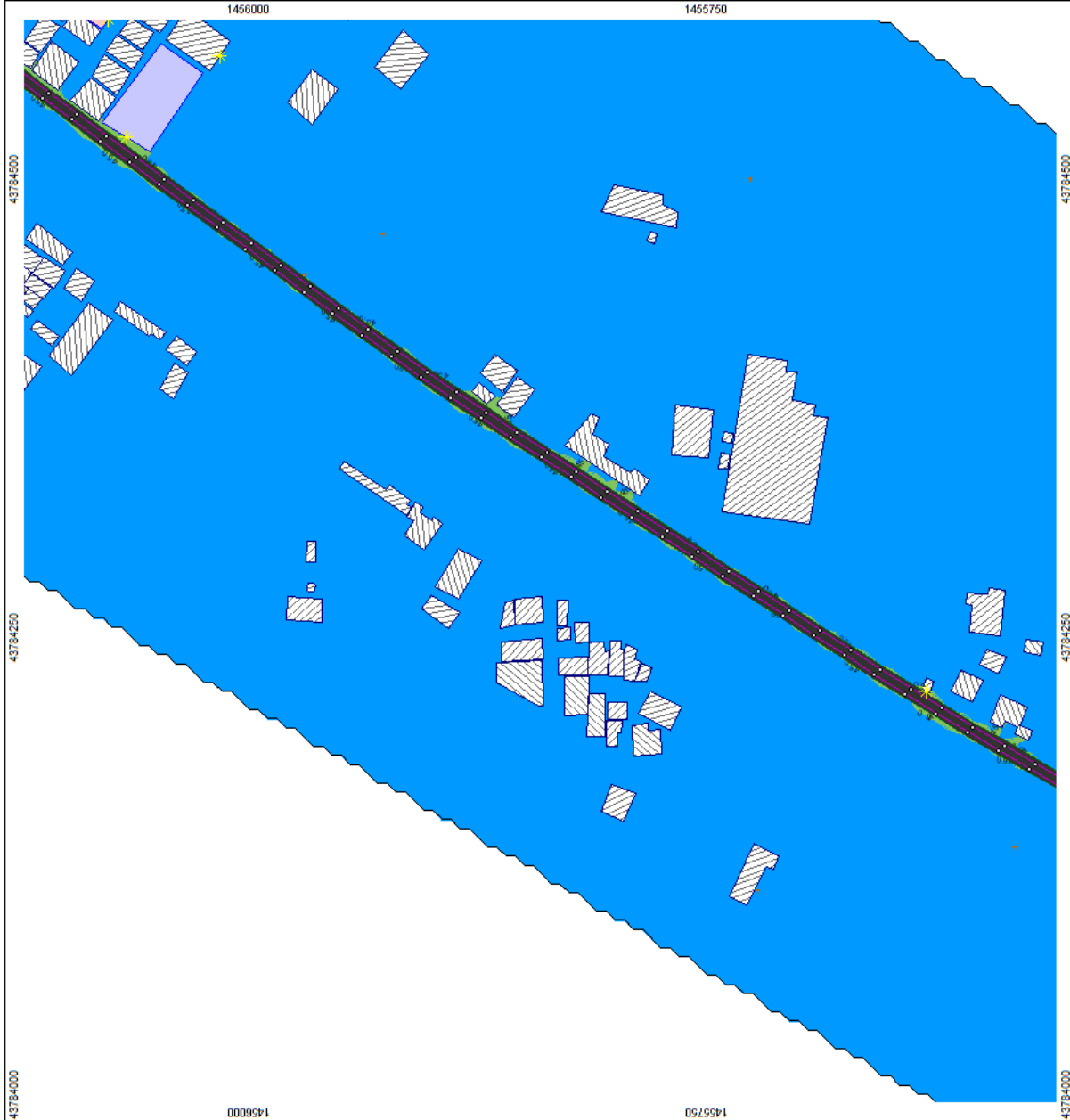
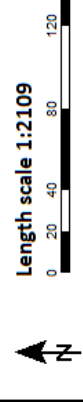
Project engineer: CMR
Created: 9/10/2020
Processed with: SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall
Construction Equip
Main building
Point receiver
+3dB(A) increase from
Point Sources
Line source
Geometry bitmap
Wall
Wall
Elevation point
Bodeneffekte
Notberücksichtigte areas



KR Puram to Kempegowda International Airport

Operational Noise Contourmap, Airside Map and Grading Levels. Train former levels taken from DMU, Suburban & L. Library and MMRD. Building Stock Specification, Train schedule and speeds from Feasibility Study.

120 2024 2B with Parapet Wall Noise Contour Map

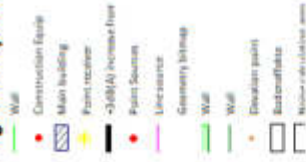
Leq,d
Calculation in 1.5 m above ground

Project engineer: CMR
Project #: 16/2023
Prepared with SoundPLAN 8.1 Update 1603/2018

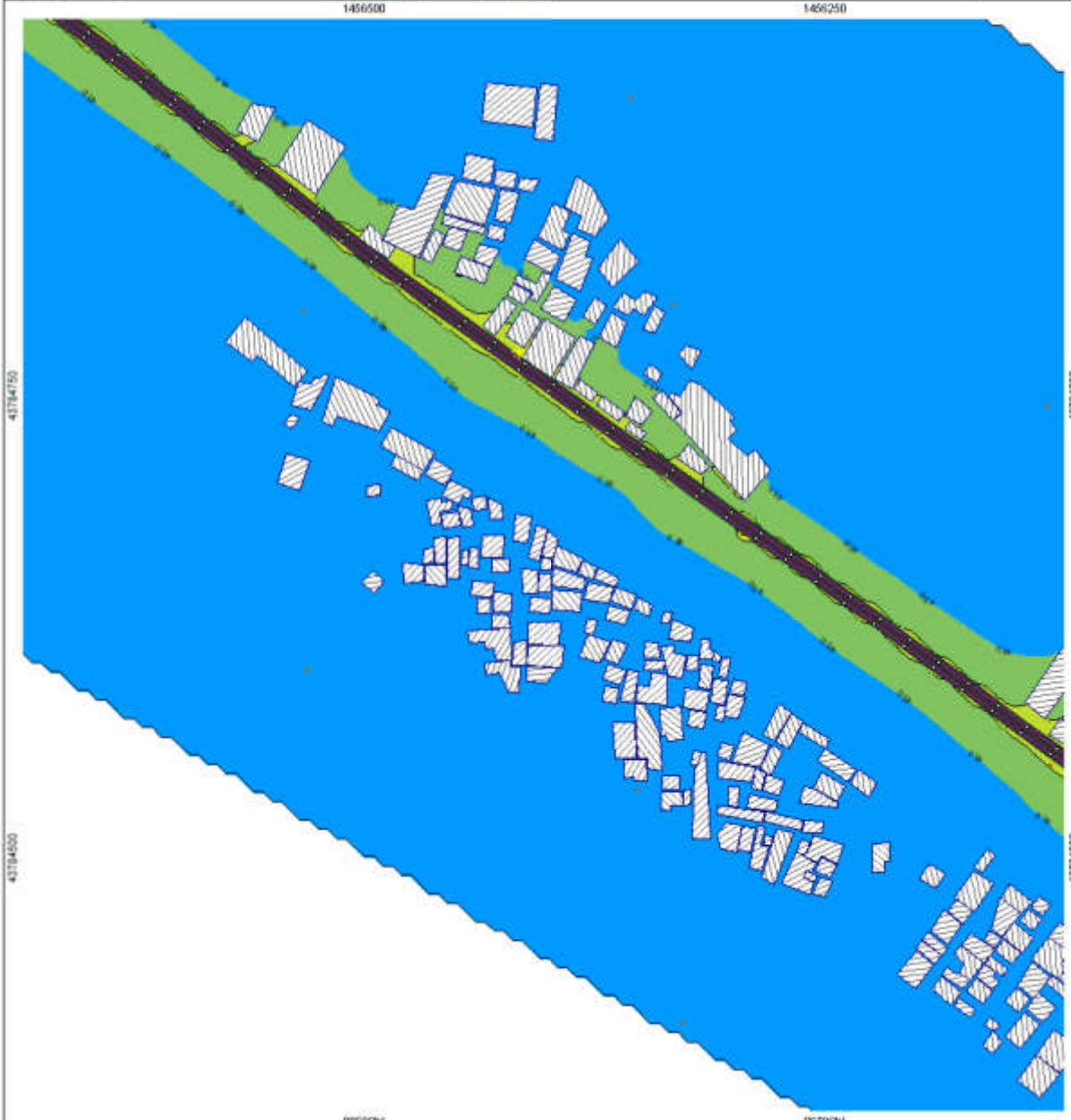
Levels Leq,d
in dB(A)



Signs and symbols



Length scale 1:2109



KR Puram to Kempgowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Noise contours from SoundPLAN 8.1.1 Library and
BMBCL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

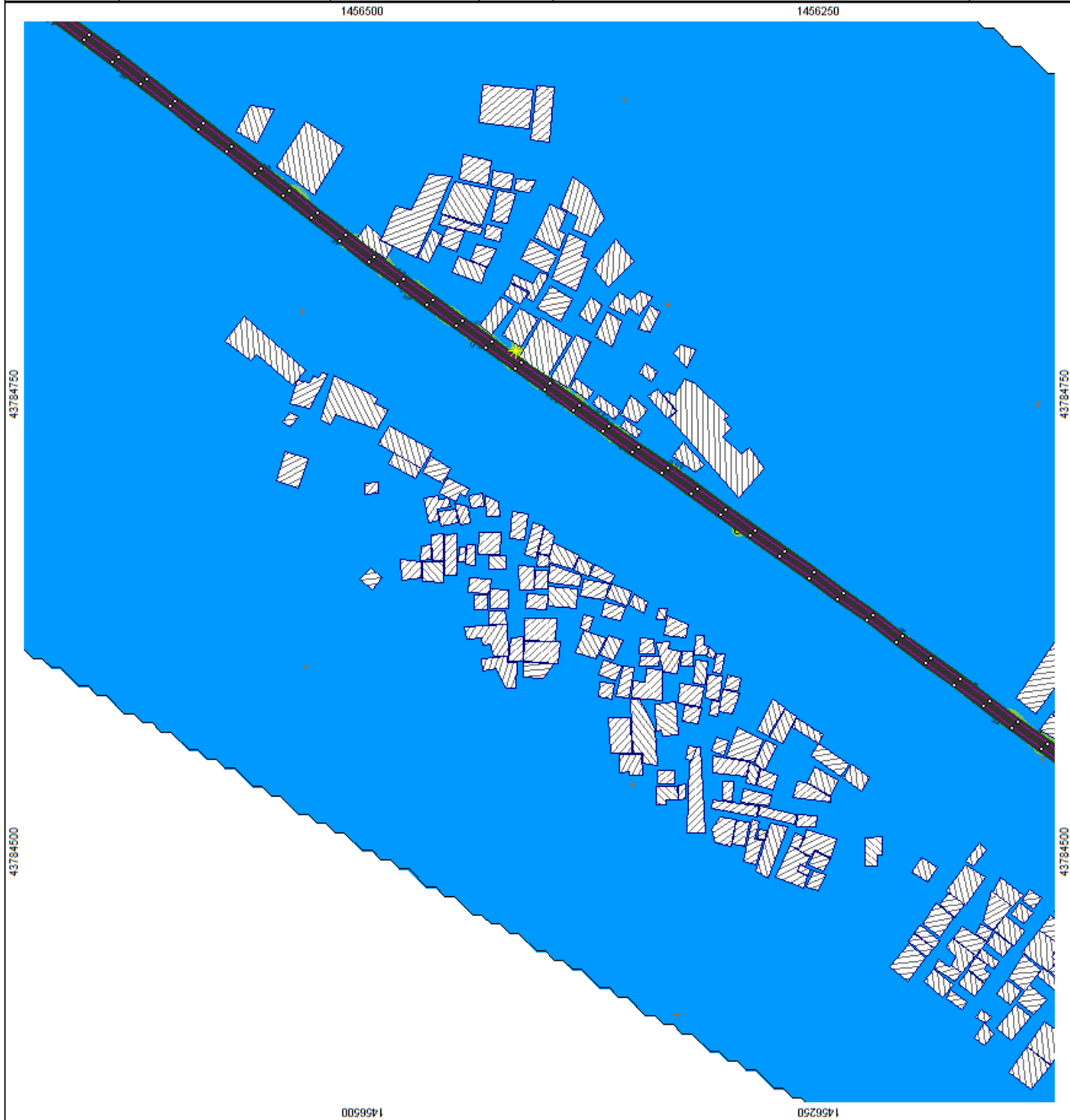
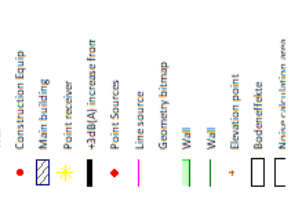
**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2024
Processed with SoundPLAN 8.1.1, Update 10/23/2018

**Levels Leq,n
in dB(A)**



Signs and symbols



KR Puram to Kempegowda International Airport

Operational Noise Contour Map and Graphical Data
 The graph plots noise contours (L₅₀, L₅₅, L₆₀, L₆₅) and the proposed 120m Parapet Wall. The map shows the noise contours and the proposed wall structure along the road.

120 2024 2B with Parapet Wall Noise Contour Map
 Leq,d
 Calculation in 1.5 m above ground

Project Engineer: OMR
 Project No: 10/2024
 Prepared with SoundPLAN 8.1.1 Update 10/21/2018

Levels Leq,d
 in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall	Construction type
Main building	Main building
Peak marker	Peak marker
+20dB(A) increase from	+20dB(A) increase from
Point Source	Point Source
Line source	Line source
Geometry shortcut	Geometry shortcut
Wall	Wall
Location point	Location point
Receivertable	Receivertable
Minimum distance area	Minimum distance area



KR Puram to Kempegowda International Airport

Operational Noise:
 Detailed Noise Contour Map and Google Earth
 Receiver noise levels taken from EMU Soundplan 8.1 Library and
 BMIRCL Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
 Noise Contour Map
 Leq,1n**
 Calculation in 1.5 m above ground

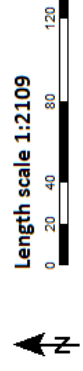
Project engineer: CMR
 Contact: 910,00,000
 Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,1n in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
≥ 65

Signs and symbols

Wall
Construction Equip
Main building
Point receiver
-3dB(A) increase from
Point Sources
Line source
Geometry bitmap
Wall
Wall
Elevation point
Bottomreflekt
Noise calculation area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Topography from SRTM30 PLUS. Road Network from
BMRB. Building Footprint Locations: Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

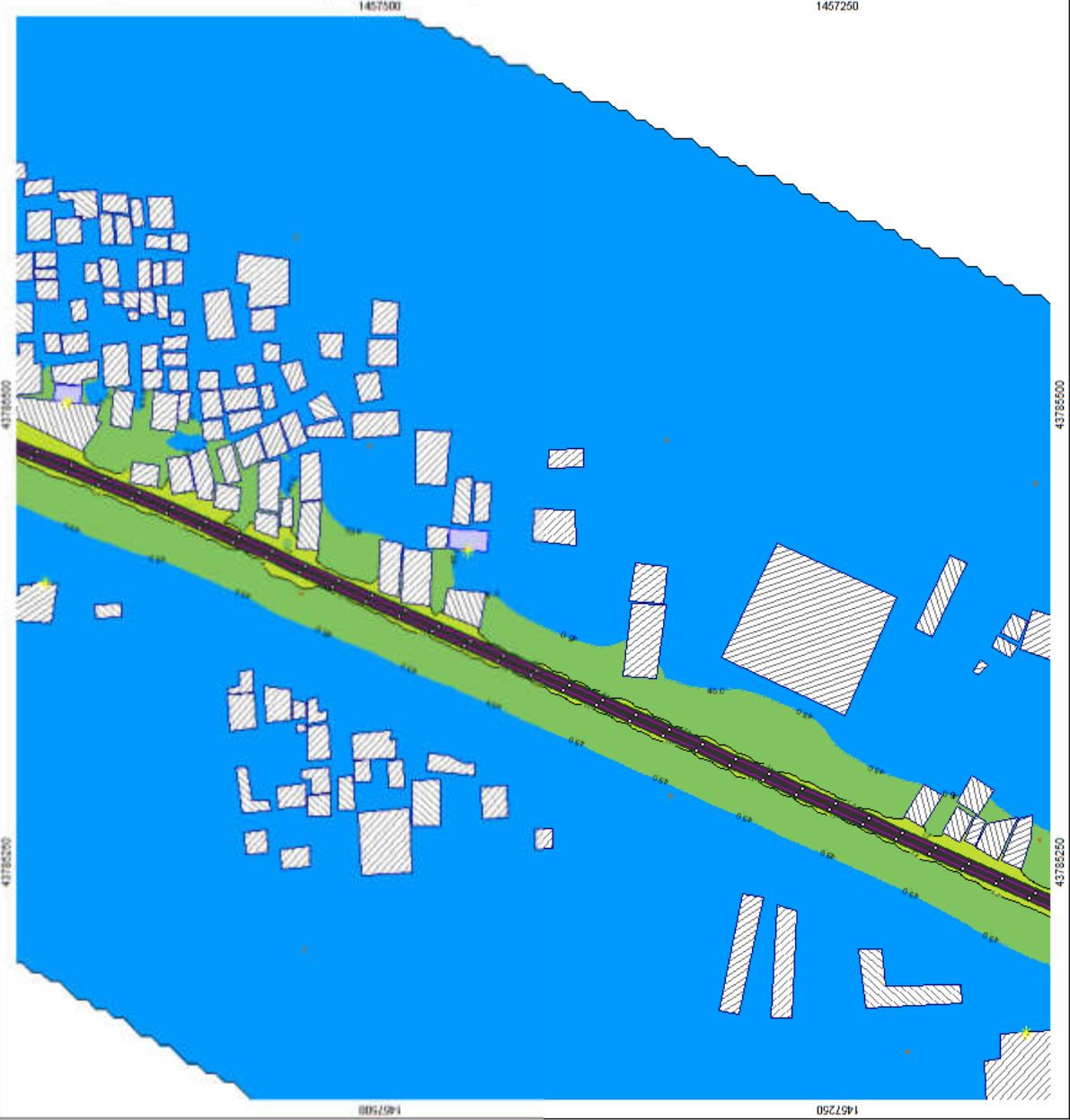
Project Engineer: DMM
Created: 8/15/2023
Processed with: SoundPLAN 8.1, Update: 10/23/2018

Levels Leq,d
in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall
Construction Equip
Main building
Point receiver
-3dB(A) increase from
Point Sources
Line source
Geometry blimp
Wall
Wall
Elevation point
Bodemfalte
Noise calculation area



KR Puram to Kempegowda International Airport

Operational Noise
 Buildings from Street Map and Google Earth
 Train noise power levels taken from EMU Soundplan 8.1 Library and
 BMRC Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
 Noise Contour Map
 Leq,n**

Calculation in 1.5 m above ground

Project engineer: CMR
 Created: 9/10/2020
 Processed with: SoundPLAN 8.1, Update: 10/23/2018

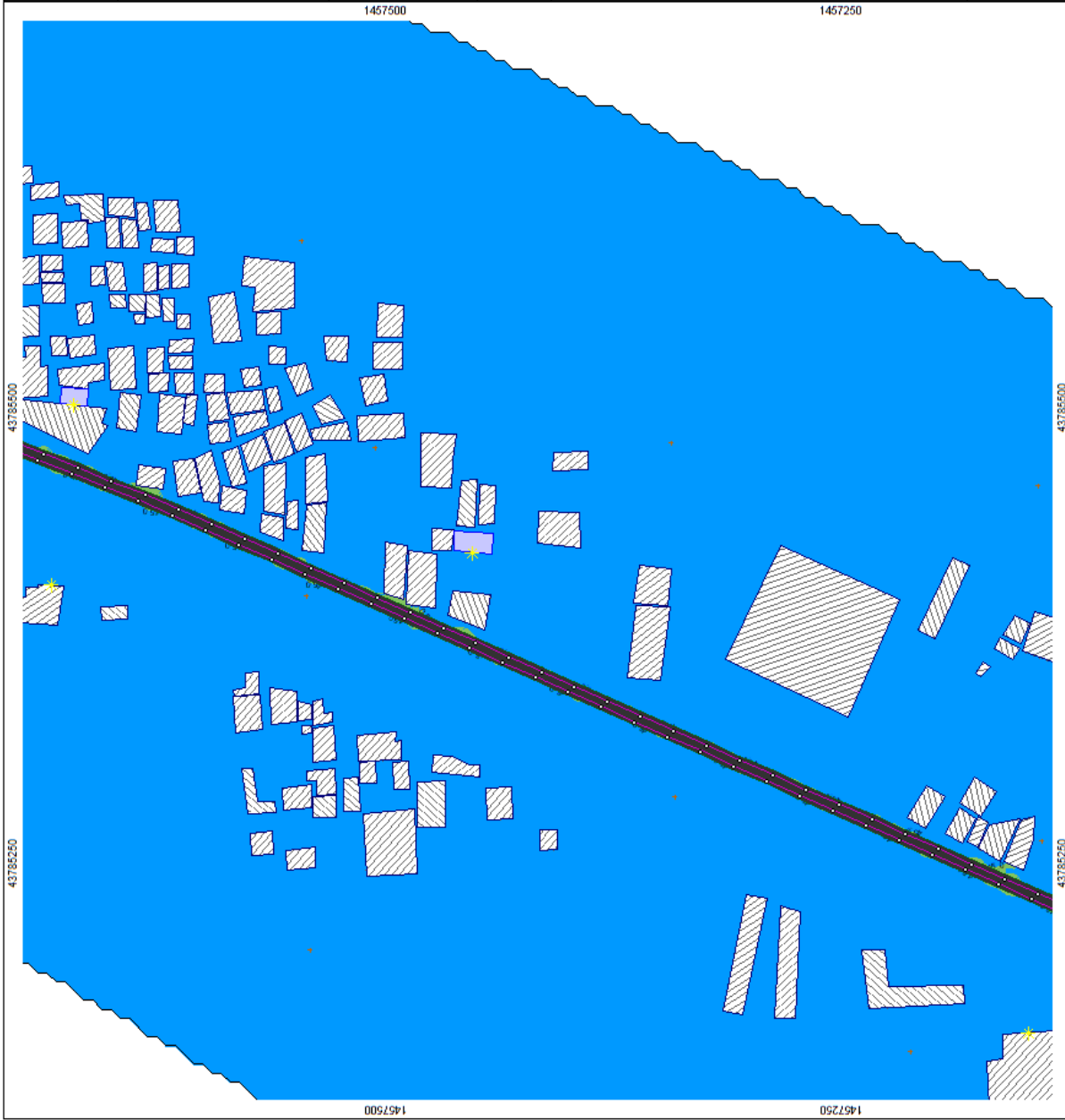
**Levels Leq,n
 in dB(A)**



Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- 3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Wall
- Elevation point
- Bodenreflekt
- Noise calculation area

Length scale 1:2109

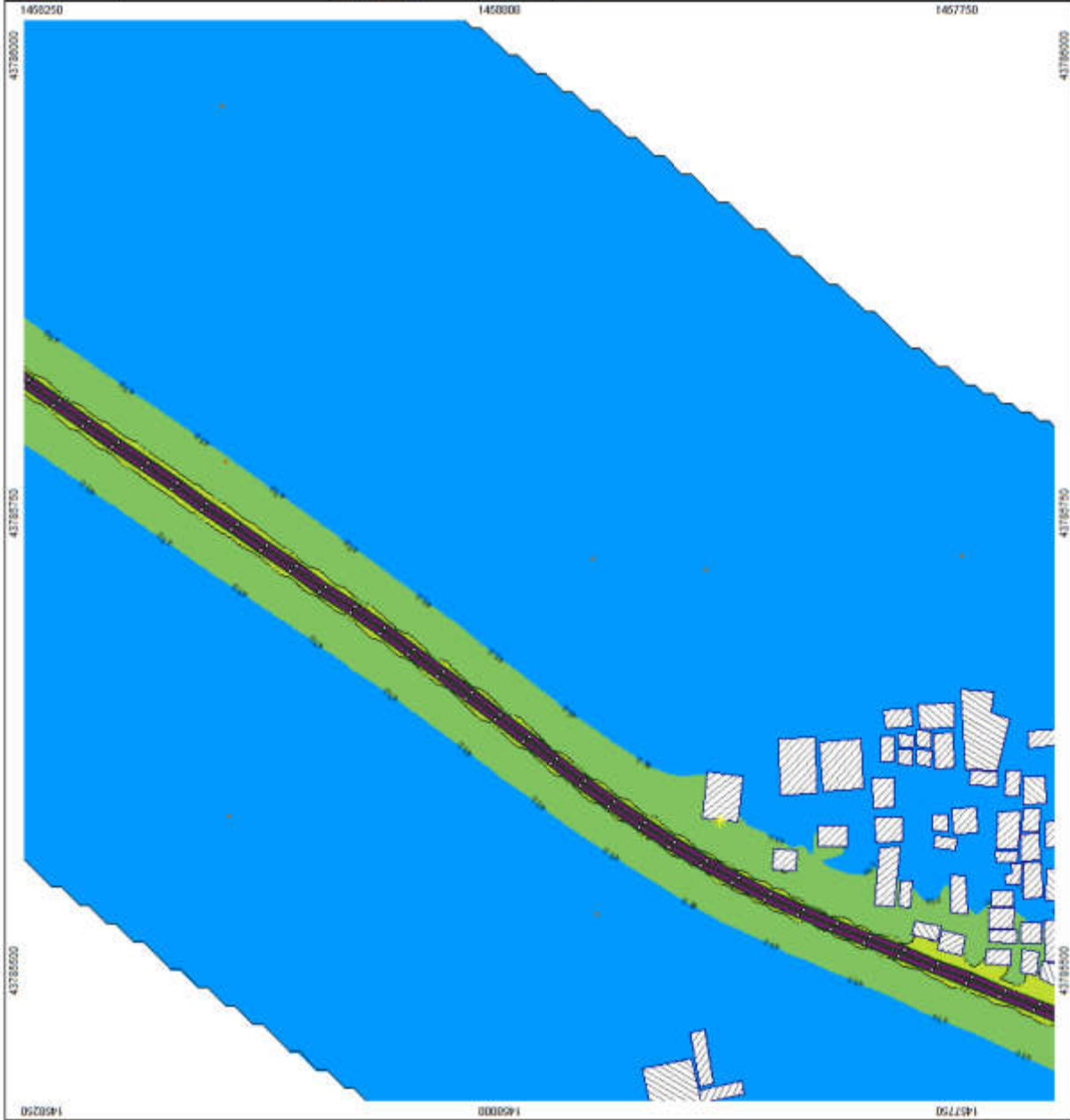


KR Puram to Kempegowda International Airport

Operational Noise, Prediction from Screen Map and Growth Earth, MRCO, Building Stock Specification, Train schedule and Health Impact Feasibility Study.

120 2024 2B with Parapet Wall Noise Contour Map
Leq,d
 Calculation in 1.5 m above ground

Project Engineer: CMR
 Created: 15/10/2024
 Proposed with SoundPLAN 8.1. Update: 10/21/2024



Levels Leq,d in dB(A)

- ≤ 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- ≥ 65

Signs and symbols

- Construction Equip
- Main building
- Point receiver
- 10dB(A) increase from
- Point Sources
- Line source
- Geometry change
- Wall
- Elevation point
- Buildings
- Topographic contour lines



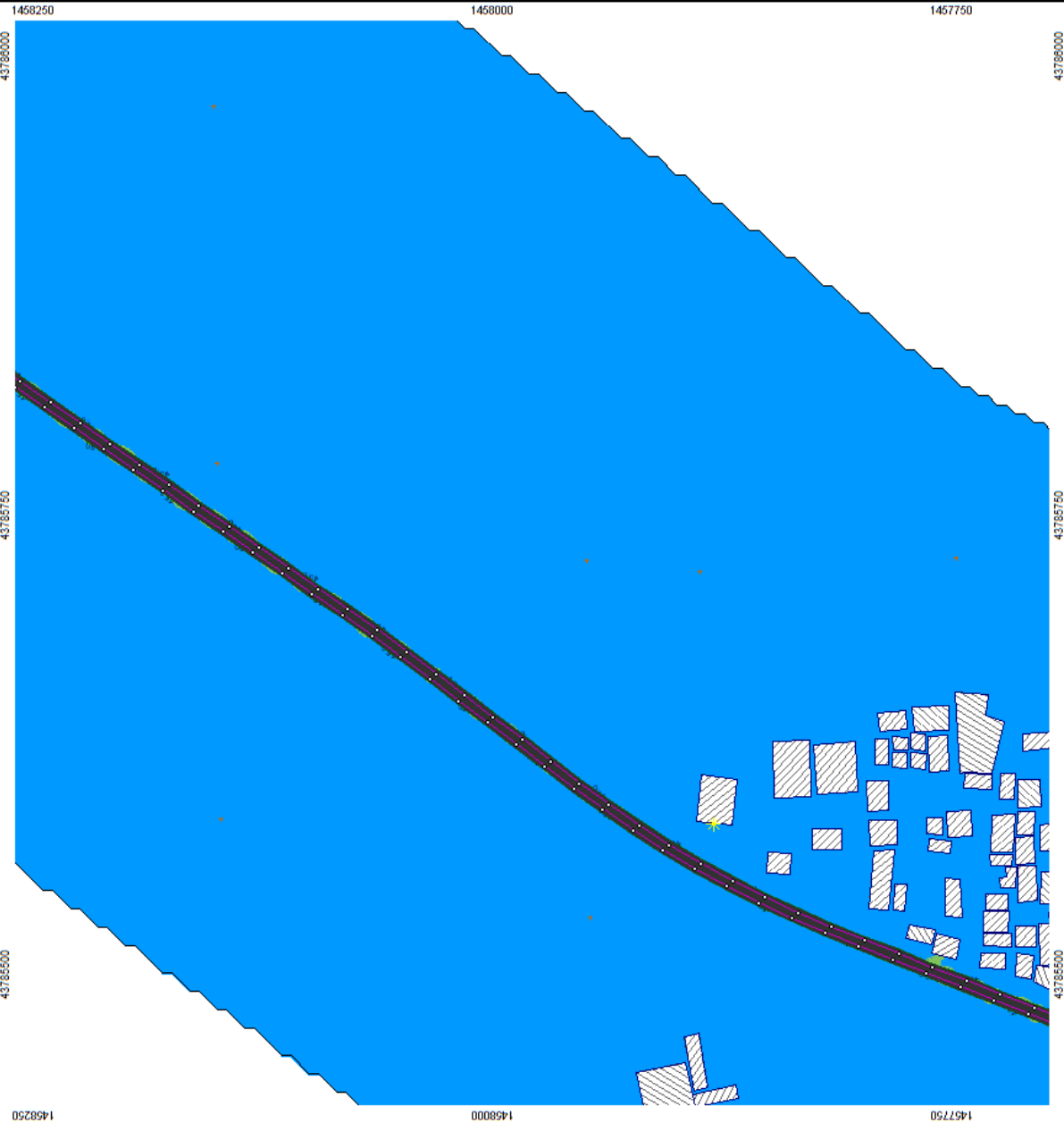
KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Noise contours from SoundPLAN 8.1 Library and
BMBCL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map**

Leq,n
Calculation in 1.5 m above ground

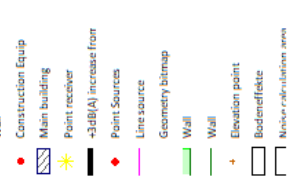
Project engineer: CMR
Created: 31/10/2020
Revised: 10/03/2021
Processed with SoundPLAN 8.1, Update 10/23/2018



**Levels Leq,n
in dB(A)**



Signs and symbols



Length scale 1:2109



4378500 1458250 4378550 1458000 4378600 1457750 4378650

KR Puram to Kempegowda International Airport

Operational Noise
 Noise Contour Map and Geoidal Earth
 Train noise power levels taken from BML Soundplan 8.1 Library and
 BMRCL Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
 Noise Contour Map
 Leq,d**
 Calculation in 1.5 m above ground

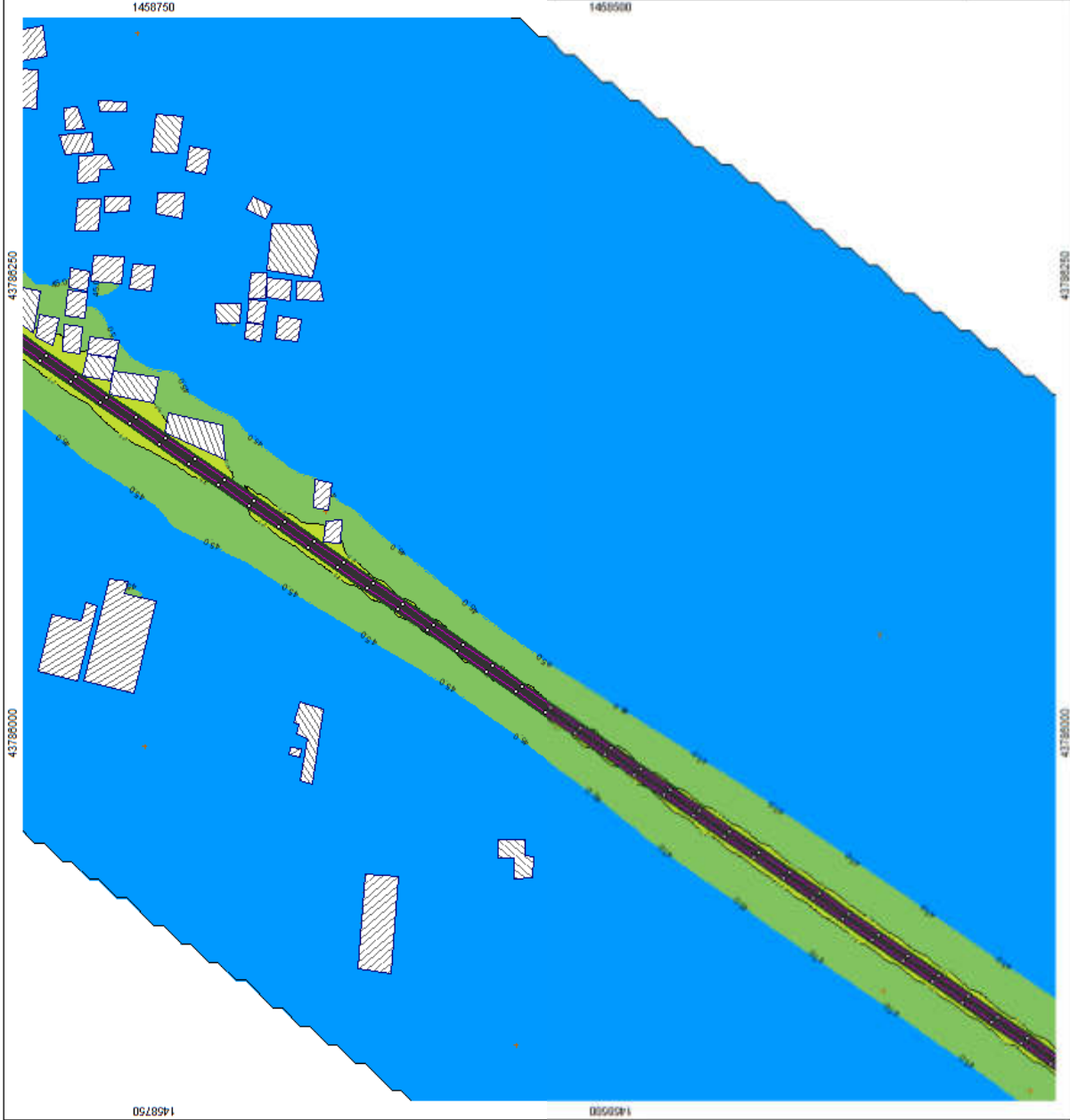
Project engineer: CMR
 Created: 9/10/2020
 Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,d
 in dBA

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

- Wall
- Construction Equip.
- Main building
- Power receiver
- 3dB(A) increase from
- Power Sources
- Line receiver
- Geometry Settings
- Wall
- Elevation point
- Real world data
- Maximum calculation area

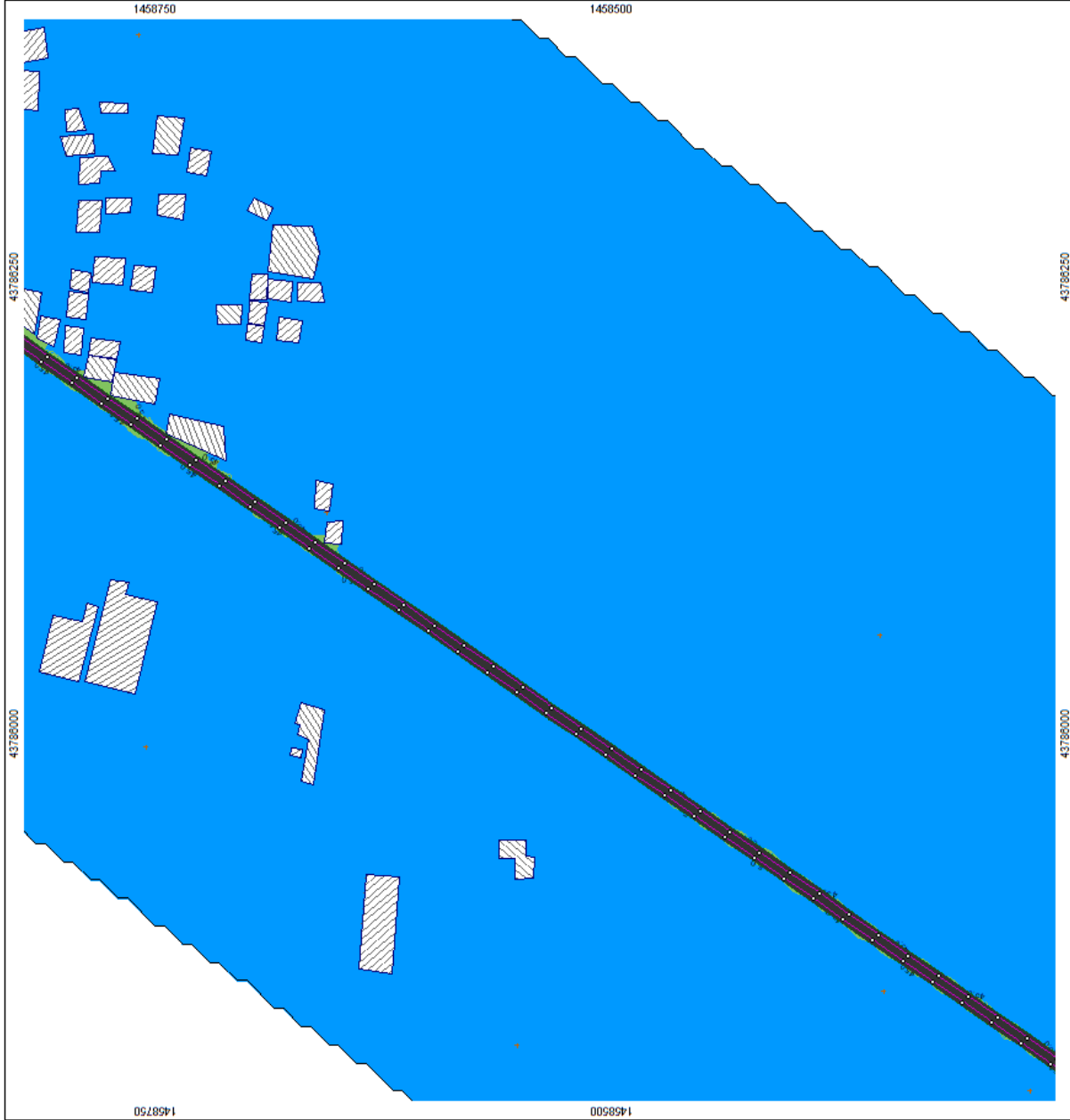
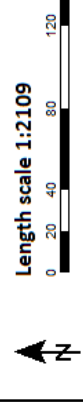
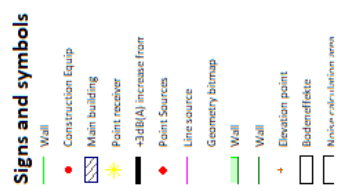
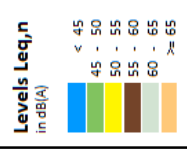


KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Noise contours from the model using the ILMU Sonar
BAMCL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018



KR Puram to Kempegowda International Airport

Orientation of Noise
 Modelling Area Bound Map and Soundmap Levels
 Train noise map levels taken from DMU Soundmap B.1.1. Library and
 BMRCL Building Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
 Noise Contour Map
 Leq,d**

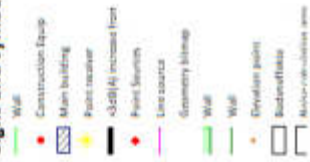
Calculation in 1.5 m above ground

Project engineer: CNR
 Created: 3.11.2023
 Produced with: SoundPLAN 8.1.1, Update: 10/23/2023

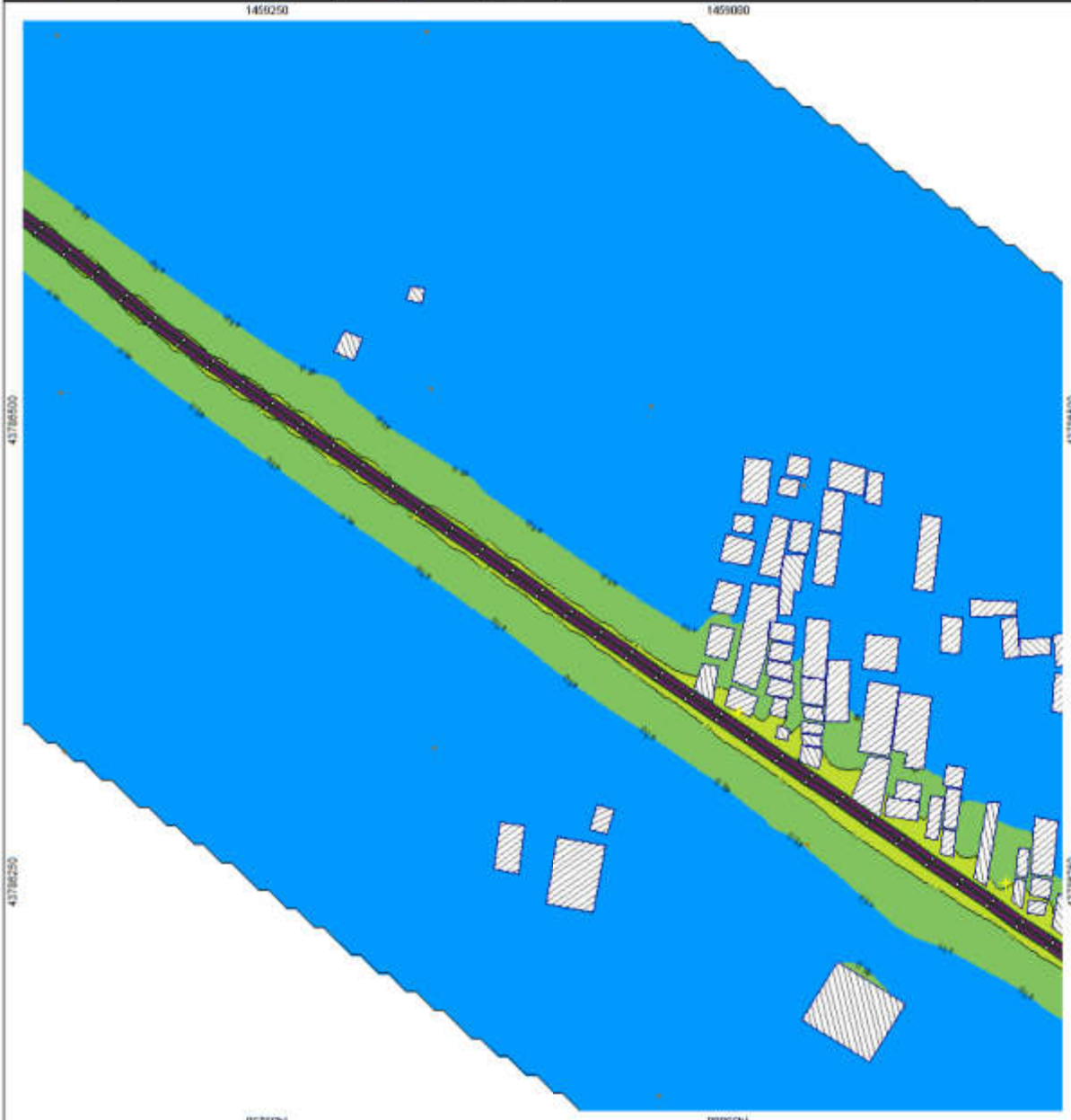
Levels Leq,d



Signs and symbols



Length scale 1:2109

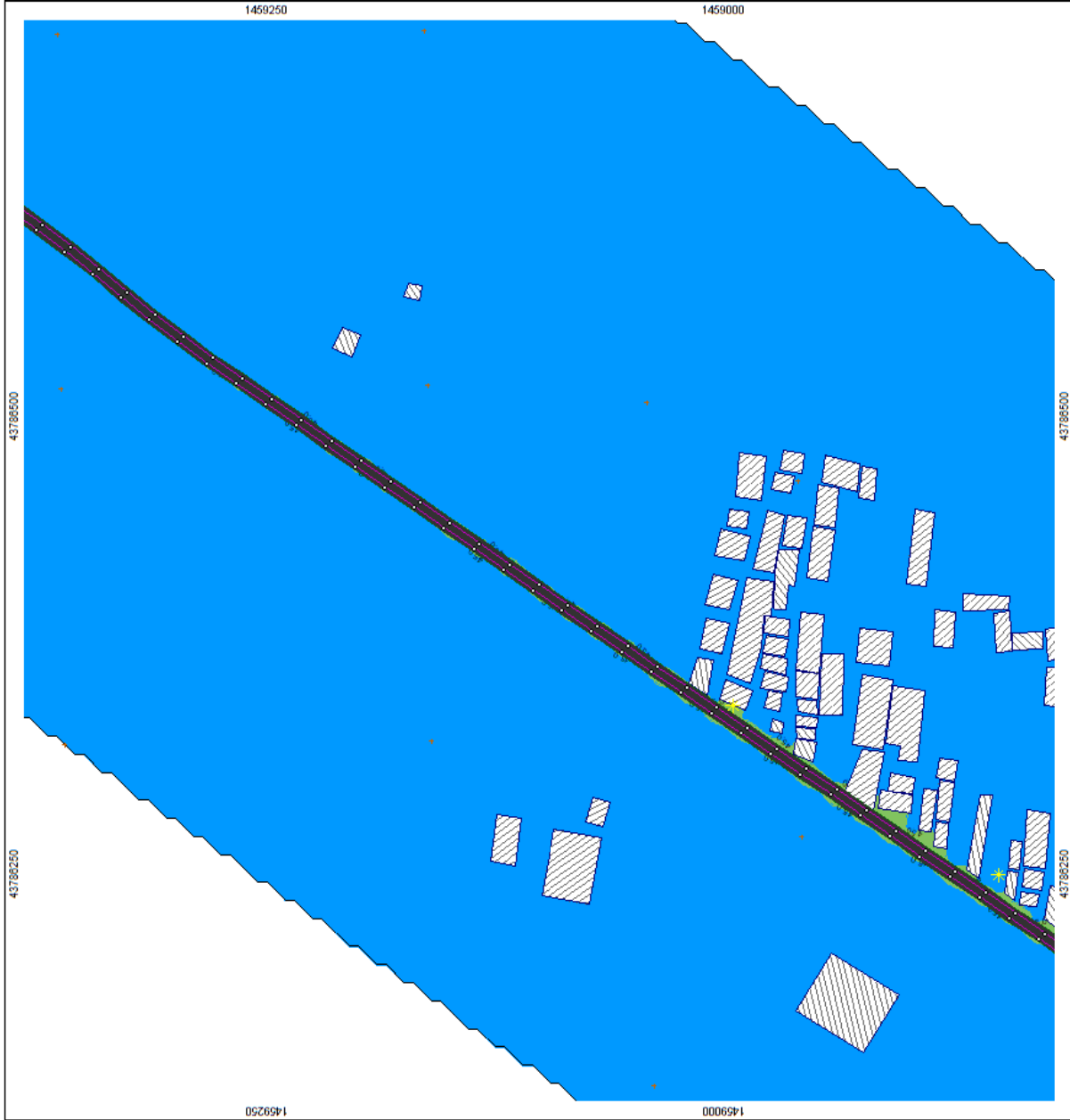


KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Noise contours from SoundPLAN 8.1.1 Library and
BANCAL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 19/10/2020
Processed with SoundPLAN 8.1.1, Update 10/23/2018

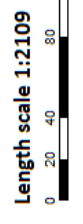


**Levels Leq,n
in dB(A)**



Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodeneffekte
- Noise calculation area



KR Puram to Kempegowda International Airport

Operational Noise
Buildings from Street Map and Google Earth
Noise contours from May 2024
SMAQI, Soil, Road, and Air Quality
Health from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

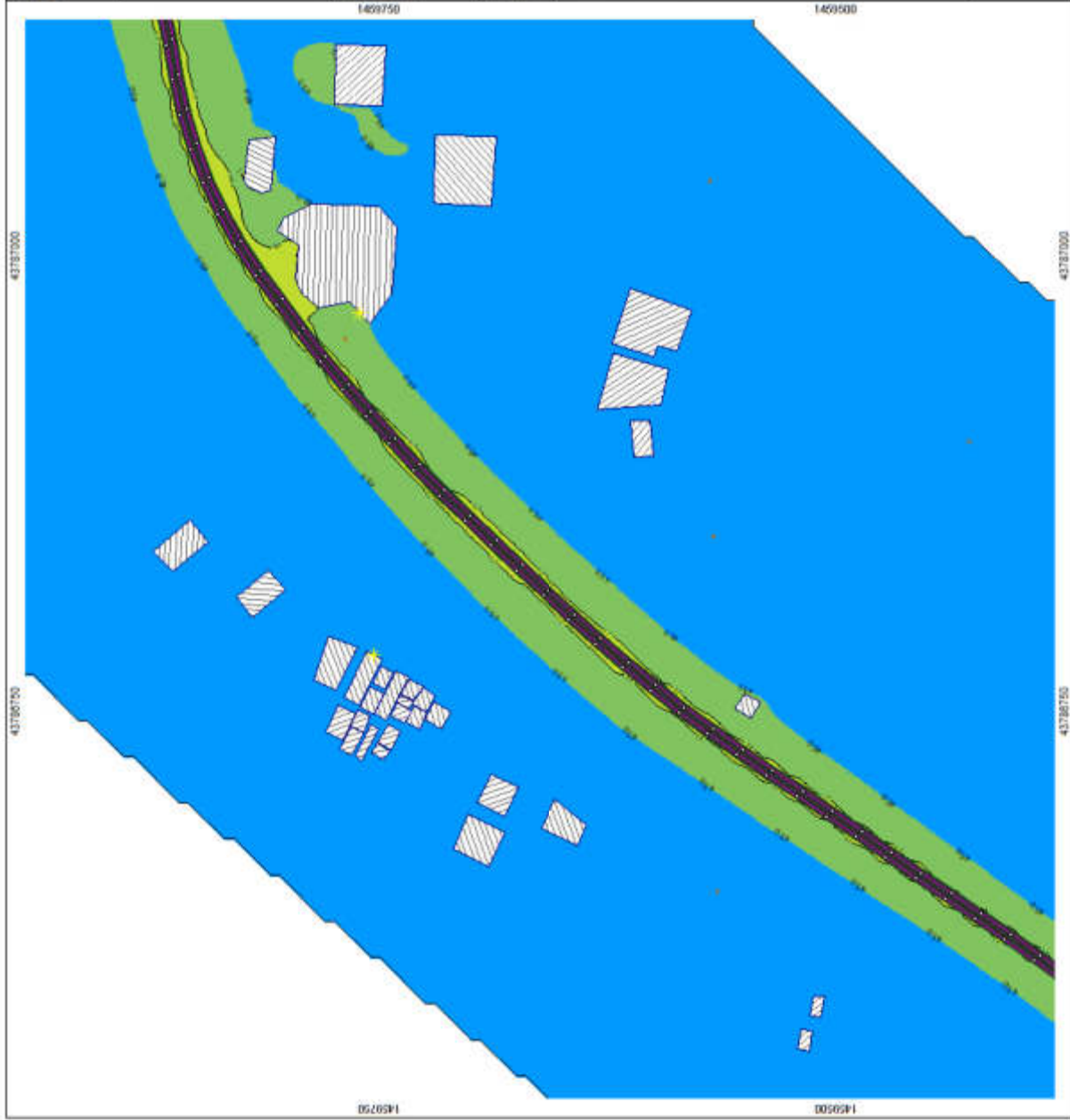
Project engineer: DMK
Project: 17020003
Prepared with SoundPLAN 11. Update: 16/03/2024

Levels Leq,d in dB(A)

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Wall
- Construction fence
- Main building
- Point receiver
- 10dB(A) increase from
- Point Source
- Line source
- Geometry diagram
- Wall
- Direction point
- Background noise
- Reference noise



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise power levels taken from EMU Soundplan 8.1. Library and BIRAC. Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1. Update: 10/23/2018

Levels Leq,n in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Construction Equip
Main building
Point receiver
-3dB(A) increase from
Point Sources
Line source
Geometry bitmap
Wall
Elevation point
Bottomeflate
Noise calculation area

