

Environmental Impact Assessment

October 2020

India: Bengaluru Metro Rail Project

Phase 2A (Outer Road Ring Metro Line)

Volume 11
Annex 5

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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KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Main noise power levels taken from IIR/Scientific & Library and
BIMBQ listing 2014. Other buildings taken from Google Earth
and from Feasibility Study.

**120 2041 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

Project engineer: DMH
Created: 30/11/2020
Processed with soundPLAN 8.11, Update 10/03/2018

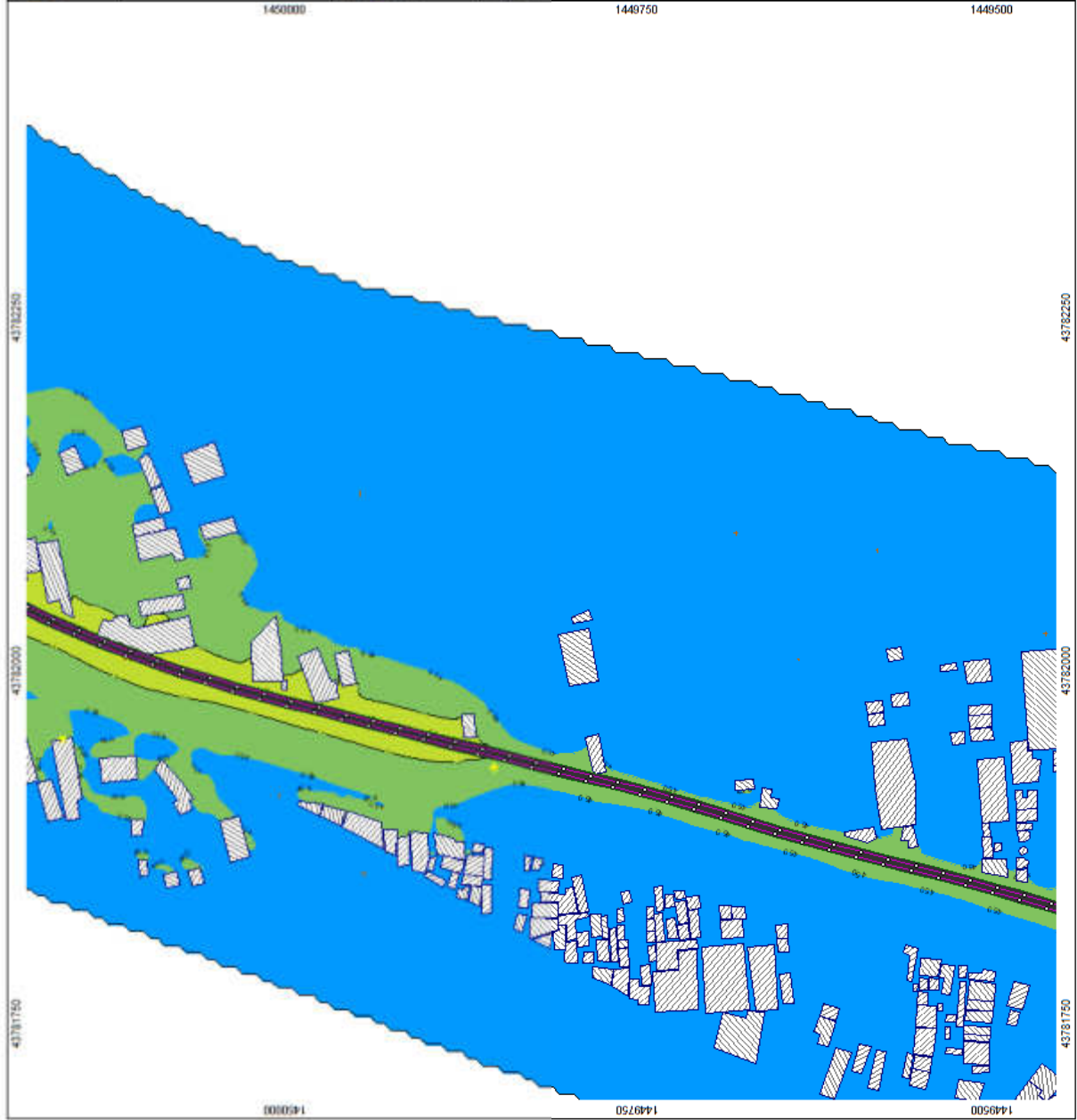
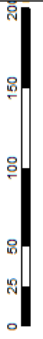
**Levels Leq,n
in dB(A)**



Signs and symbols

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

Length scale 1:2727



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Green Map and Google Earth.
Noise power levels taken from ENR Guidelines 8.1 Library and
BNAI. Noise contour calculation, noise prediction and
visuals from Predictability Study.

**120 2041 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

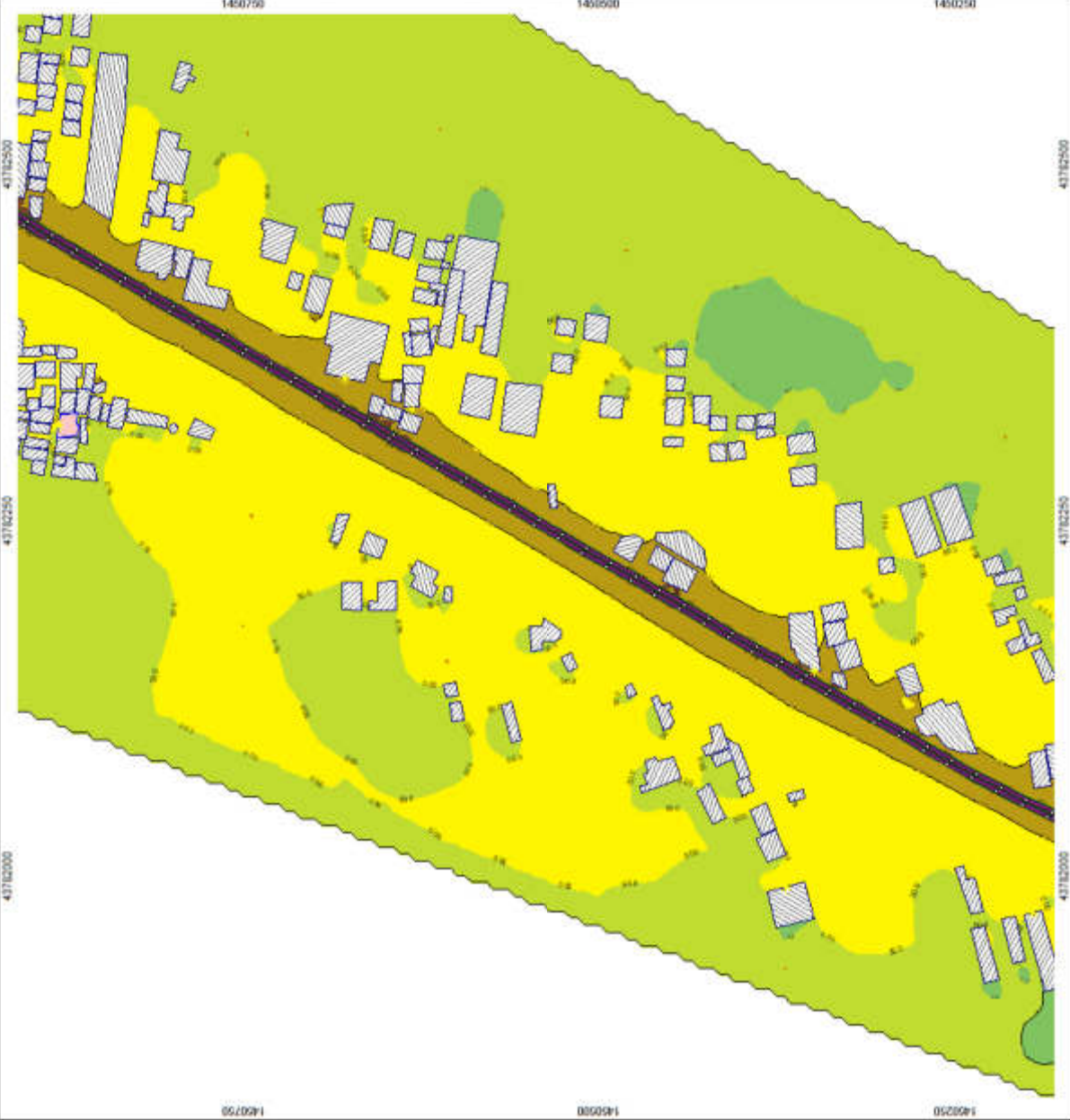
Project engineer: CMM
Created: 9/11/2020
Processed with SoundPLAN 8.1, Update 10/03/2018

Levels Leq,d
in dB(A)

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

Signs and symbols

Construction Equip
Main building
Point source
1000(A) receiver filter
Point Source
Line source
Geometry source
Wall
Wall
Elevation point
Hydrofactor
Receiver elevation zone



KR Puram to Kempegowda International Airport

Contourlines derived from Intra Map and Google Earth. Train and car levels taken from DMU Specification & Library and BMBCI Building Stock Specification. Train schedule and speeds from Feasibility Study.

120 2041 2B with Parapet Wall Noise Contour Map

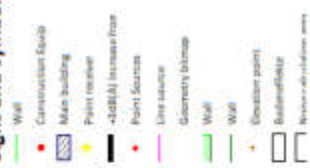
Leq_n Calculation in 1.5 m above ground

Project engineer: CMR
 Checked: B.L.L.2020
 Prepared with SoundPLAN 8.1. Update: 10/23/2018

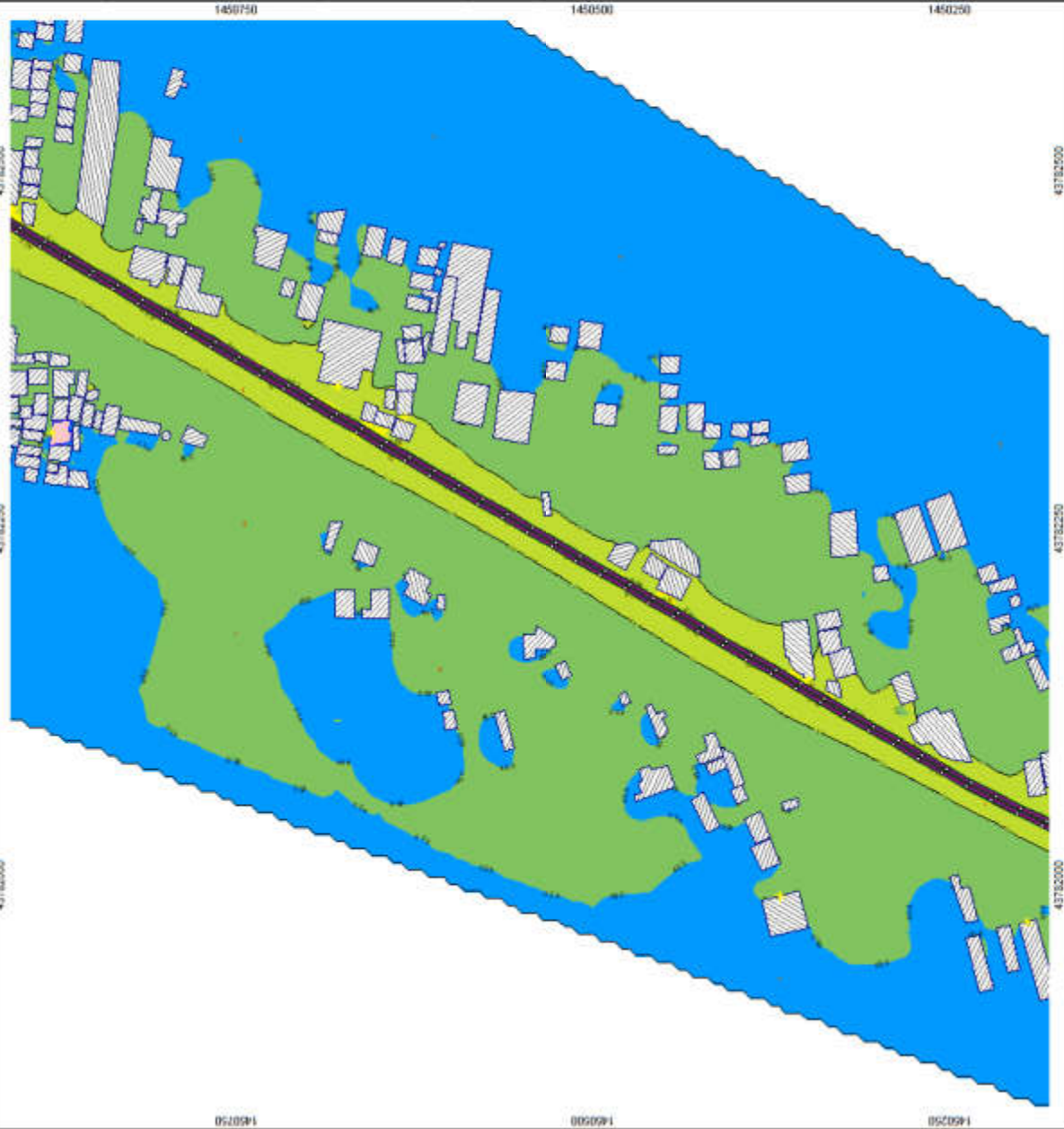
Levels Leq_n



Signs and symbols



Length scale 1:2727



KR Puram to Kempegowda International Airport

Operational Noise
Buildings from Soos Map and Google Earth.
The noise power levels from ICAO SoundPLAN 8.1 Library and
BANC, building Stock Specifications. Train schedule and
speeds from Feasibility Study.

**120 2041 2B with Parapet Wall
Noise Contour Map
Leq,d**

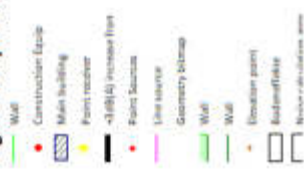
Calculation in 1.5 m above ground

Project engineer: CMB
Created: 05/11/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

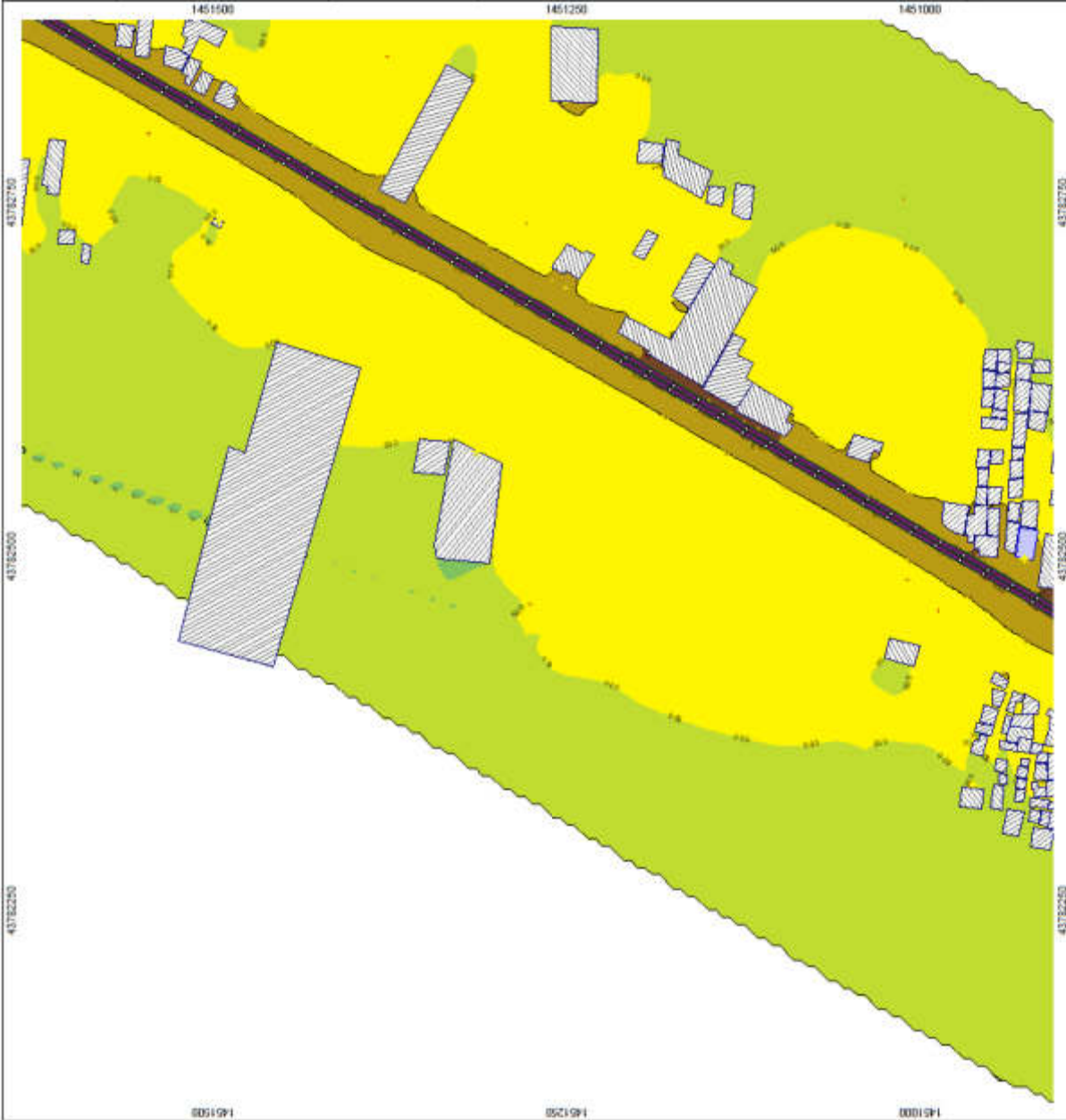
Levels Leq,d



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 DMO Soundmap & Library and
BNSF building Stock Identification. Train vehicles and
speeds from feasibility study.

**120 2041 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

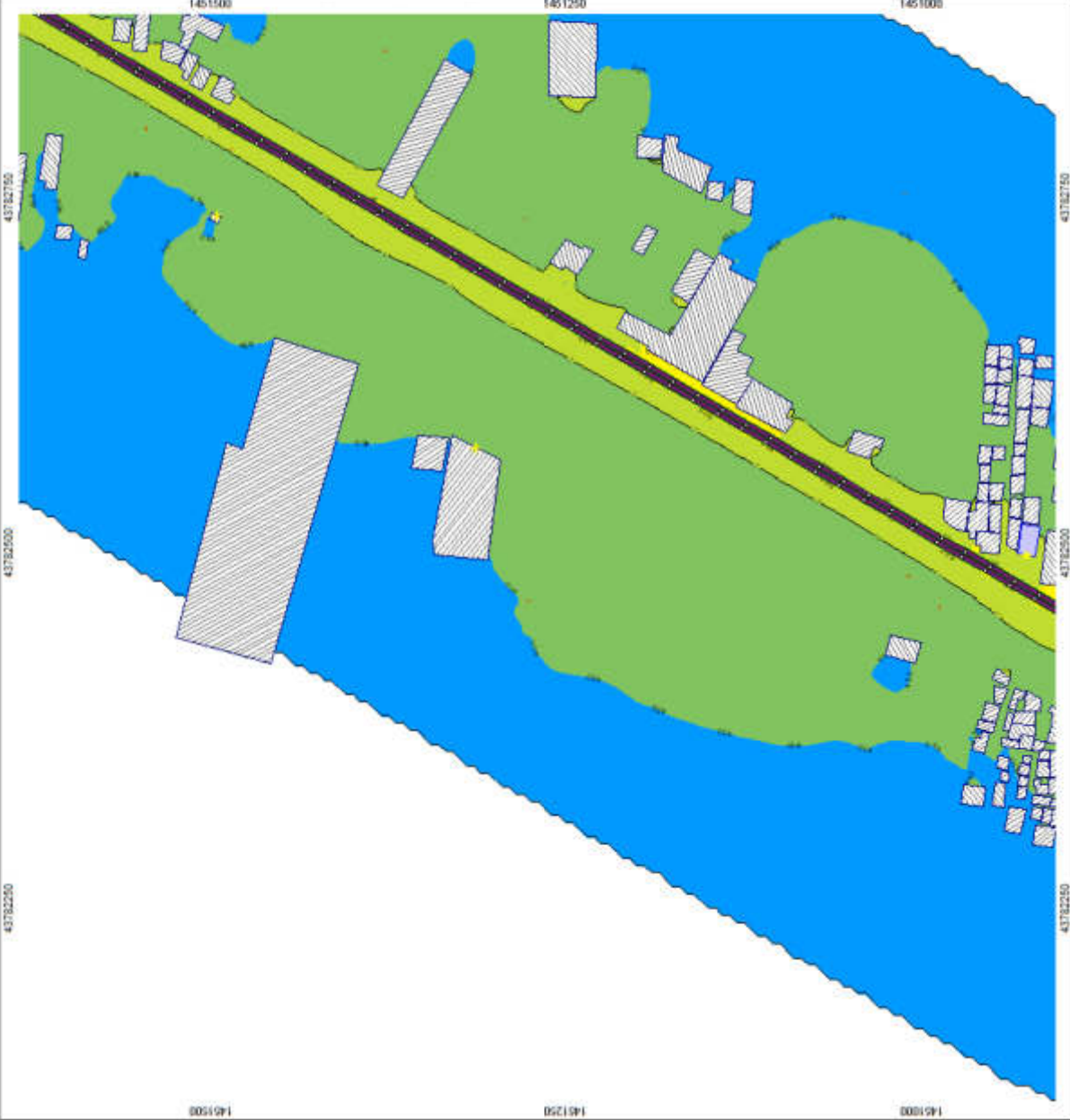
Project engineer: CMM
Created: 01/10/20
Previous with SoundPLAN 8.1 Update (607302618)

Levels Leq,n
in dB(A)

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

Signs and symbols

Construction Eye
Main building
Point receiver
-3dB(A) increase from
Point Source
Line source
Geometry change
Wall
Wall
Division point
Subdivision
Noise calculation area



KR Puram to Kempegowda International Airport

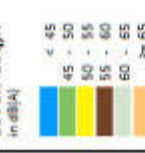
Operational Noise, Building Area Map and Google Earth. This noise map was prepared from the (B&B) Simulation 8.1 Library and (B&B) Building Stock Specifications. Train schedule and speeds from Feasibility Study.

120 2041 2B with Parapet Wall Noise Contour Map

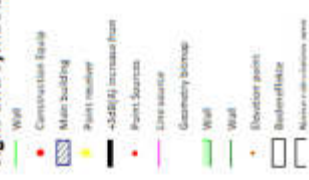
Leq_n Calculation in 1.5 m above ground

Project engineer: GMR
 Created: 5/11/2020
 Processed with: SoundPLAN 8.1, Update 10/21/2018

Levels Leq_n in dB(A)



Signs and symbols



Length scale 1:2727



KR Puram to Kempgowda International Airport

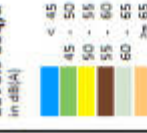
Operational Noise, Obstacle Clearance, Obstruction Map and Ground Length. From aircraft noise taken from (DMU) Scandillon B.L.I Library and (BMRCL) Building Stock Specifications. Train schedule and speeds from Feasibility Study.

120 2041 2B with Parapet Wall Noise Contour Map

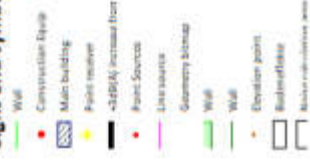
Leq,d
Calculation in 1.5 m above ground

Project engineer: CNR
Created on: 11/12/2010
Associated with: SoundPLAN B.L.I. Update: 16/07/2018

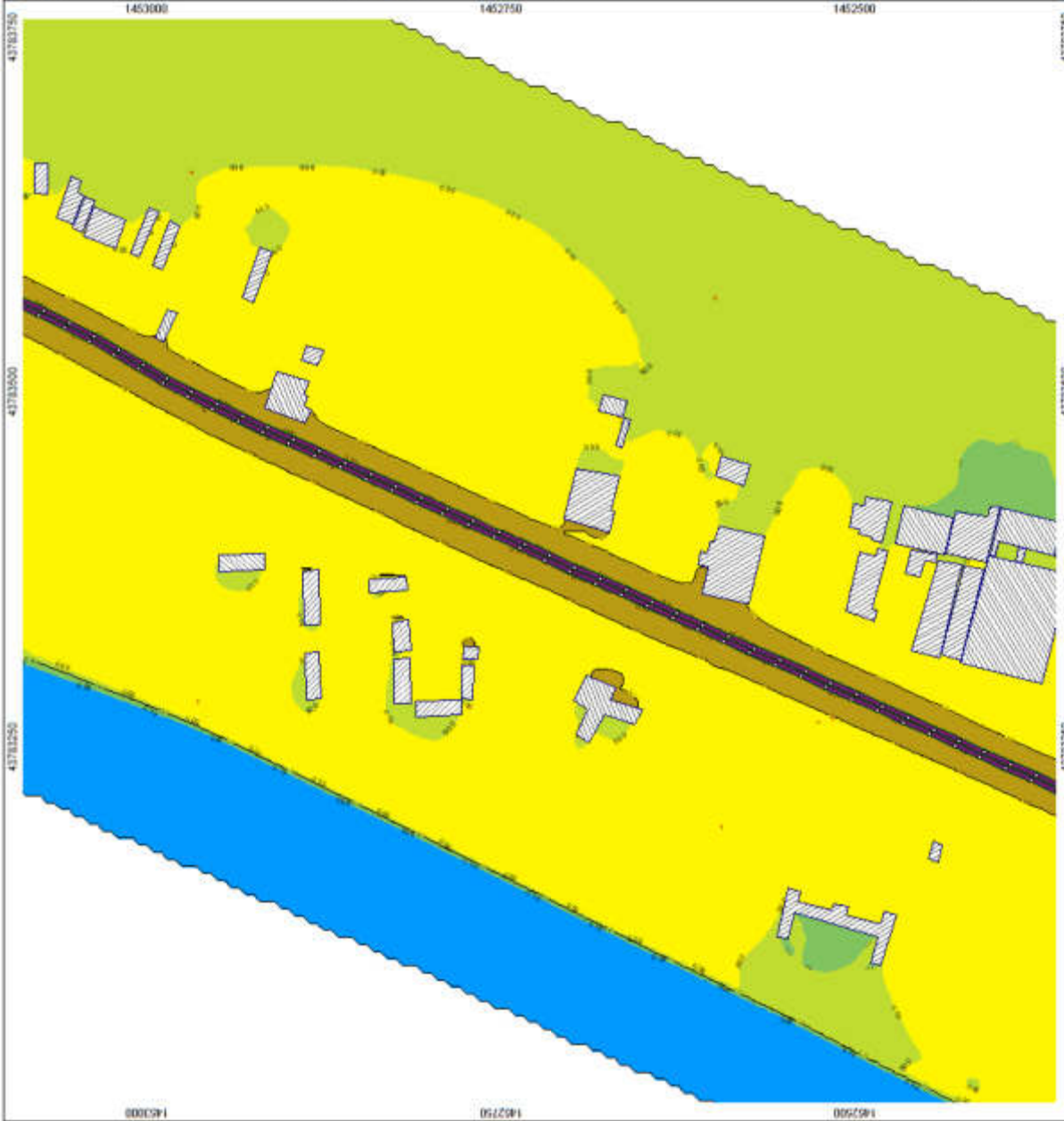
Levels Leq,d in dB(A)



Signs and symbols



Length scale 1:2727



KR Puram to Kempegowda International Airport

Operational Basis:
Buildings from Street Map and Google Earth.
Main colour-coding from Urban Noise Assessment (U.N.A.) Library and
Black building blocks for location. Train stations and
stops from Railway Study.

**120 2041 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

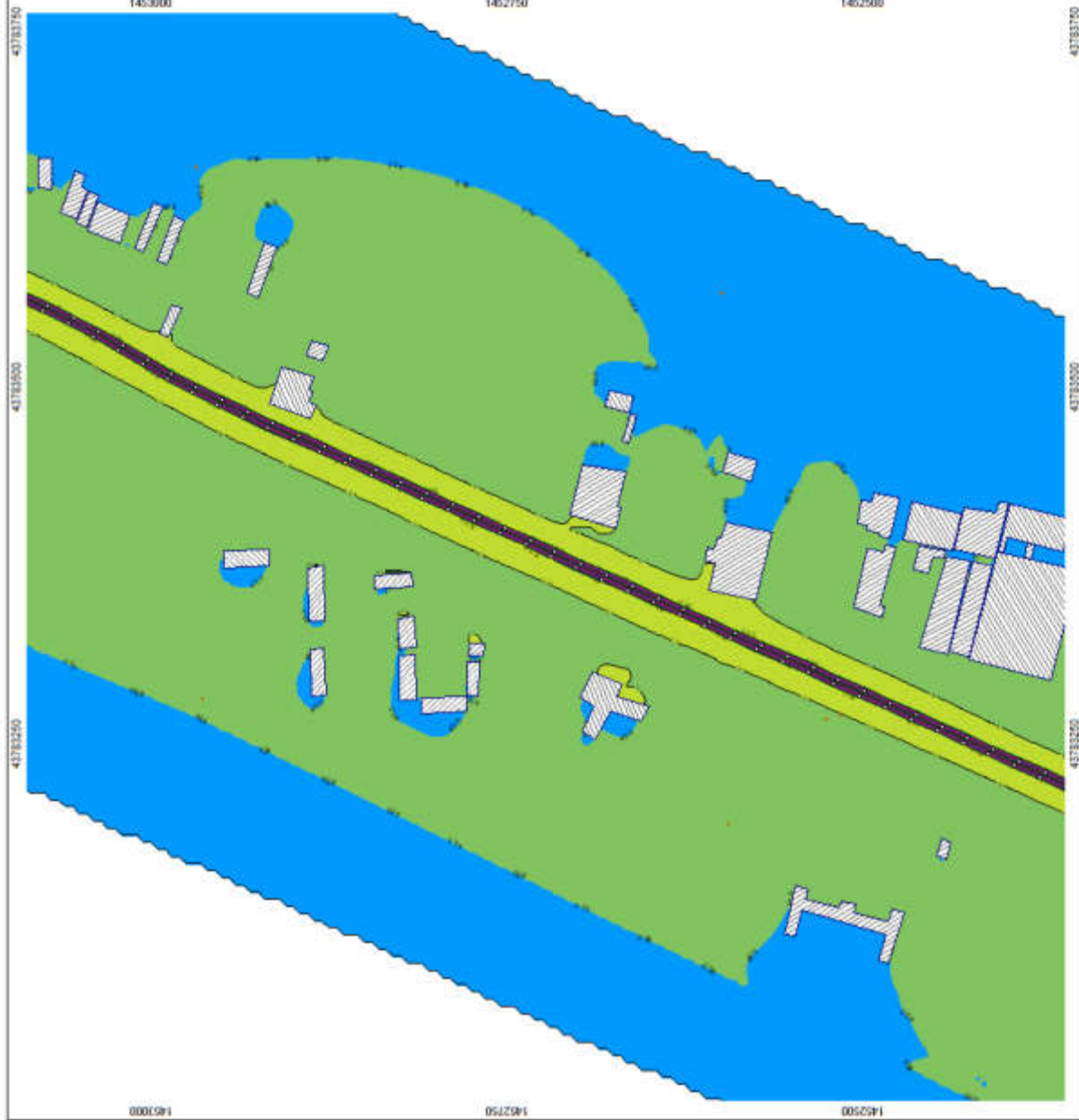
Project engineer: CMR
Contact: 97117020
Provided with StreetMap & L. Update (07/12/18)

Levels Leq,n in dB(A)

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

Signs and symbols

Wall
Construction type
Main building
Point marker
>35dB(A) increase from
Point Source
Line source
Geometry building
Wall
Wall
Direction points
Acoustic fence
Noise calculation area



KR Puram to Kempegowda International Airport

Operational Basic:
Buildings from Screen Map and Google Earth.
Train noise parameter values taken from DMU SoundPLAN 8.1.1 Library and
BIMBCL Building Stock Specification. Train schedule and
speeds from Feasibility Study.

120 2041 2B with Parapet Wall
Noise Contour Map
Leq,d
Calculation in 1.5 m above ground

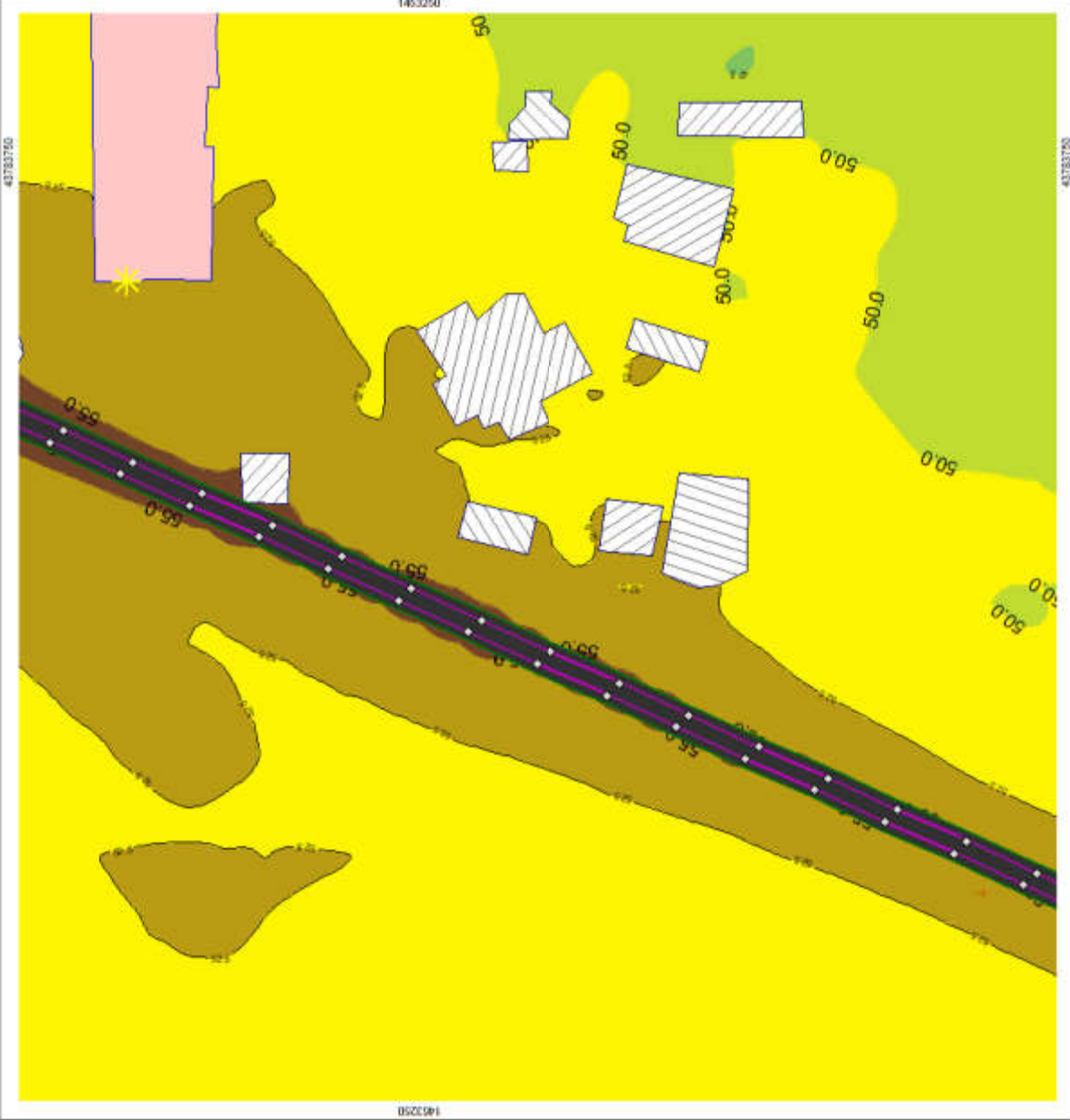
Project engineer: CMH
Created: 6/11/2020
Processed with SoundPLAN 8.1.1, Update: 10/21/2018

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

Red circle	Wall
Green circle	Construction Equip
Blue square	Main building
Yellow star	Point receiver
Black circle	+3dB(A) increase from
Red circle	Point Source
Pink line	Line source
Green line	Secondary building
Green line	Wall
Red line	Wall
Black cross	Diversion points
Black square	Substation
Black rectangle	Noise calculation area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise barrier levels taken from DMU Subscription E.I. Library and
BABC Building Gawk Specification. Train schedule and
speeds from feasibility study.

**120 2041 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

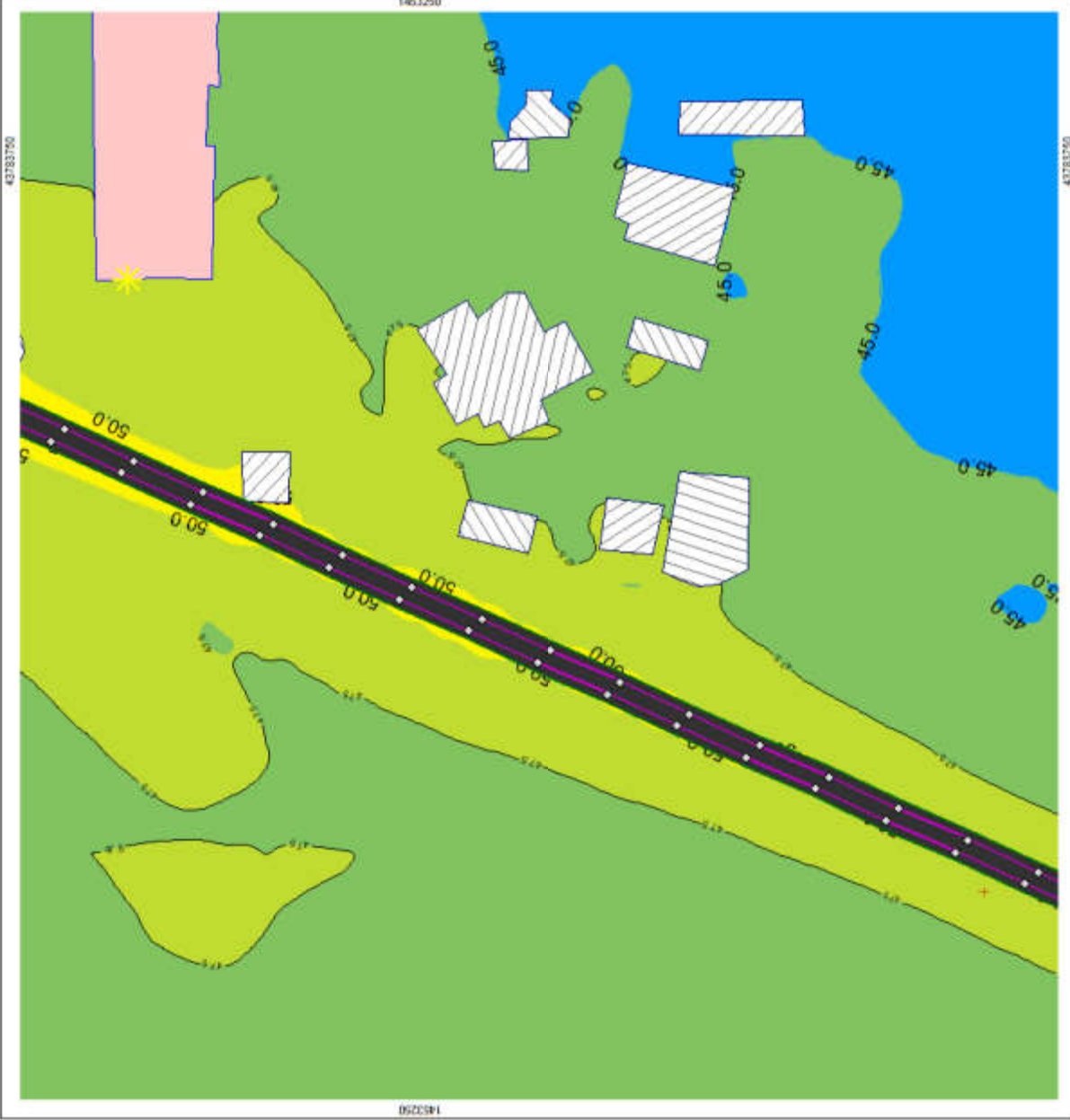
Project engineer: CNB
Created: 8/11/2020
Processed with SoundPLAN 8.1.1, Update 10/23/2018

Levels Leq,n
in dBA

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

Signs and symbols

Red circle	Construction fence
Blue square	Wall
Blue square with diagonal lines	Make building
Yellow star	Point receiver
Black circle with diagonal lines	-3dB(A) increase from
Red circle	Point sources
Pink line	Live source
Green line	Geometry change
Green line	Wall
Green line	Wall
Green line	Excavation points
White square	Receptor
White square	Receiver at different times



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Noise contours are derived from the 2005 SoundPLAN 8.1.1 Library and
MARC's Building Block algorithm. The algorithm
applies from feasibility study.

**120 2041 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

Project engineer: CMH
Created: 9/11/2020
Processed 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

Construction Equip
Main building
Point receiver
+3dB(A) increase from
Point receiver
Line source
Geometry blocking
Wall
Wall
Elevation point
Background
Receiver calculation area

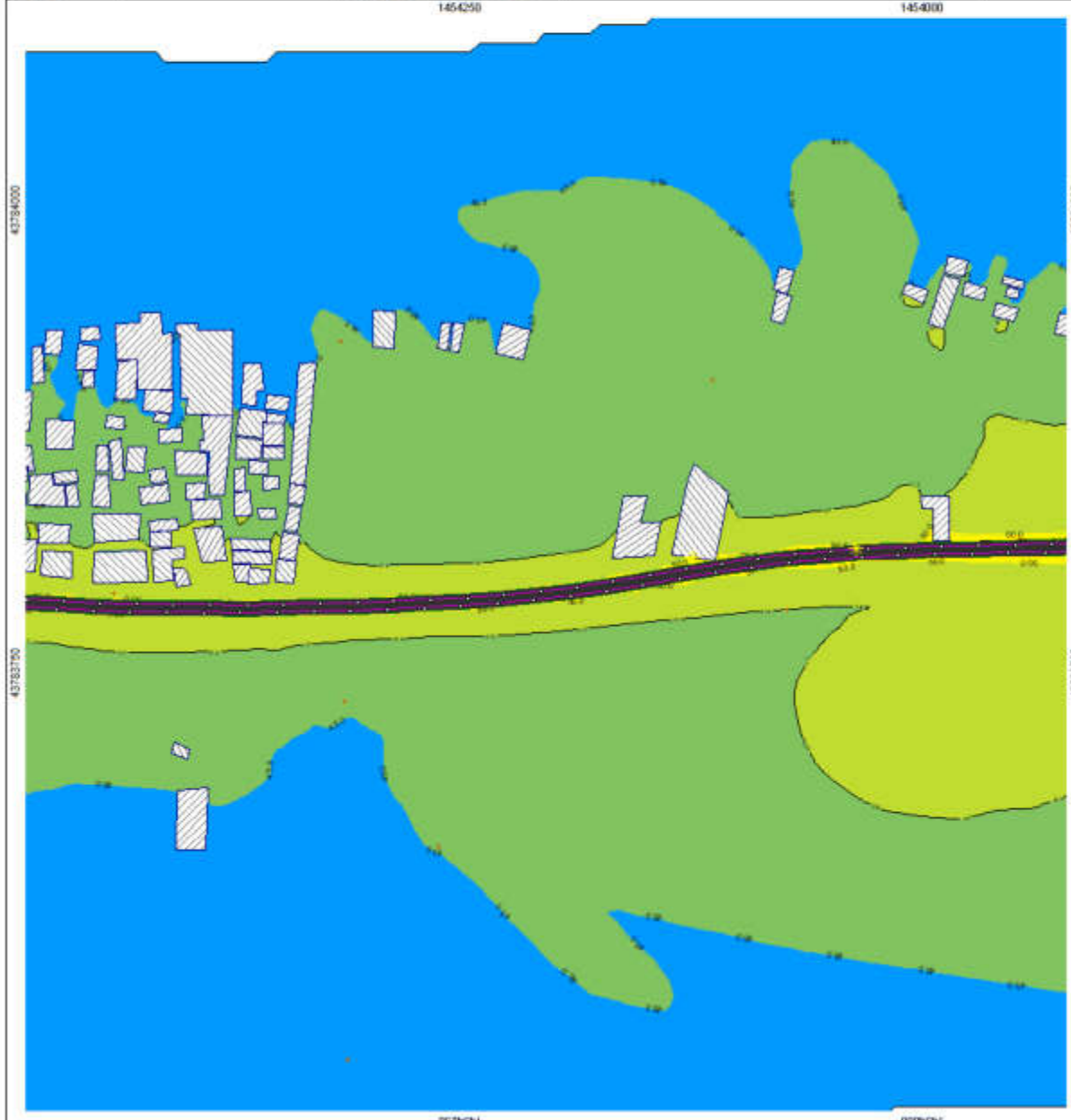


KR Puram to Kempegowda International Airport

Operational Route:
 Building from Street Map and Google Earth.
 Main structure walls taken from IBM Sketchplan 8.1 Library and
 IBM CL Building Block Specifications. Item standards and
 symbols from feasibility study.

**120 2041 2B with Parapet Wall
 Noise Contour Map
 Leq,n**
 Calculation in 3.5 m above ground

Project engineer: OMR
 Created: 3/1/2018
 Processed with SoundPLAN 8.1, Update: 10/21/2018



KR Puram to Kempegowda International Airport

Operational Noise:
 Buildings from Street Maps and Google Earth
 Buildings from Street Maps and Google Earth
 BMBCL Building Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2041 2B with Parapet Wall
 Noise Contour Map
 Leq,d**

Calculation in 1.5 m above ground

Project engineer: CNR
 Created on: 01/10/2010
 Project: with Saurabh/AN E.L. Update 10/21/2010

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

Red line	Wall
Green line	Construction Equip
Blue hatched box	Main building
Yellow hatched box	Point receiver
Black line with arrow	-10dB(A) increase due
Red line with arrow	Point source
Pink line	Line source
Green hatched box	Geometry change
Green line	Wall
Red line	Wall
Red dot	Elevation point
Red rectangle	Receptor
Red rectangle	Receptor-substation area



KR Puram to Kempegowda International Airport

Operational Period:
 Starting from Street Map and Google Earth.
 From Bangalore to Airport (BMR) Soundbarrier R.L. Library and
 BMRD Building South Specification. Train schedule and
 speeds from Feasibility Study.

**120 2041 2B with Parapet Wall
 Noise Contour Map**

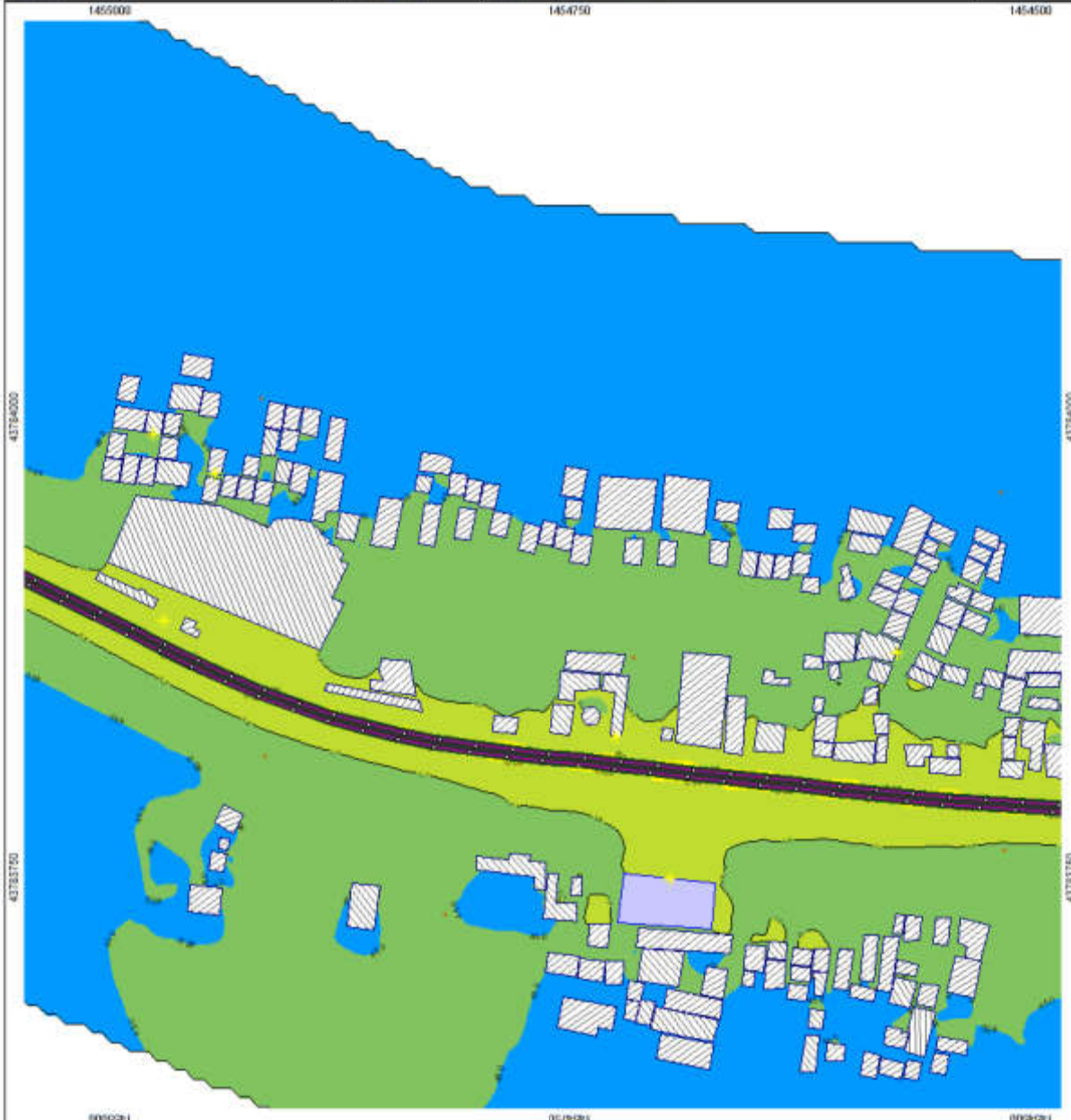
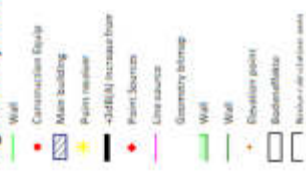
Leq,n
 Calculation in 1.5 m above ground

Project engineer: CMR
 Created: 9.11.2010
 Produced with SoundPLAN 8.1.1 Update (02/10/18)

Levels Leq,n



Signs and symbols



KR Puram to Kemppegowda International Airport

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

**120 2041 2B with Parapet Wall
 Noise Contour Map
 Leq,d**
 Calculation in 1.5 m above ground

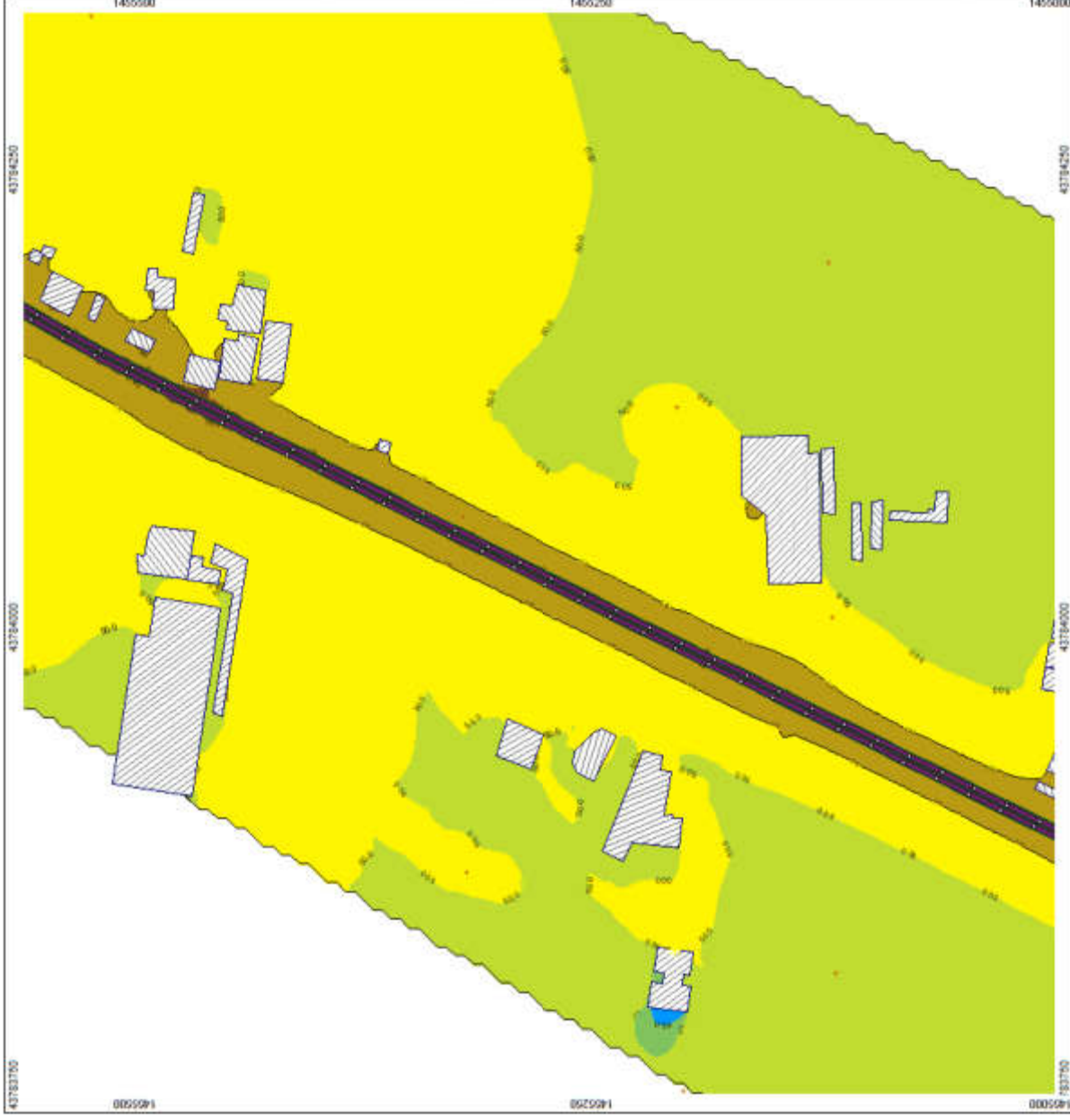
Project engineer: OMB
 Created: 8/11/2020
 Projected with SoundPLAN 8.1, Update 10.0.12018

Levels Leq,d in dB(A)

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

Signs and symbols

- Wall
- Construction Equip
- Main building
- Front receiver
- 3 dB(A) increase from
- Point Sources
- Line source
- Geometry change
- Wall
- WAF
- Elevation points
- Background noise
- Receiver elevation above



KR Puram to Kempegowda International Airport

Operational Noise:
 Right from the Map and Google Earth
 The noise levels taken from DMS Soundplan 8.1 Library and
 (MBC) Building Stock Specification. Type schedule and
 aspects from Feasibility Study.

**120 2041 28 with Parapet Wall
 Noise Contour Map**
 Leq_n
 Calculation in 1.5 m above ground

Project engineer: CMR
 Created: 01/11/2020
 Processed with: SoundPLAN 8.1, Update 10.0.1.02118

Levels Leq_n
 In dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
65 - 70
70 - 85

Signs and symbols

Construction Equip
Main building
Point number
-3 dB(A) increase from
Point Source
Line source
Geometry blocking
Wall
Wall
Elevation point
Hydrofloodline
Water table elevation



KR Puram to Kempegowda International Airport

Operational Noise
Buildings from Street Map and Google Earth.
Train noise barrier both taken from DMU Soundplan 8.1 Library and
BMBCL Existing Stock Specifications. Train schedule and
speeds from Feasibility Study.

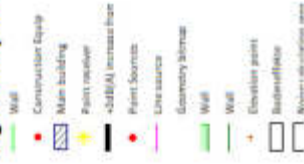
**120 2041 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/11/2020
Processed with SoundPLAN 8.1. Update: 10/21/2018

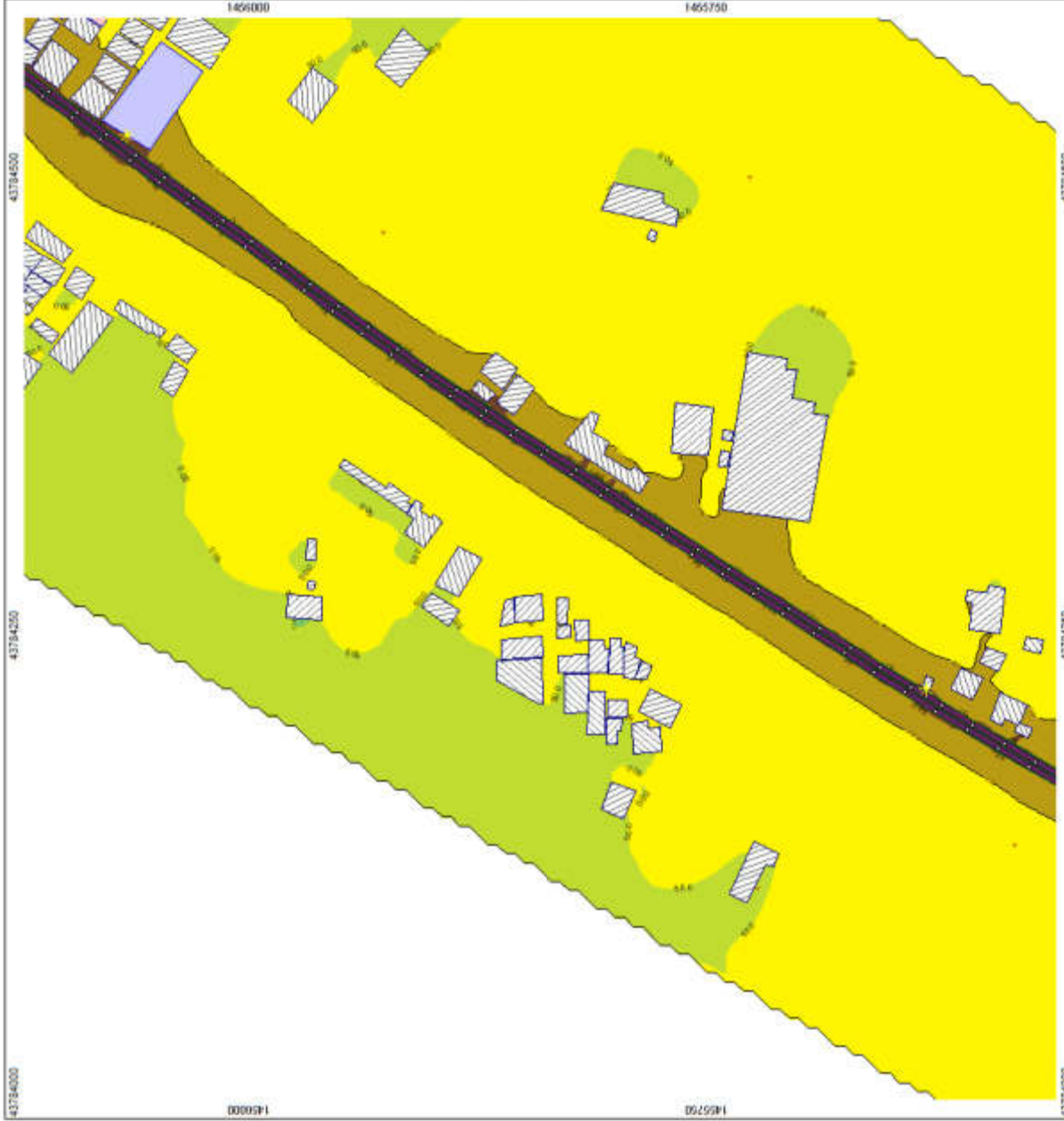
Levels Leq,d
in dB(A)



Signs and symbols



Length scale 1:2109



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
True noise power levels taken from ICAO, Stockholm & Library and
BAAEC Rating Stock Specifications. True sound level and
spread from feasibility study.

**120 2041 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 04/11/2020
Processed with SoundPLAN 8.1. Update: 10/21/2018

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

Red line	Construction type: Wall
Blue hatched area	Main building
Yellow star	Point receiver
Black line with red dot	-3dB(A) increase from
Black line with red dot	Point sources
Purple line	Line source
Green line	Geometry lines
Green line	Wall
Red line	Wall
Red dot	Elevation point
White box	Superficial
White box	Noise-reduced line area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Noise meter tower (not taken from IIR) Specifications & Library and
IIR/CI. Existing Stock Specifications. Train schedule and
speeds from Feasibility Study.

**120 2041 2B with Parapet Wall
Noise Contour Map
Leq,n**

Calculation in: 1.5 m above ground

Project engineer: DMK
Course: 30/12/2020
Prepared with AutoCAD & L. Update: 10/21/2018

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

Red dot	Wall
Green dot	Construction Equip
Blue hatched box	Main Building
Yellow hatched box	Paint number
Black dot	-(dB(A) increase from
Red dot	Paint Source
Black line	Line source
Green line	Geometry (shape)
Green line	Wall
Red line	Elevation point
Black box	Station/stop
Black box	Reference elevation area

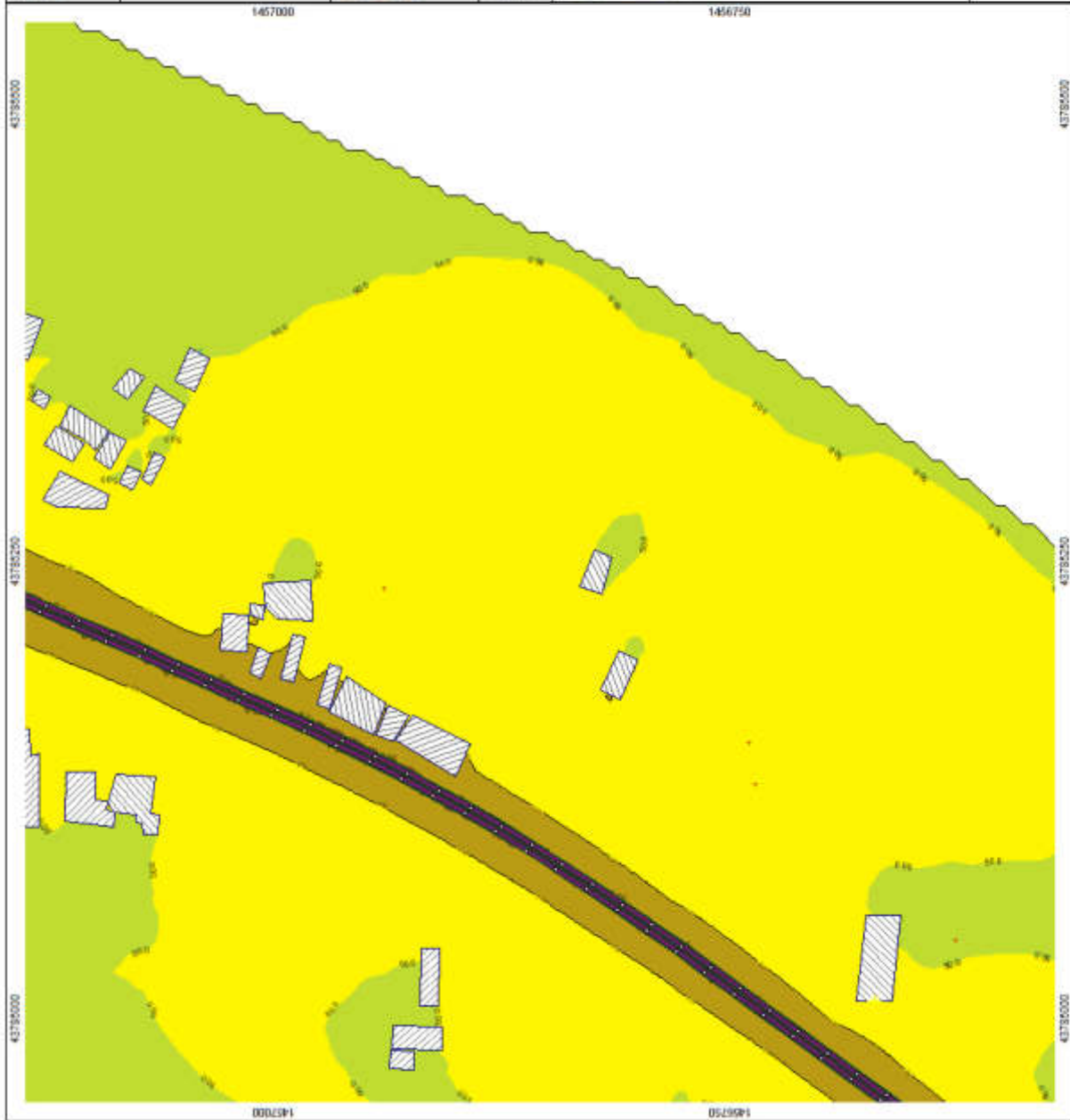


KR Puram to Kempegowda International Airport

Operational Noise:
 Building from Street Map and Google Earth.
 Data from the noise contours from the ICAO Annex 14 Library and
 ICAO Building Block Specification. Train vehicles and
 aircraft from feasibility study.

**120 2041 2B with Parapet Wall
 Noise Contour Map
 Leq,d**
 Calculation in 1.5 m above ground

Project engineer: CMH
 Created in 11/2023
 Produced with SoundPLAN 8.1. Update 10/23/2018



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



Signs and symbols

- Wall
- Construction layer
- Main building
- Point source
- dB(A) intersection
- Point Source
- Line source
- Geometry source
- Wall
- Wall
- Division point
- Substrate
- Active calculation area



Length scale 1:2109



KR Puram to Kempegowda International Airport

Quantitative Noise
 Modelling Area Based Map and Sample Paths
 Train noise levels taken from DMU Soundline 8.1 Library and
 BANC Building Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2041 2B with Parapet Wall
 Noise Contour Map**

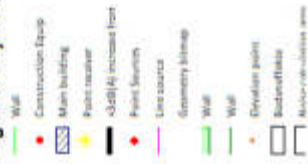
Leq,n
 Calculation in 1.5 m above ground

Project engineer: CNR
 Client: SLL/2013
 Produced with SoundPLAN 8.1.1, Update 10/21/2013

Levels Leq,n
 in dB(A)



Signs and symbols



Length scale 1:2109



KR Puram to Kempegowda International Airport

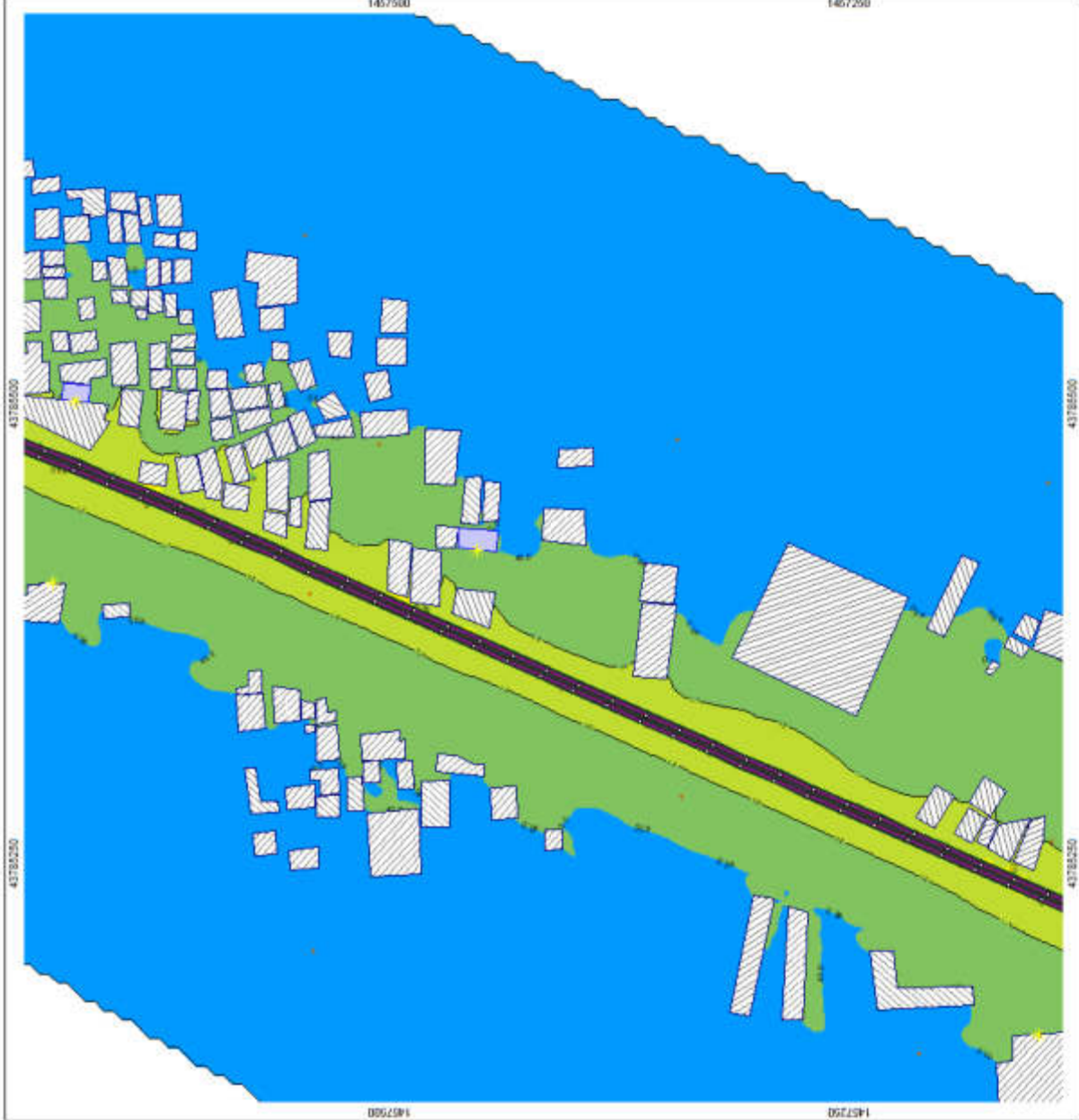
Directional Noise: Traffic from Town Map and Growth South. Traffic from Town Map and Growth North. Traffic from Town Map and Growth East. Traffic from Town Map and Growth West. Traffic from Town Map and Growth South. Traffic from Town Map and Growth North. Traffic from Town Map and Growth East. Traffic from Town Map and Growth West.

120 2041 2B with Parapet Wall Noise Contour Map

Calculation in 1.5 m above ground

Project engineer: DMK
 Created: 8/11/2020
 Approved with: Suresh Kumar S.L. Update: 10/21/2018

- Levels Leq_p in dB(A)**
- < 45
 - 45 - 50
 - 50 - 55
 - 55 - 60
 - 60 - 65
 - >= 65
- Signs and symbols**
- Wall
 - Construction Cycle
 - Main building
 - Point receiver
 - dB(A) increase due to wall
 - Point Source
 - Ultra source
 - Geometry storage
 - Wall
 - Elevation points
 - Background
 - Other noise sources



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Noise contours from the ICAO Annex 16, Part 3, Volume 1, Chapter 8.1. Library and
BANCIL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2041 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

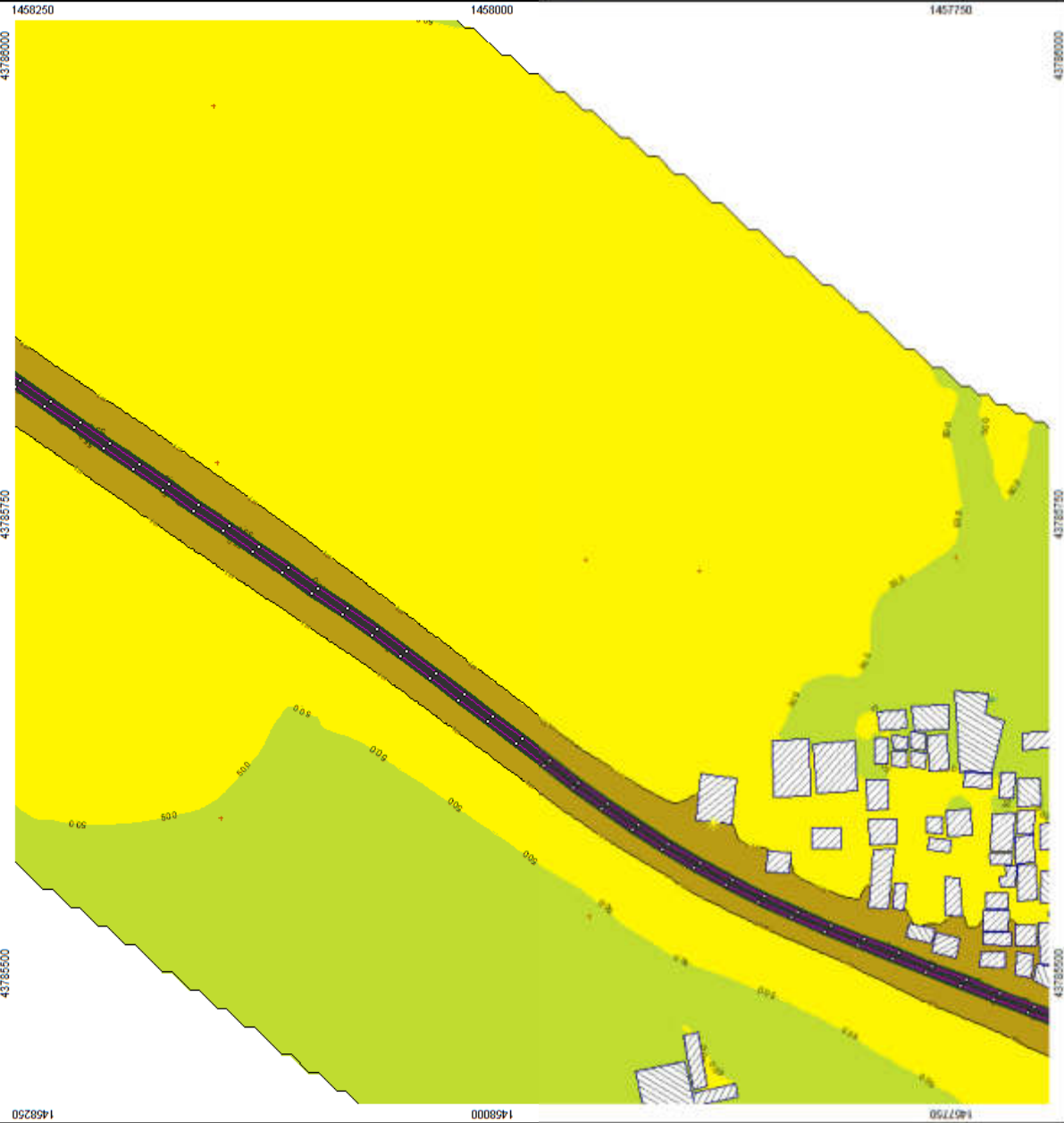
Project engineer: CMR
Created: 31/10/20
Reviewed: 10/23/2018
Proceed with SoundPLAN 8.1.1, Update 10/23/2018

Levels Leq,d
in dB(A)

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

Signs and symbols

Wall
Construction Equip
Main building
Road receiver
+3 dB(A) increase from
Point Source
Line source
Greenery beltway
Wall
Wall
Elevation point
Bottomplate
Notch/directional area

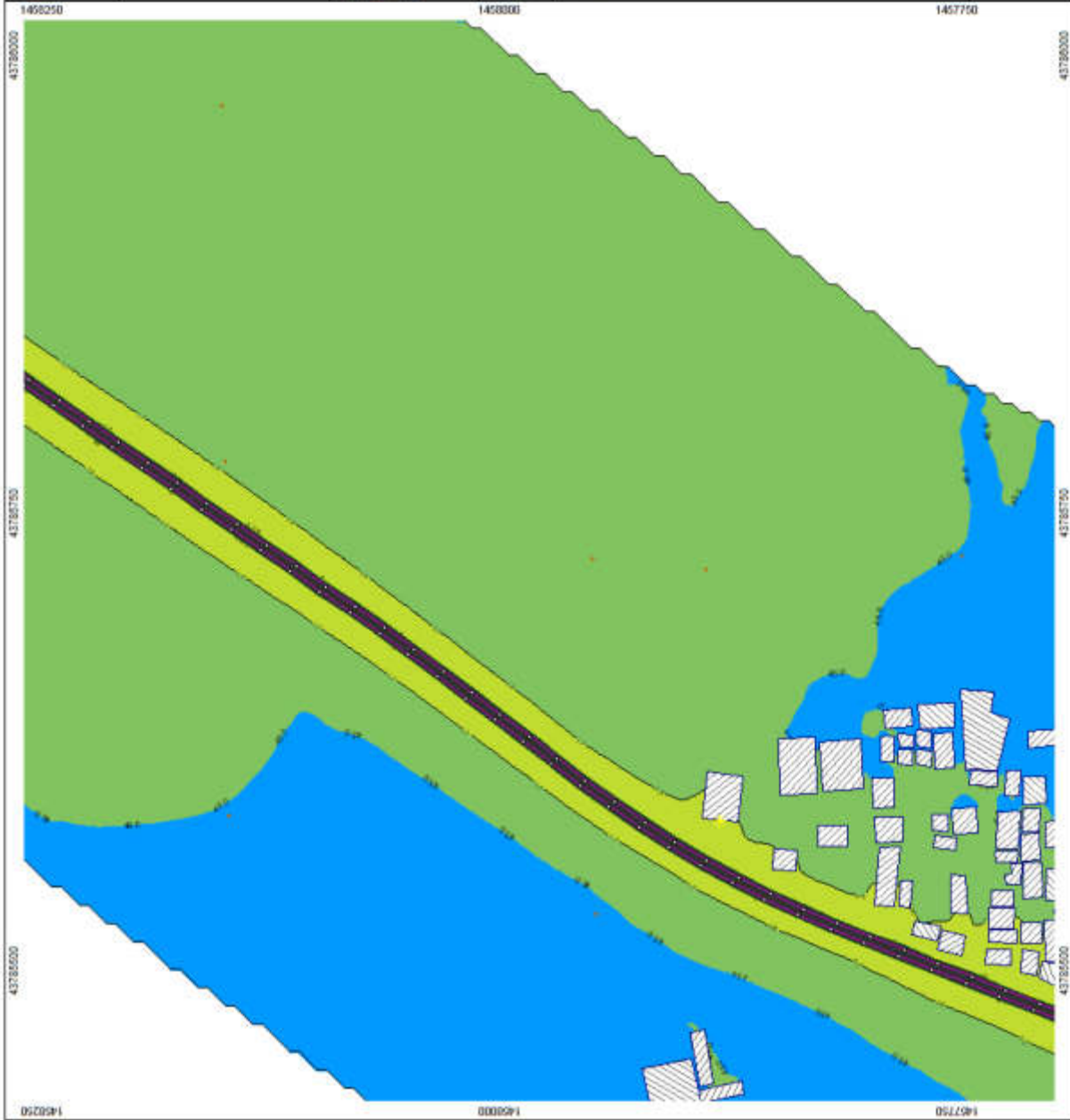


KR Puram to Kempegowda International Airport

Operational Noise, Building from Green Map and Growth Path, MARCs, Building Stock Specification, Year schedule and Month from Feasibility Study.

120 2041 2B with Parapet Wall Noise Contour Map
Leq,n
 Calculation in 1.5 m above ground

Project Engineer: CMR
 Project No: 11/2020
 Produced with SoundPLAN 8.1.1 Update (02/21/2018)



- Levels Leq,n**
in dB(A)
- < 45
 - 45 - 50
 - 50 - 55
 - 55 - 60
 - 60 - 65
 - >= 65
- Signs and symbols**
- Wall
 - Construction Eye
 - Main building
 - Point receiver
 - +10dB increase from
 - Point Source
 - Line source
 - Geometry Shape
 - Wall
 - Elevation point
 - Receptor/line
 - Microclimate area



KR Puram to Kempegowda International Airport

Operational Basic:
Buildings from Street Map and Google Earth.
Main noise power levels taken from DMR Surveillance S.I. Library and
Black Noise Book Specification. Train schedule and
levels from Feasibility Study.

**120 2041 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

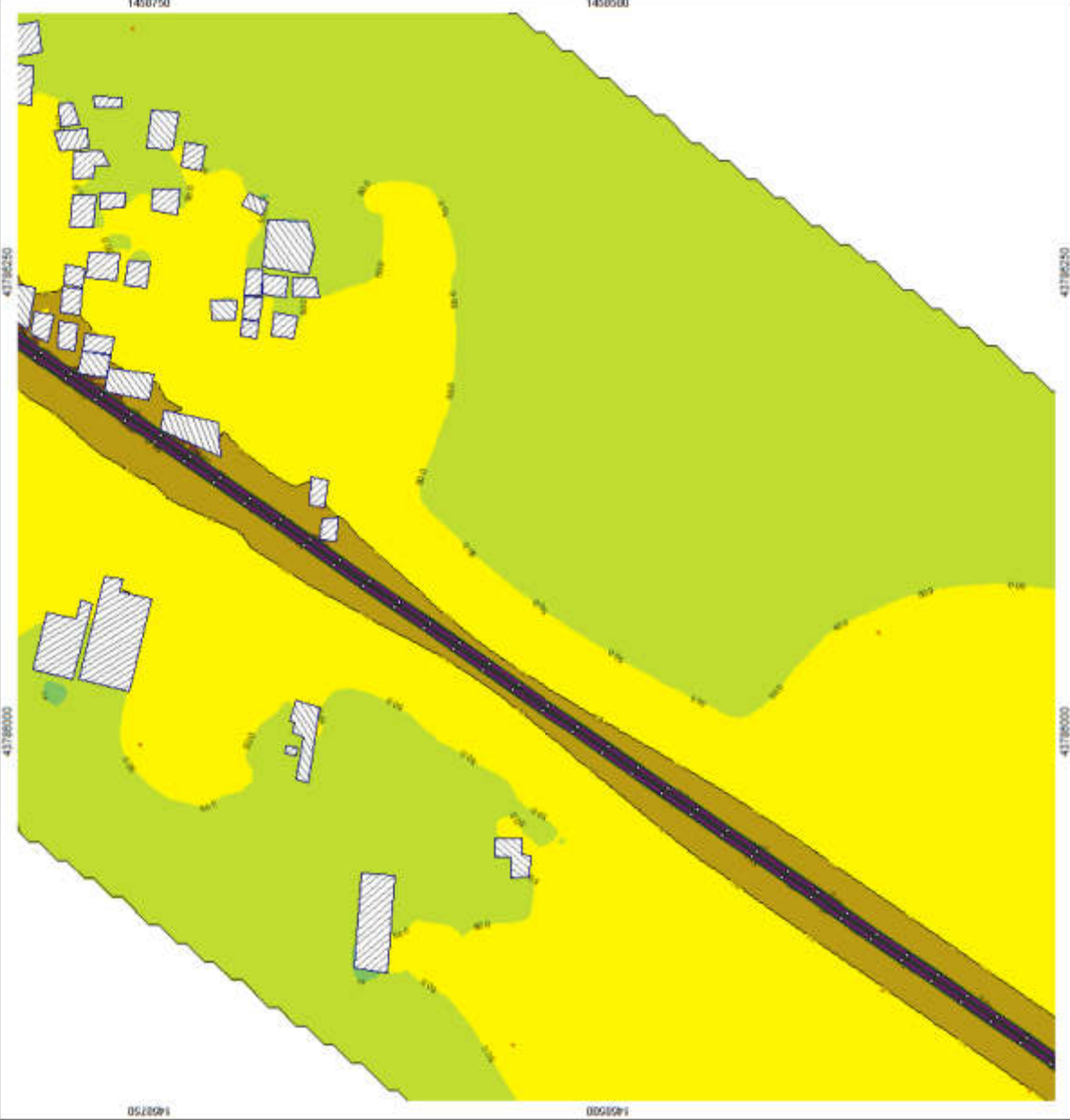
Project engineer: DMH
Created: 30/11/2020
Processed with SoundPLAN 8.1.1, Update 10/01/2018

Levels Leq,d
in dB(A)

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

Signs and symbols

Wall
Construction Edge
Main building
Point receiver
+3dB(A) increase train
Point Source
Line source
Secondary source
Wall
Wall
Obstacle point
Obstacle
Obstacle reduction area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Peak noise power levels taken from DMR, Scottsdale B.I. Library and
MARC Building Stock Specifications. Topo contour and
Slopes from topographic study.

**120 2041 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 30/11/2020
Procedure with soundPLAN 8.1.1, Update 16073/2018

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

Red dot	Construction Equip.
Blue hatched box	Main building
Yellow hatched box	Point receiver
Red hatched box	+3 dB(A) increase from
Black dot	Point Source
Red line	Line source
Green line	Geometry change
Green line	Wall
Red dot	Elevation point
White box	Backscatter
White box	Non-sound-producing area



KR Puram to Kempegowda International Airport

Operational Review
 Buildings from Survey Map and Google Earth.
 Train noise power levels taken from DMU Schedule B.1, Library and
 BIRAC Rolling Stock Specifications, Train schedule and
 speeds from feasibility study.

**120 2041 2B with Parapet Wall
 Noise Contour Map
 Leq,d**
 Calculation in: 1.5 m above ground

Project engineer: DMK
 Contact: 9511070310
 Produced 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**
- Construction site
 - Main building
 - Point receiver
 - dB(A) Average level
 - Point Source
 - Line source
 - Geometry storage
 - Wall
 - Wall
 - Downward point
 - Reflection
 - Measure of distance area

Length scale 1:2109



KR Puram to Kempegowda International Airport

Operational Review
 Buildings from Survey Map and Google Earth.
 Train noise power levels taken from DMU Schedule 8.1, Library and
 BIRAC Rolling Stock Specifications, Train schedule and
 speeds from feasibility study.

**120 2041 2B with Parapet Wall
 Noise Contour Map
 Leq,d**
 Calculation in: 1.5 m above ground

Project engineer: DMK
 Contact: 951107030
 Produced 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**
- Construction site
 - Main building
 - Point receiver
 - dB(A) Average Point
 - Point Source
 - Line source
 - Geometry storage
 - Wall
 - Wall
 - Downward point
 - Reflection
 - Measure of distance area

Length scale 1:2109



KR Puram to Kempgowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise power level taken from DMO Subscription B.I. Library and
BMRCL Piling Stack Specifications. Train schedule and
speeds from Feasibility Study.

**120 2041 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

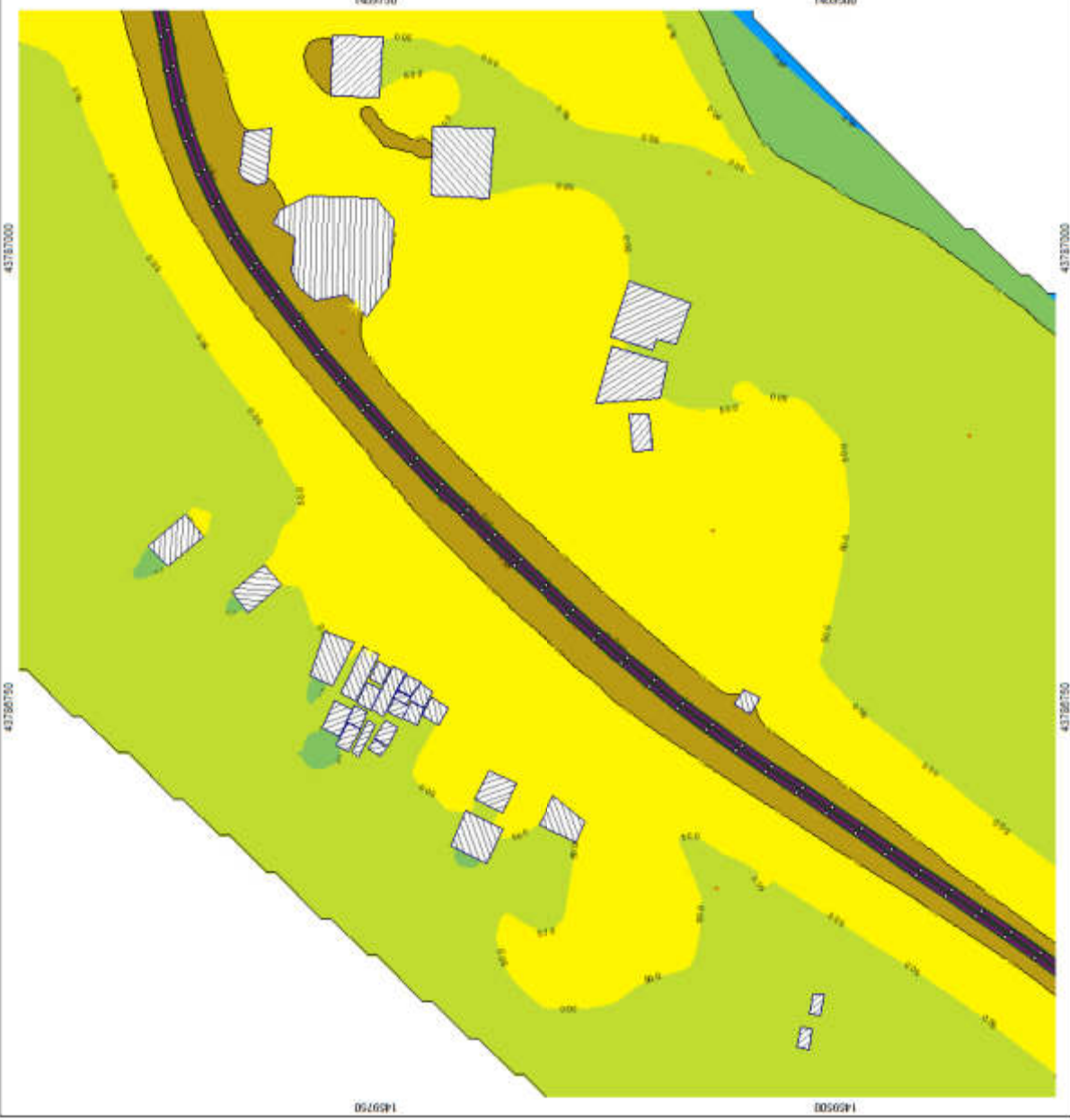
Project engineer: OMB
Contract: 301100210
Processed with SoundPLAN 8.1.1, Update: 10/23/2018

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 line	Construction Equity
Blue hatched area	Main building
Yellow hatched area	Point receiver
Black line with red dot	-10dB(A) increase from
Black line with red dot	Point Source
Purple line	Line source
Green line	Geometry change
Green line	Wall
Green line	Wall
Red triangle	Elevation point
White rectangle	Receivable
White rectangle	Receiver



KR Puram to Kempegowda International Airport

Operational Route:
 Buildings from Street Map and Google Earth.
 Walls in orange from data from DMU Karnataka S.L. Library and
 BMRB. Existing 200m buffer zone, 100m road and
 100m from Freeway levy.

**120 2041 2B with Parapet Wall
 Noise Contour Map
 Leq,n**
 Calculation in 1.5 m above ground

Project engineer: OMR
 Project: 02110020
 Produced with SoundPLAN 8.1. Update: 10/23/2018

Levels Leq,n
 in dB(A)

Light blue	< 45
Blue	45 - 50
Yellow-green	50 - 55
Yellow	55 - 60
Orange	60 - 65
Red	> 65

Signs and symbols

Red line	Wall
Green line	Construction Equip
Blue hatched	Main building
Yellow hatched	Points marker
Black line with arrow	+dB(A) increase from
Red dot	Point Source
Black line	Line source
Green hatched	Geometry building
Green line	Wall
Orange line	Wall
Red dot	Direction points
Black outline	Buildings
Black outline	Water bodies



KR Puram to Kempegowda International Airport

Operational Risks
 Building from Street Map and Google Earth.
 All data from OpenStreetMap, Google Earth, and
 BIMBOL Multi-Scale Software. This includes and
 creates from feasibility study.

**120 2041 2B with Parapet Wall
 Noise Contour Map
 Leq,d**

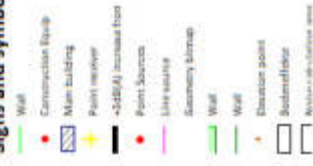
Calculation in: 1.5 m above ground

Project engineer: OMR
 Created: 30/11/2020
 Processed with SoundPLAN 8.1. Update: 10/21/2021

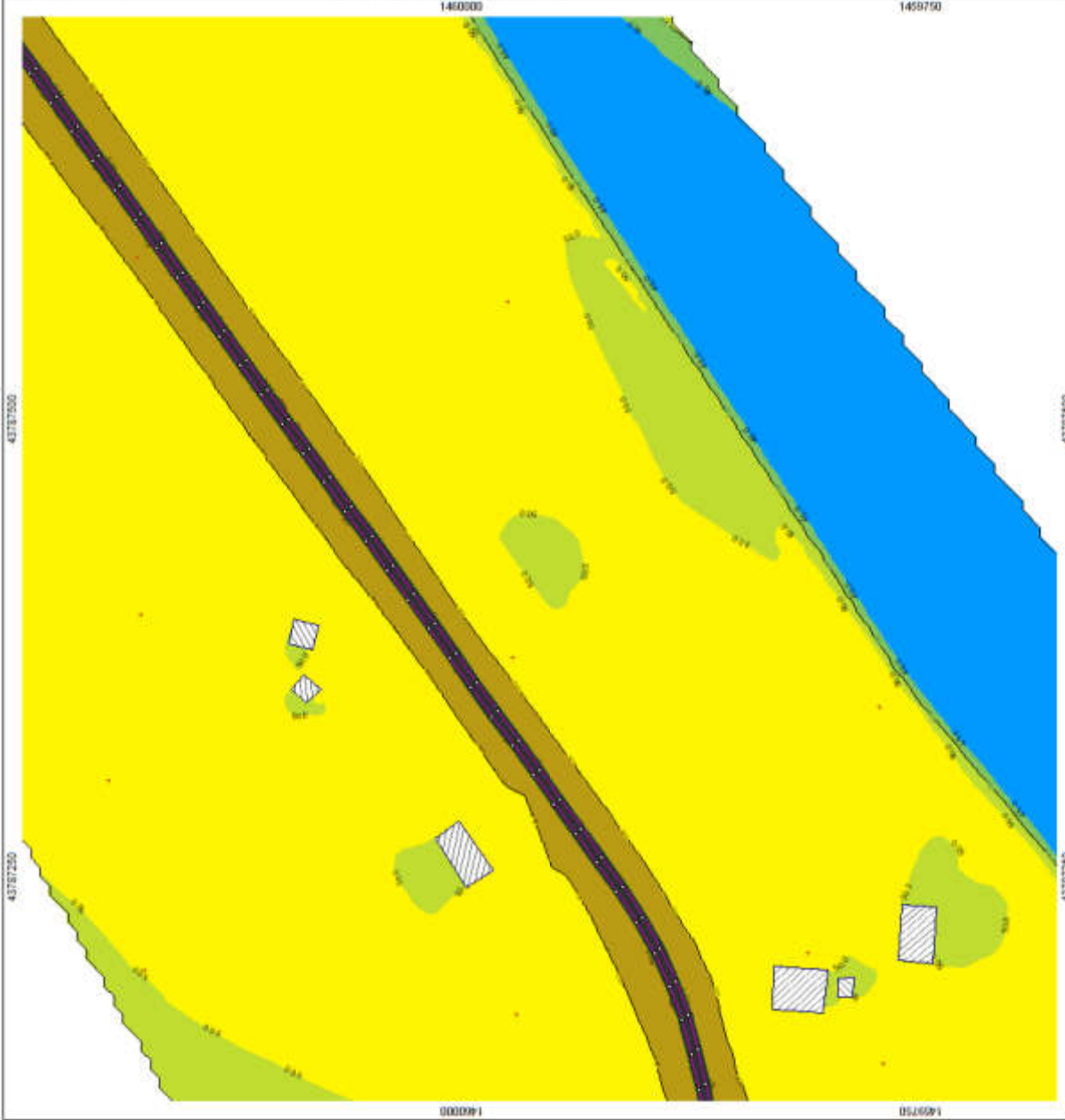
Levels Leq,d



Signs and symbols



Length scale 1:2109



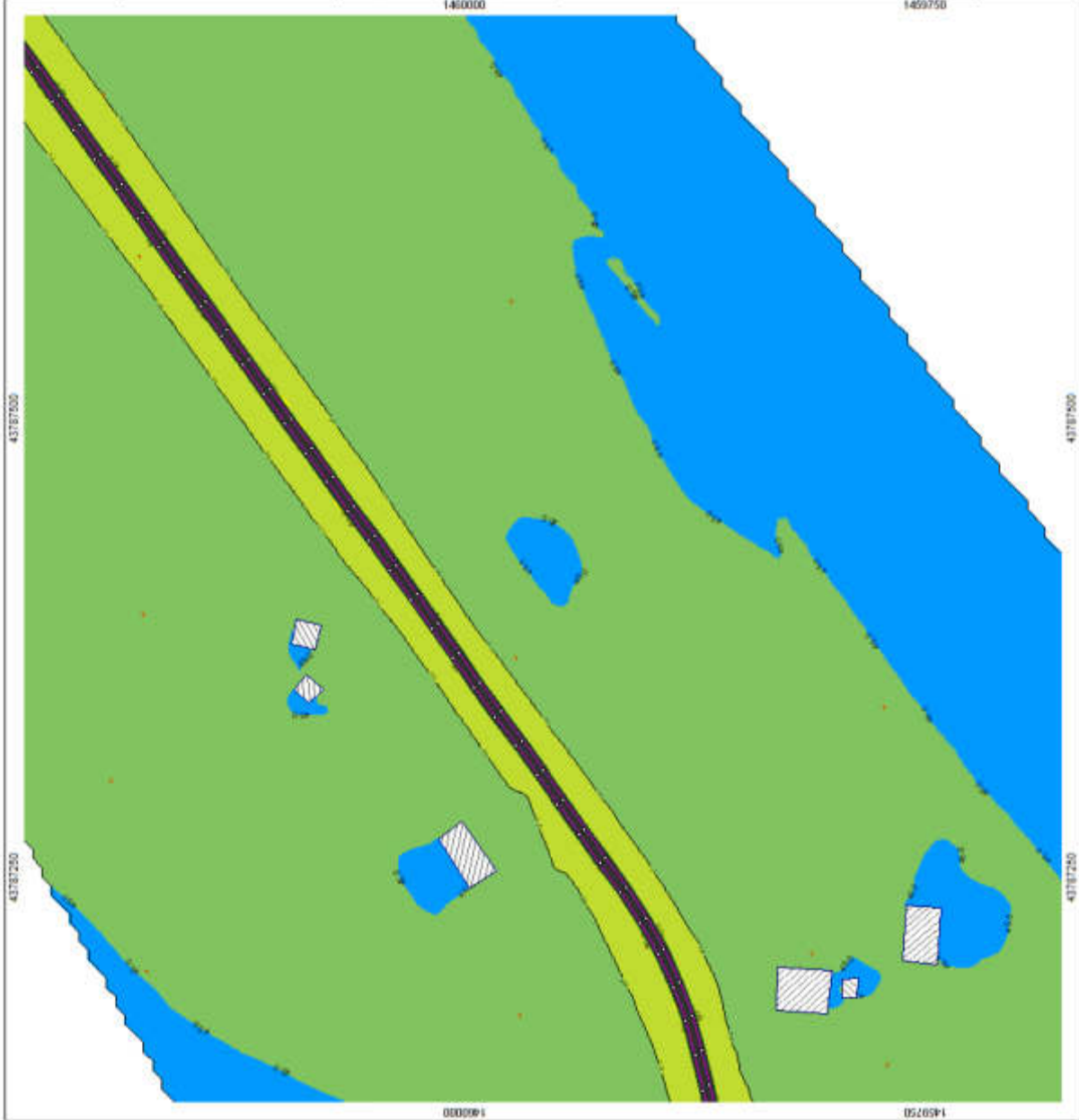
KR Puram to Kempegowda International Airport

Orientation of Noise Contour Map and Google Earth screenshot from Google Earth. Prepared by Srinivasan K. Srinivasan & S. Srinivasan (SRS&S) Bangalore. Prepared by SRS&S Bangalore. Prepared by SRS&S Bangalore. Prepared by SRS&S Bangalore.

120 2041 2B with Parapet Wall Noise Contour Map
Leq,n
 Calculation in 1.5 m above ground

Project engineer: GMR
 Control: S/11/0030
 Prepared with SRS&S Bangalore 10/03/2018

- Levels Leq,n (in dB(A))**
- 45 - 50
 - 50 - 55
 - 55 - 60
 - 60 - 65
 - 65 - 70
- Signs and symbols**
- Construction Equipa
 - Main building
 - Point number
 - AAD(A) increase from
 - Point Sources
 - Line source
 - Geometry drawing
 - Wall
 - Elevation point
 - Isodrawings
 - Noise prediction area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Main receiver from BNO Scotland & I Library and
Main building from BNO Scotland & I Library and
Main building from BNO Scotland & I Library and
Main building from BNO Scotland & I Library and

**120 2041 2B with Parapet Wall
Noise Contour Map
Leq,d**

Calculation in 1.5 m above ground

Project engineer: DMH
Revision: 3/11/2020
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 Equip
- Main building
- Point receiver
- 3dB(A) increase from
- Point Sources
- Line source
- Geometry blimap
- Wall
- Wall
- Elevation point
- Bodendefekte
- Noise calculation area

Length scale 1:2109

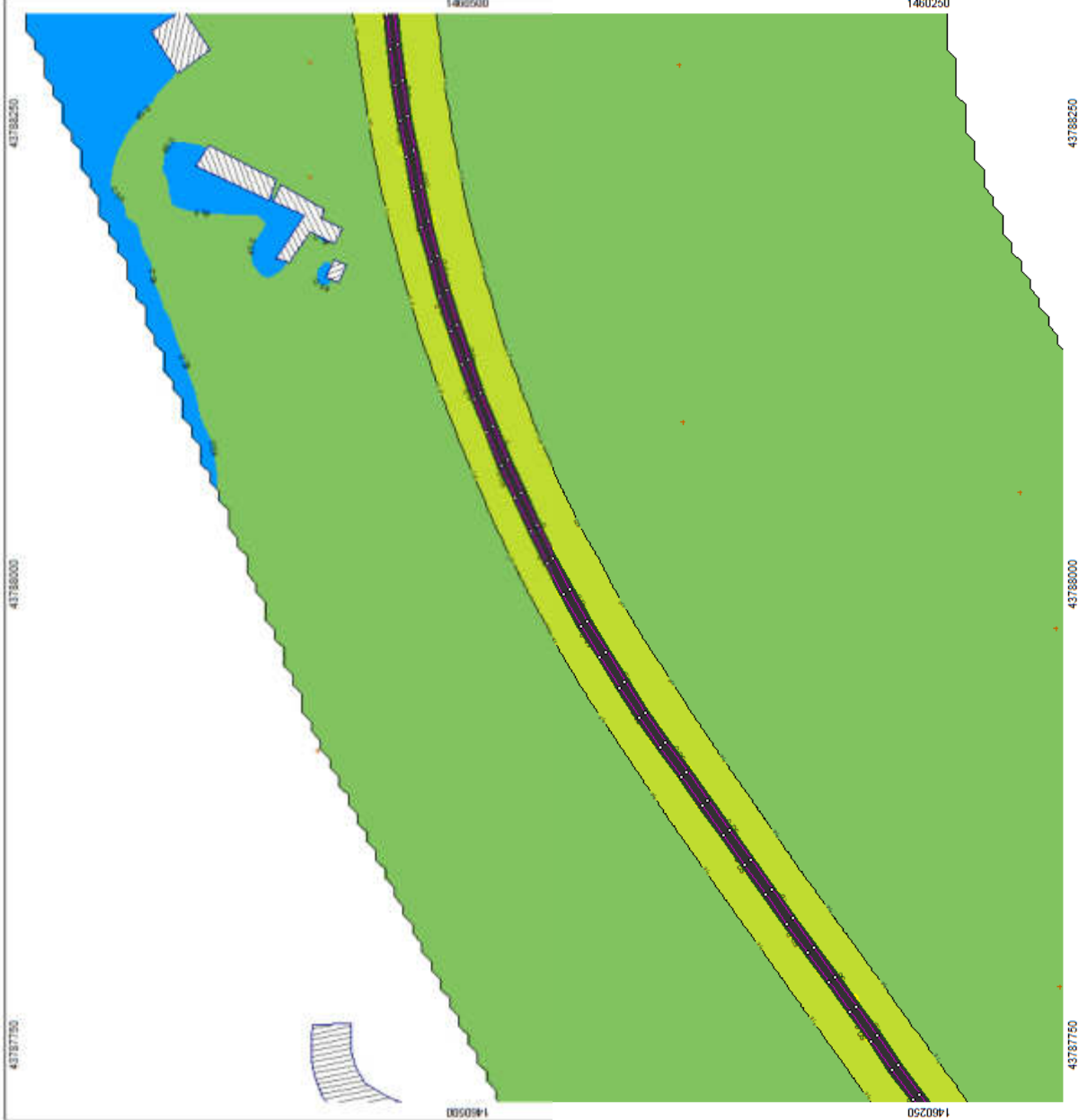


KR Puram to Kempegowda International Airport

Operational Noise:
 Profile from Green Map and Google Earth.
 Profile from Green Map and Google Earth.
 (MNO) Building Stock Specification, Train Schedule and
 approach from Feasibility Study.

**120 2041 2B with Parapet Wall
 Noise Contour Map**
 Leq,n
 Calculation in 1.5 m above ground

Project engineer: CMR
 Created: 03/11/2010
 Projected with Spherulium 8.1, Update 16/03/2018



**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
- Rechner-zulassbar area



KR Puram to Kempegowda International Airport

Operational Noise
 Buildings from Source Map and Google Earth
 BANC Building Information System, Year 2010/11 and
 various from Planning Society.

**120 2041 2B with Parapet Wall
 Noise Contour Map
 Leq,n**
 Calculation in 1.5 m above ground

Project engineer: OMR
 Created: 03/12/2018
 Prepared with: noisePLAN 8.1. Update 10/03/2018

- Levels Leq,n in dB(A)**
- 45 - 50
 - 50 - 55
 - 55 - 60
 - 60 - 65
 - >= 65
- Signs and symbols**
- Construction Equip
 - Max building
 - Point receiver
 - 10dB(A) increase barrier
 - Point Source
 - Line source
 - Geometry change
 - Wall
 - Elevation point
 - Background
 - Water-vegetation areas





KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Trees from BIRU Soundplan 8.1. Library and
BAREIL Building Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2041 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 31/10/2018
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 EMU Soundplan 8.1 Library and
BMICL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2041 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 dBA)

45 - 50
50 - 55
55 - 60
60 - 65
65 - 70

Signs and symbols

Construction Equip
Main building
Point receiver
A-weighting increase front
Point sources
Line source
Geometry library
Wall
Wall
Direction points
Background
Reference elevation area



KR Puram to Kempegowda International Airport

Operational Noise:
 Building Area Screen Map and Geogrid Earth.
 Train noise power levels taken from DMU Soundplan 8.1 Library and
 BMRCL Rolling Stock Specifications. Train schedule and
 speeds from Feasibility Study.

**120 2041 2B with Parapet Wall
 Noise Contour Map
 Leq,d**
 Calculation in 1.5 m above ground

Project engineer: CMK
 Created: 3/11/2020
 Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,d
 in dB(A)

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

Signs and symbols

Construction type
Main building
Paint marker
±(dBA) measurement
Paint sources
Line source
Geometry string
Wall
Wall
Elevation point
Buildings/plate
Noise-receiver location



KR Puram to Kempegowda International Airport

Operational Road,
Buildings from Street Map and Google Earth.
Main noise barrier levels taken from DMR Surveillance S.I. Library and
BMRCL. Noise Barrier Calculation: Train schedule and
levels from Feasibility Study.

**120 2041 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

Project engineer: OMB
Location: 3011/002B
Processed with SoundPLAN 8.1.1, Update 15/01/2018

- Levels Leq,n in dB(A)**
- ≤ 45
 - 45 - 50
 - 50 - 55
 - 55 - 60
 - 60 - 65
 - ≥ 65
- Signs and symbols**
- Wall
 - Construction Edge
 - Main building
 - Point receiver
 - 3dB(A) increase train
 - Point Source
 - Line source
 - Geometry border
 - Wall
 - Wall
 - Direction points
 - Acoustic fence
 - Noise calculation area



