Environmental Impact Assessment

October 2020

India: Bengaluru Metro Rail Project

Phase 2A (Outer Road Ring Metro Line)

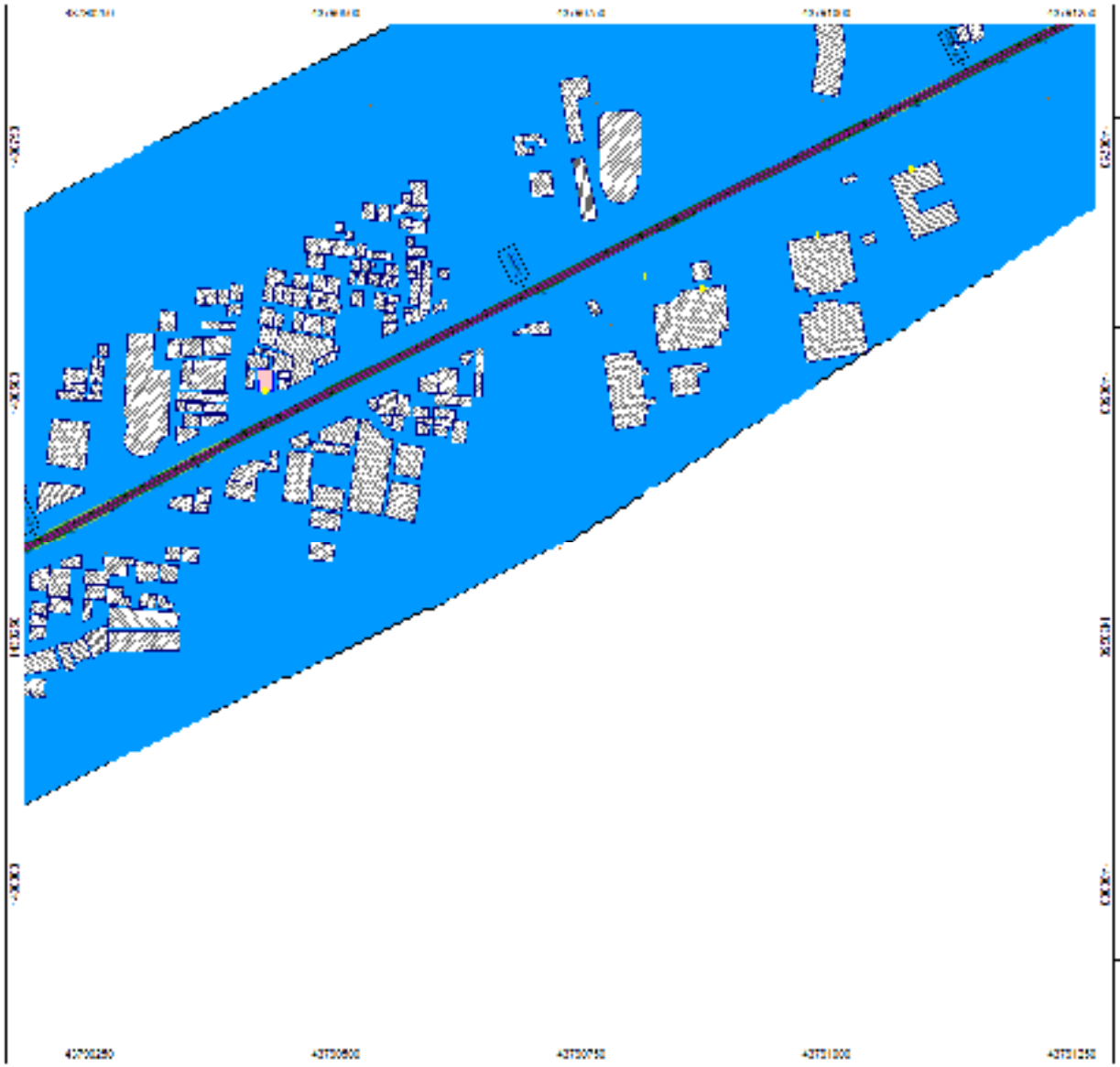
Volume 8
Annex 5

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.



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

110 2041 2A with Parapet Wall

Noise Contour Map

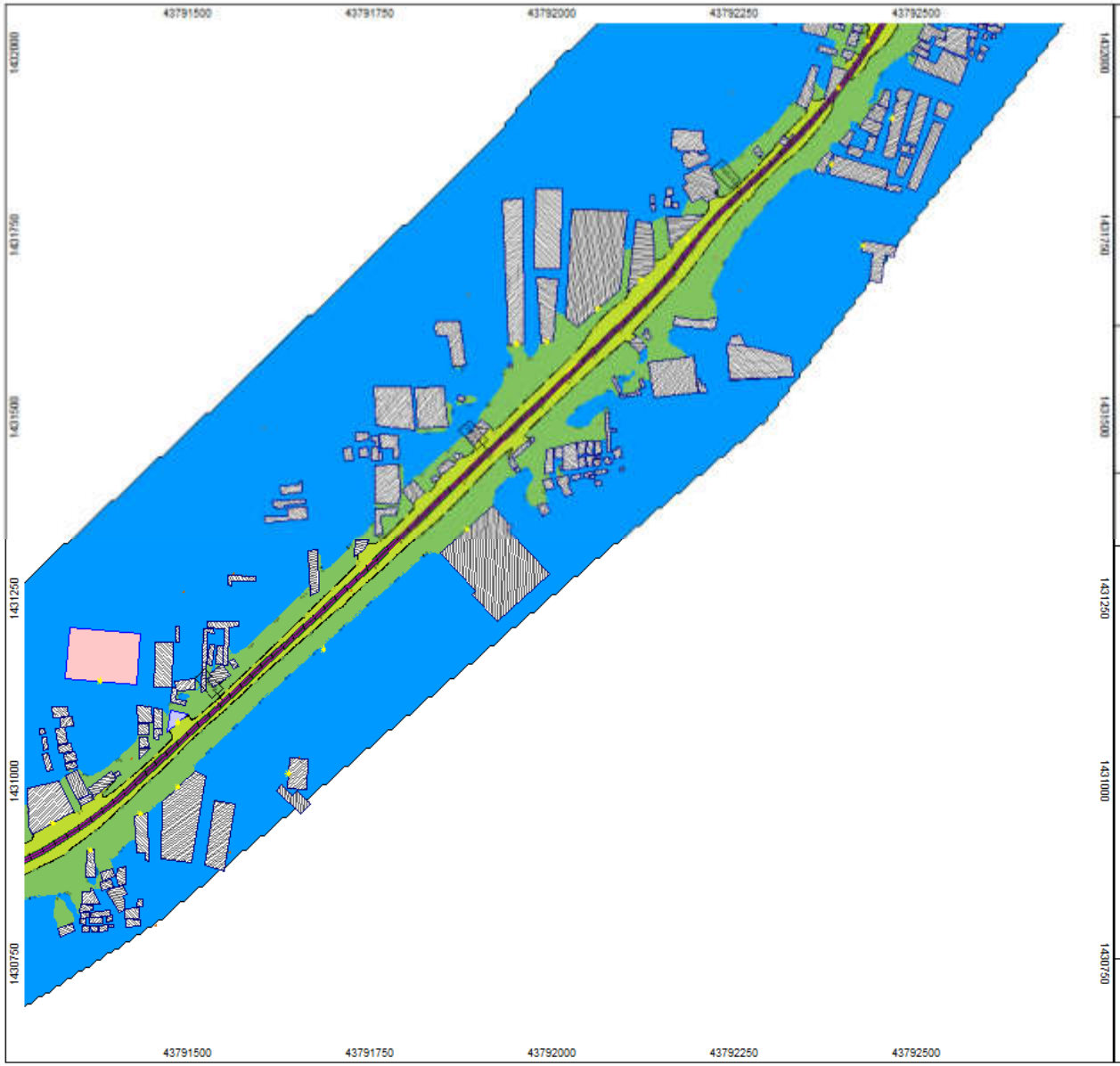
Leq,n

Calculation in 1.5 m above ground

Levels Leq,n in d(A)

Signs and symbols

Length scale 1:3887



"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 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

N

Length scale 1:5245

0 45 90 180 270 360 m

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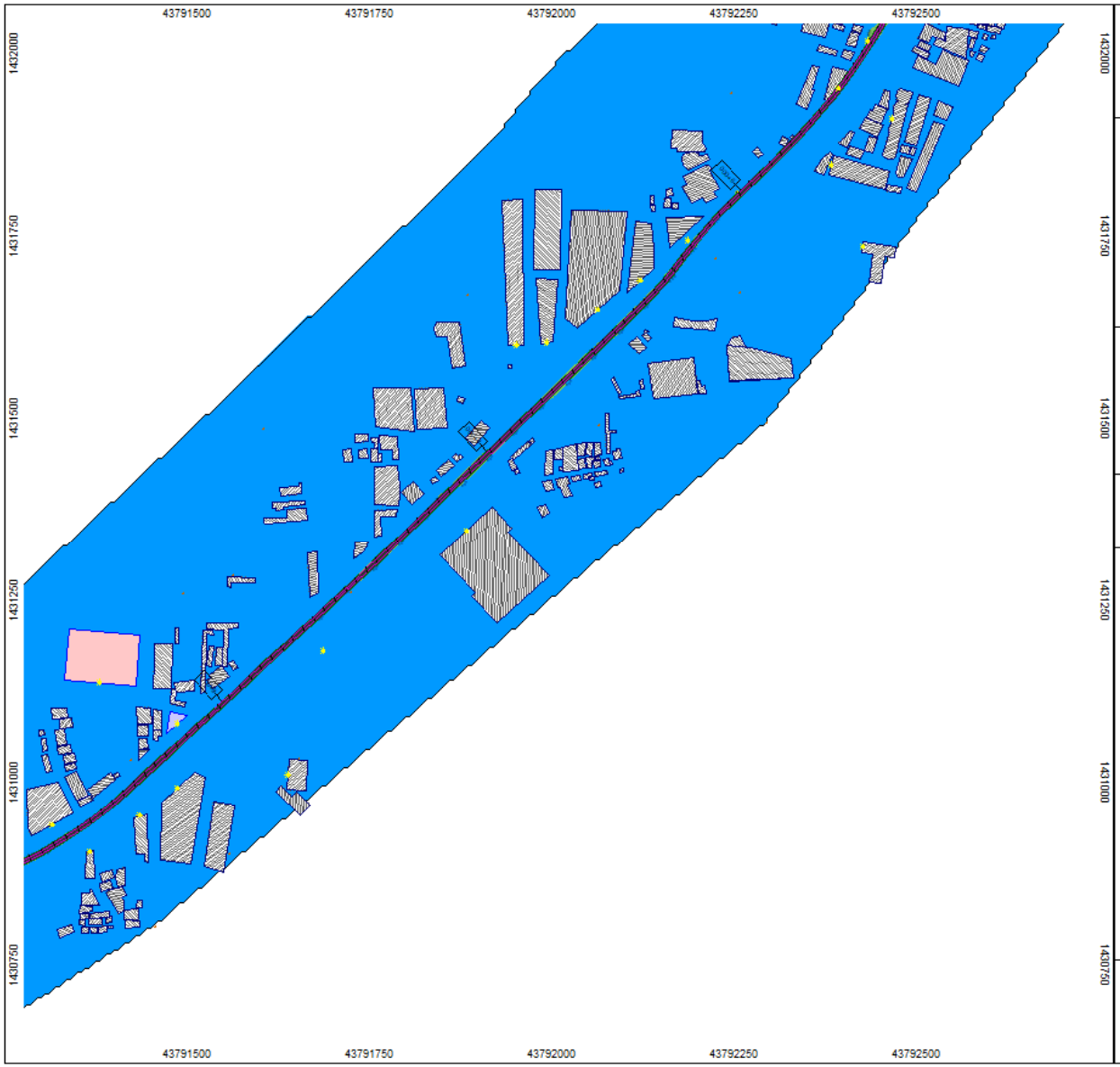

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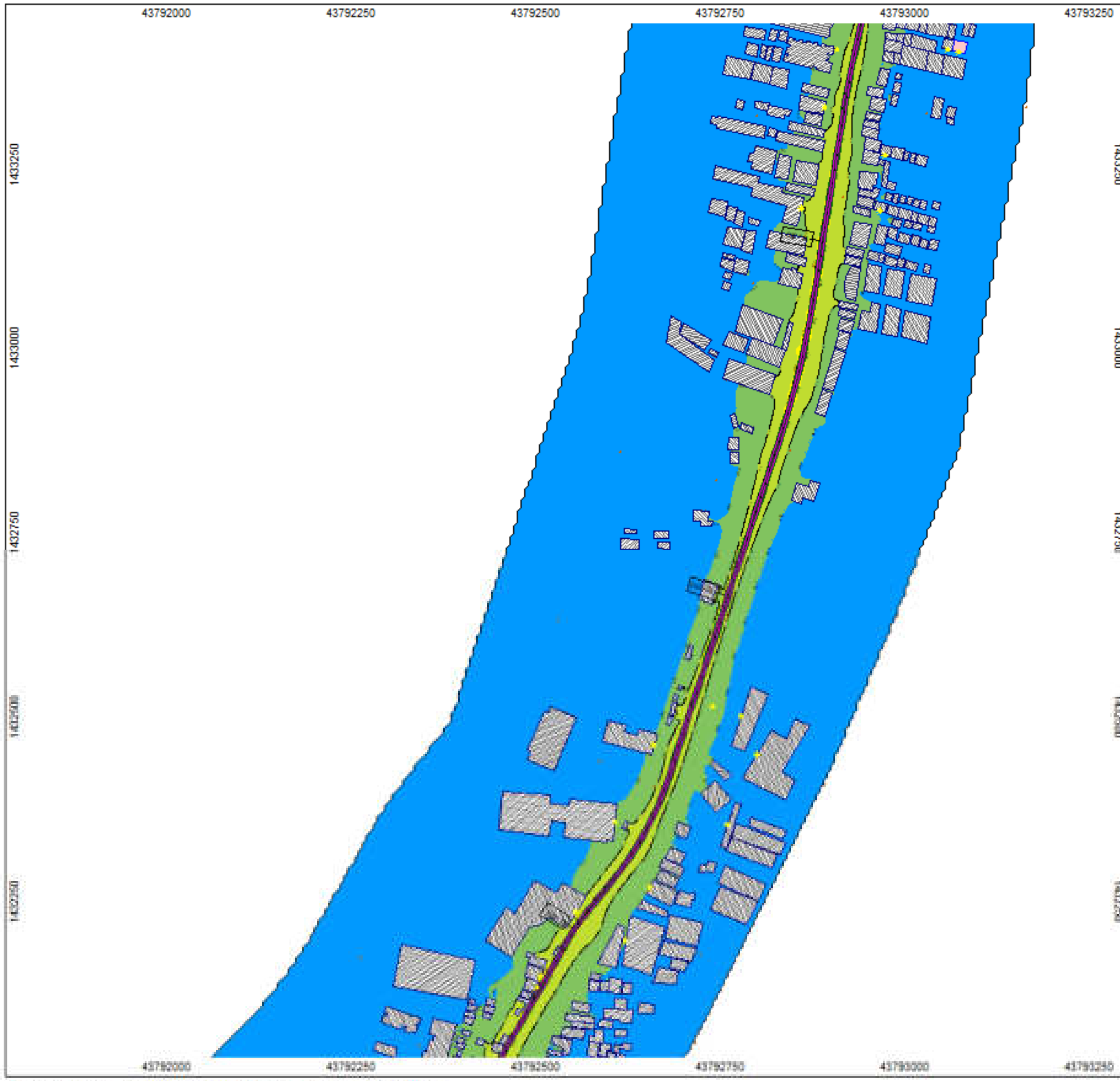

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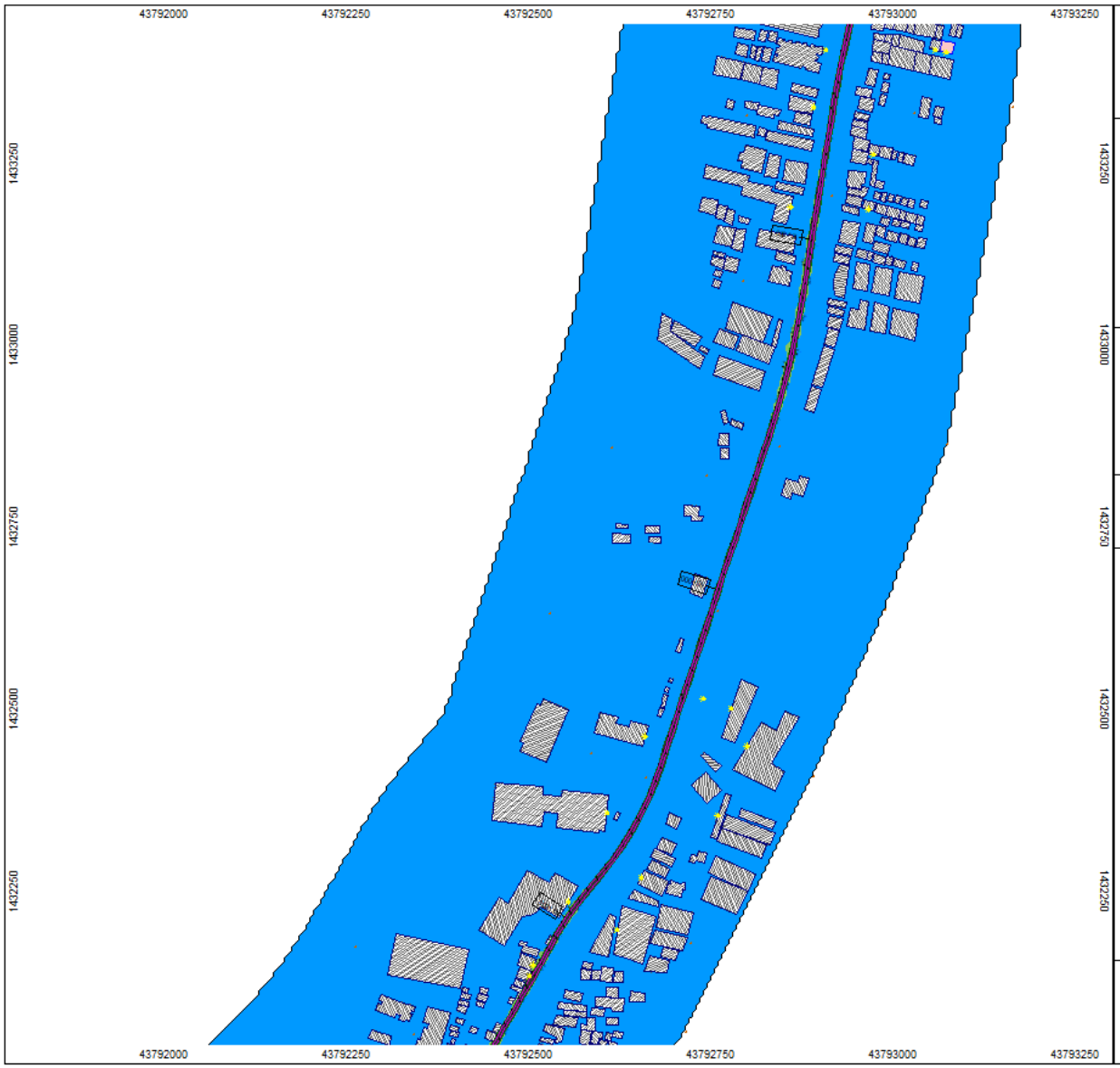

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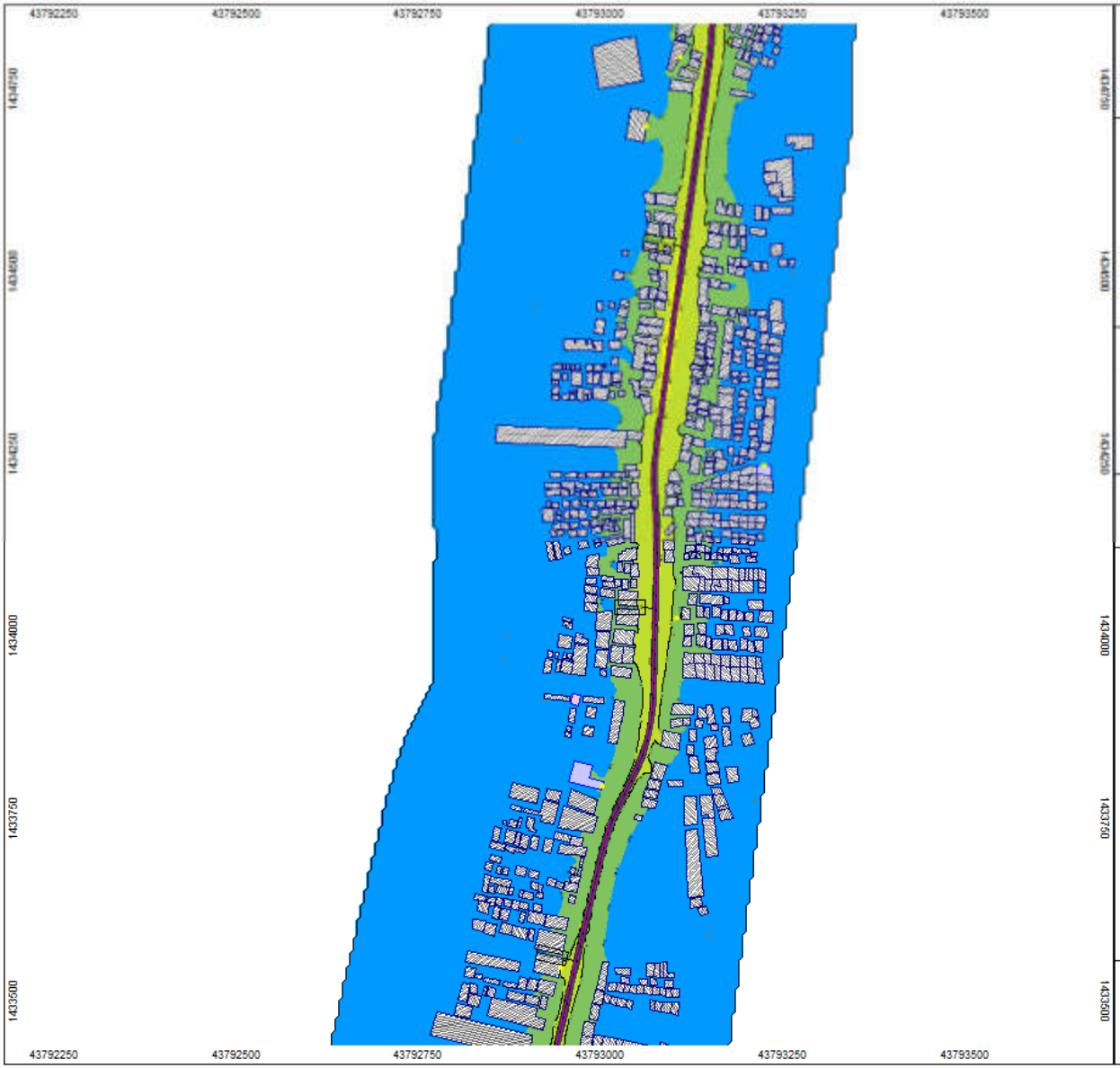

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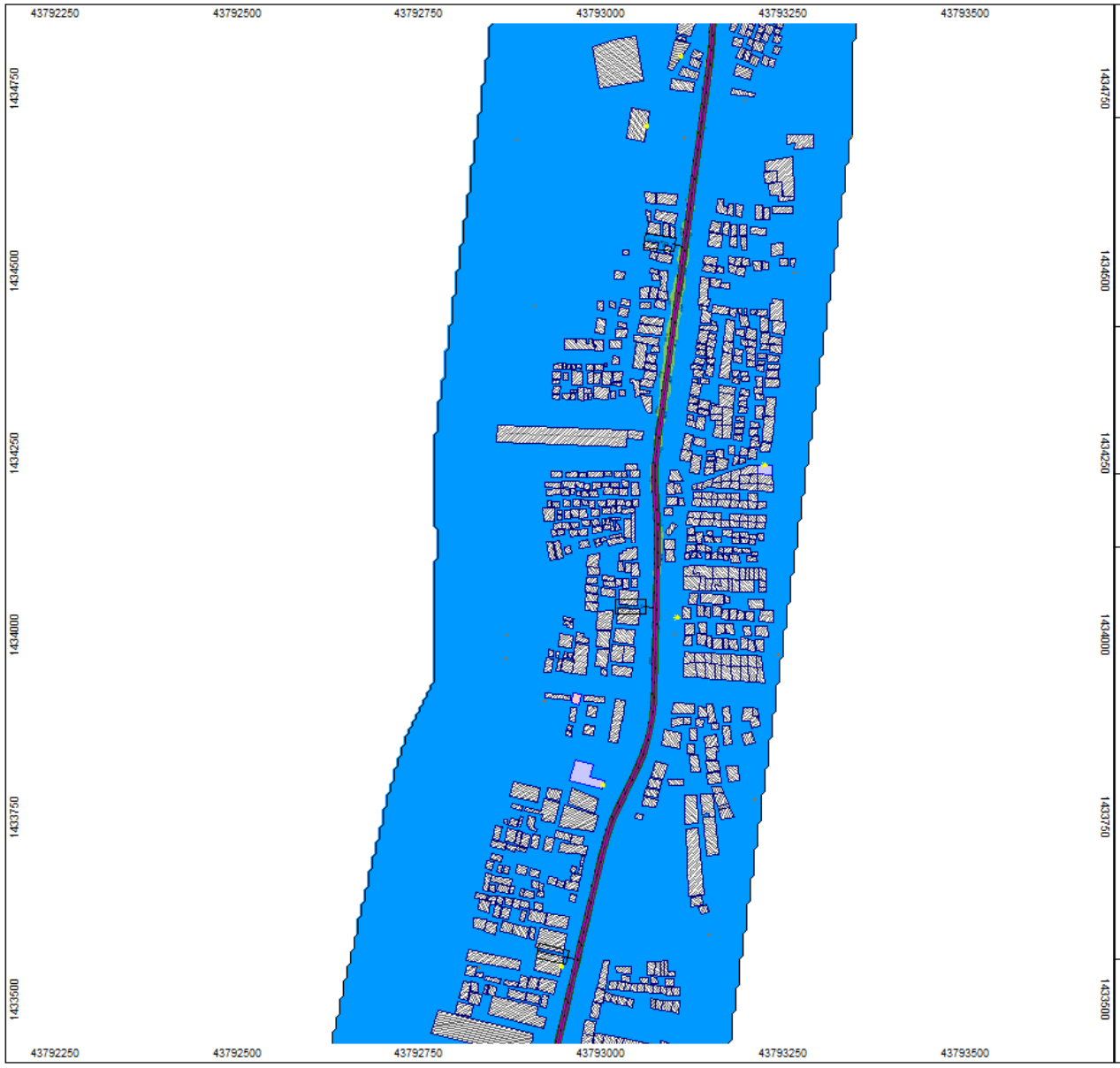

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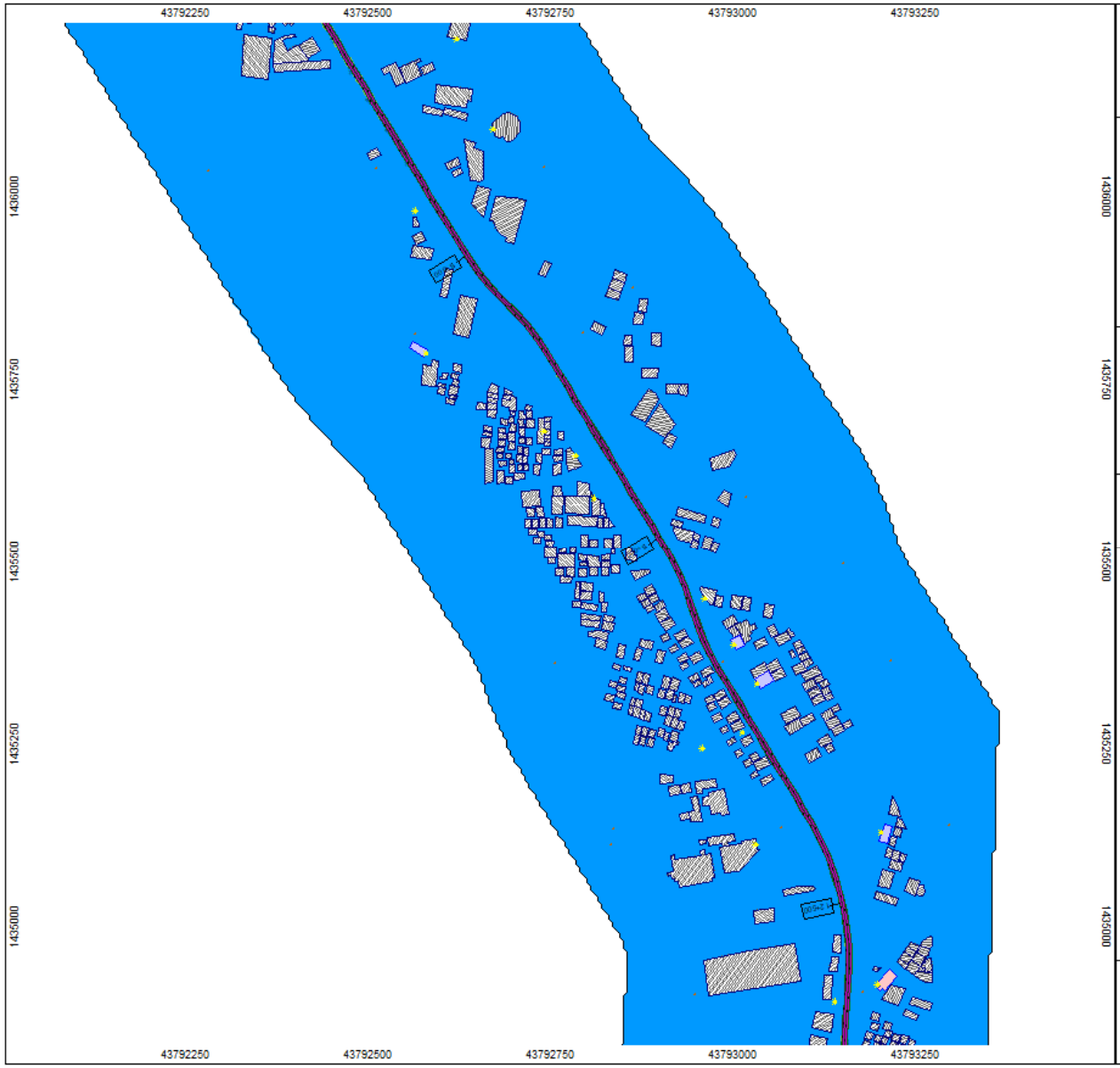

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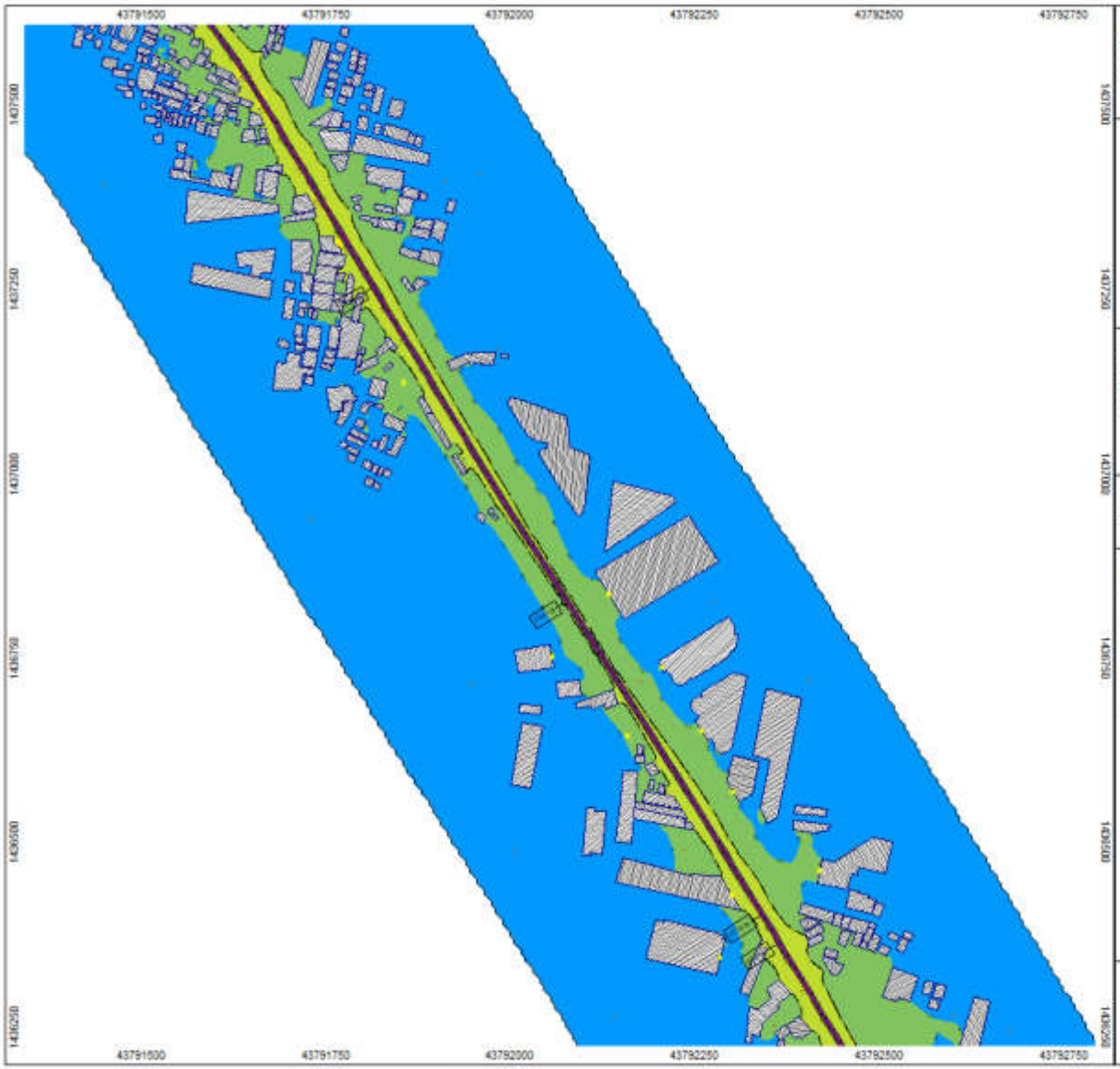

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Length scale 1:5181
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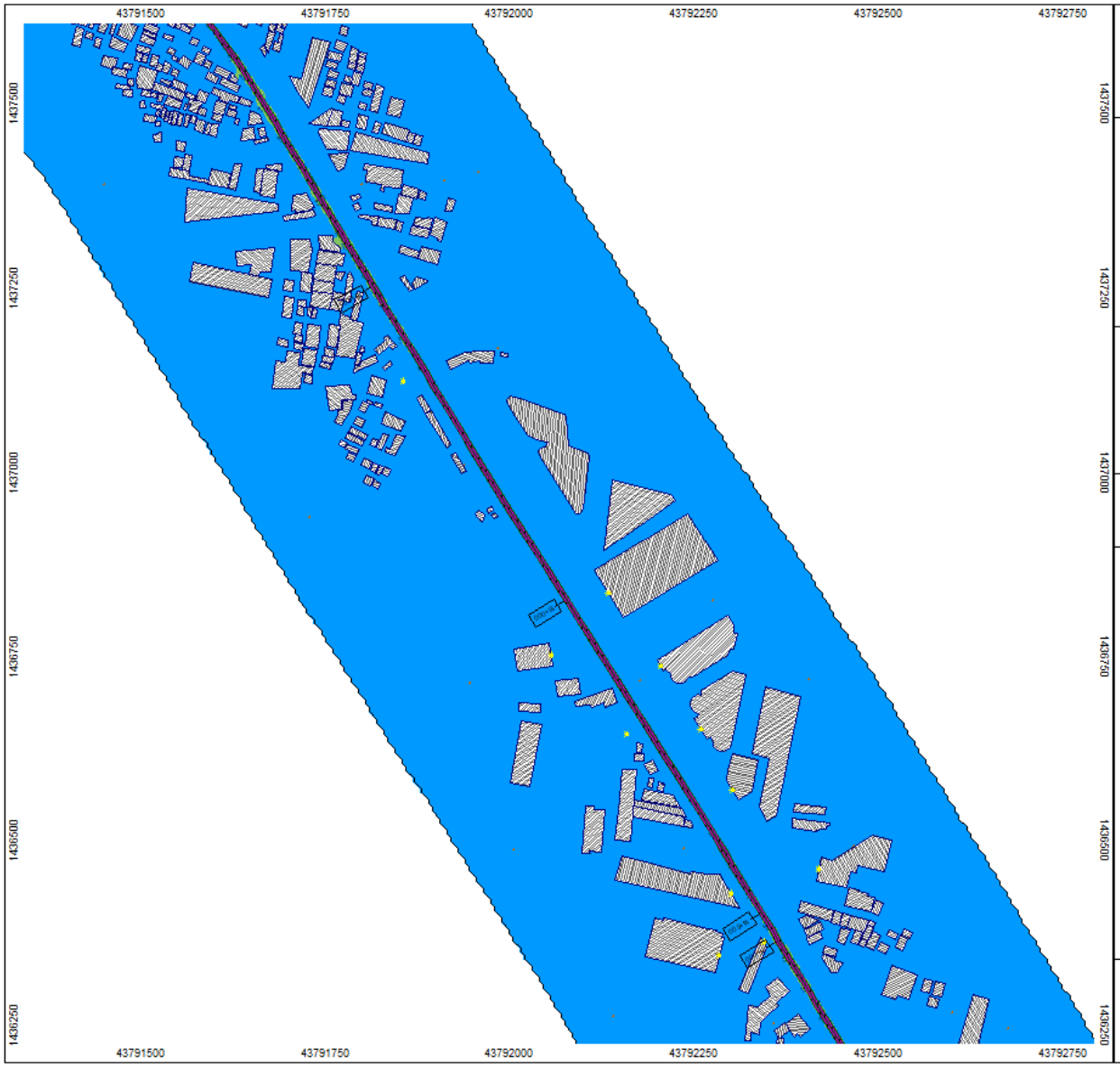

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Length scale 1:5181

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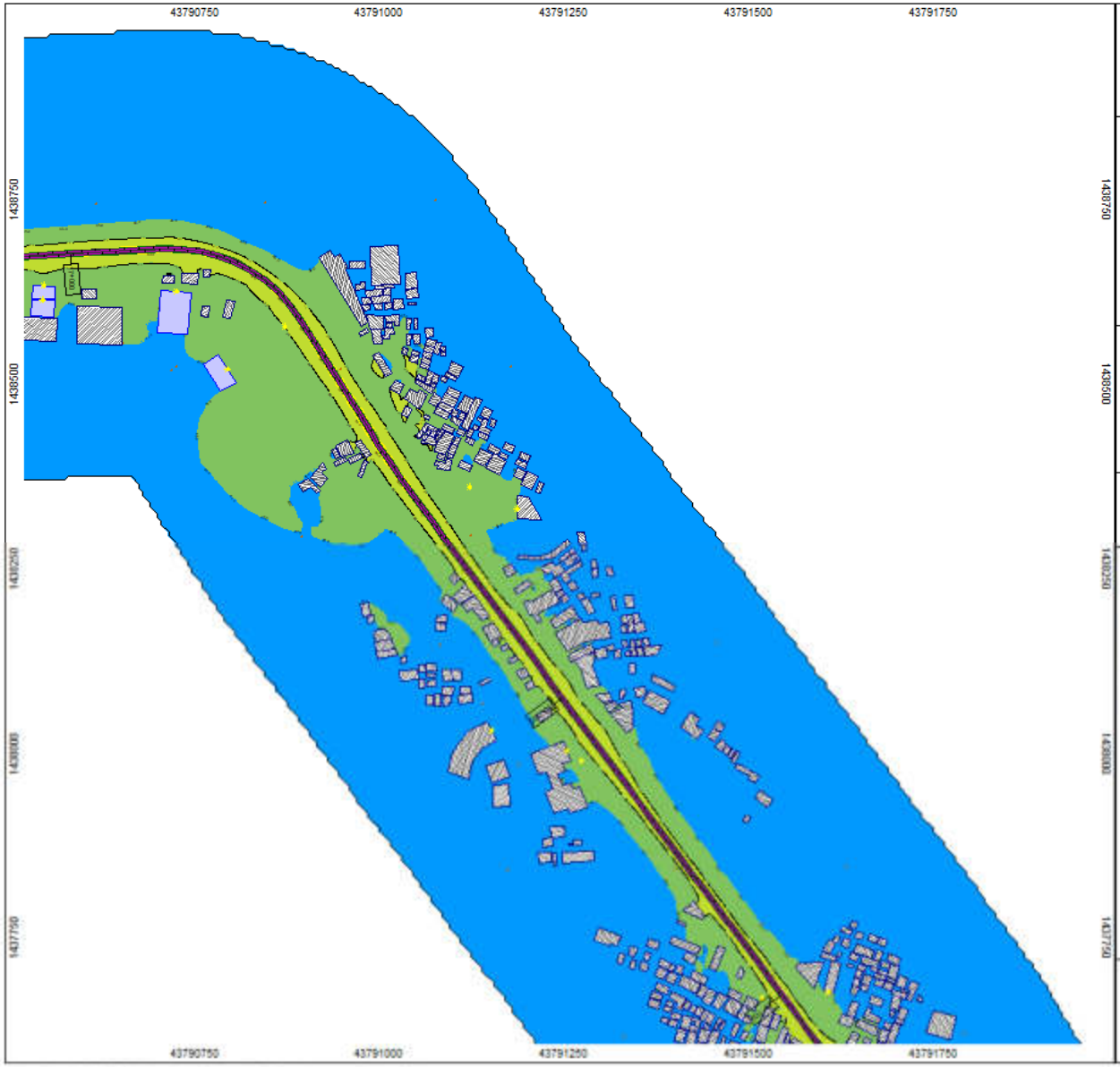

"ORR Metro Line" on Outer Ring Road from Central Silk (CSB) Junction to KR Puram

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Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
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Signs and symbols

Wall
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Length scale 1:5181
0 45 90 180 270 360 m

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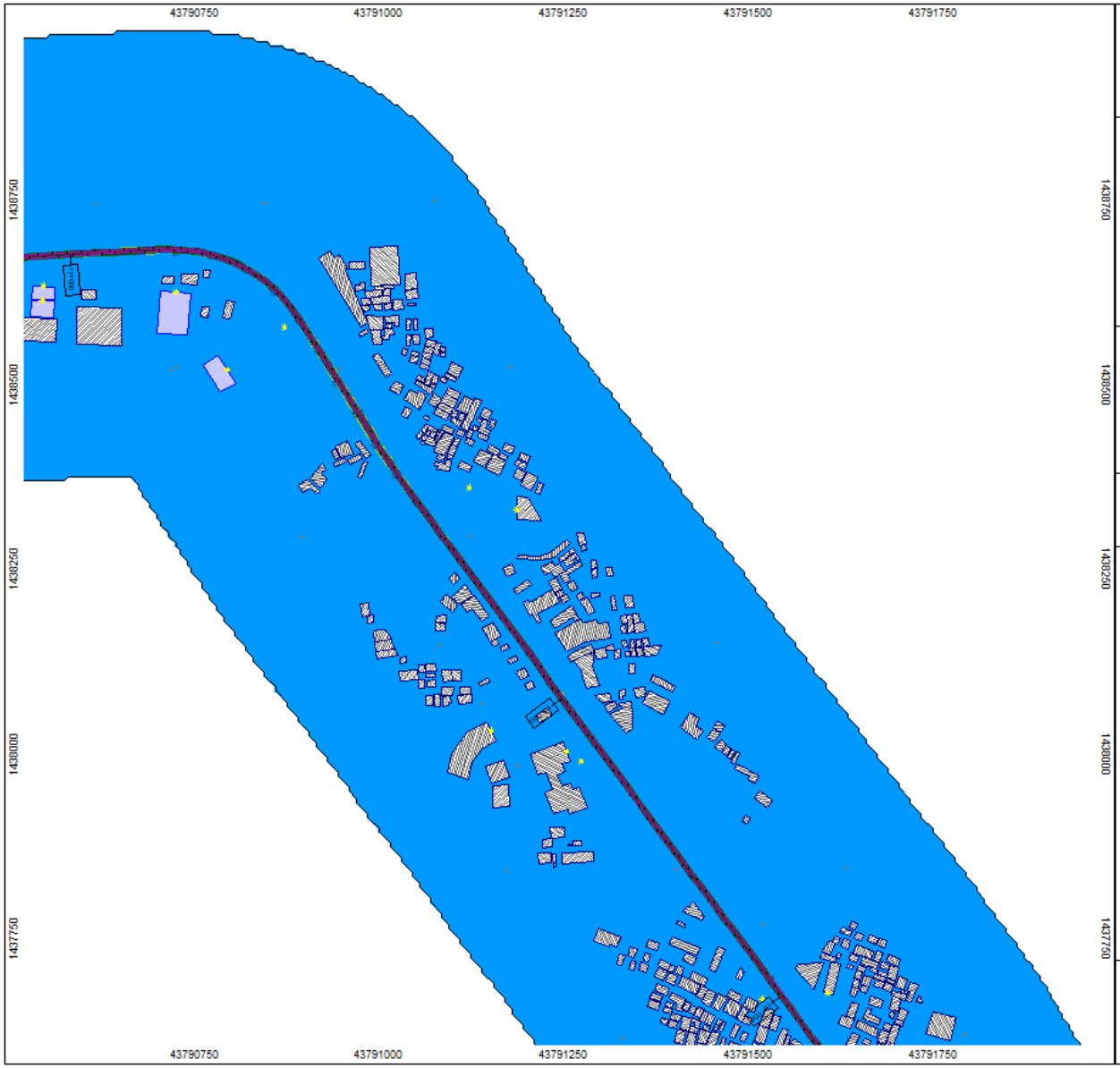

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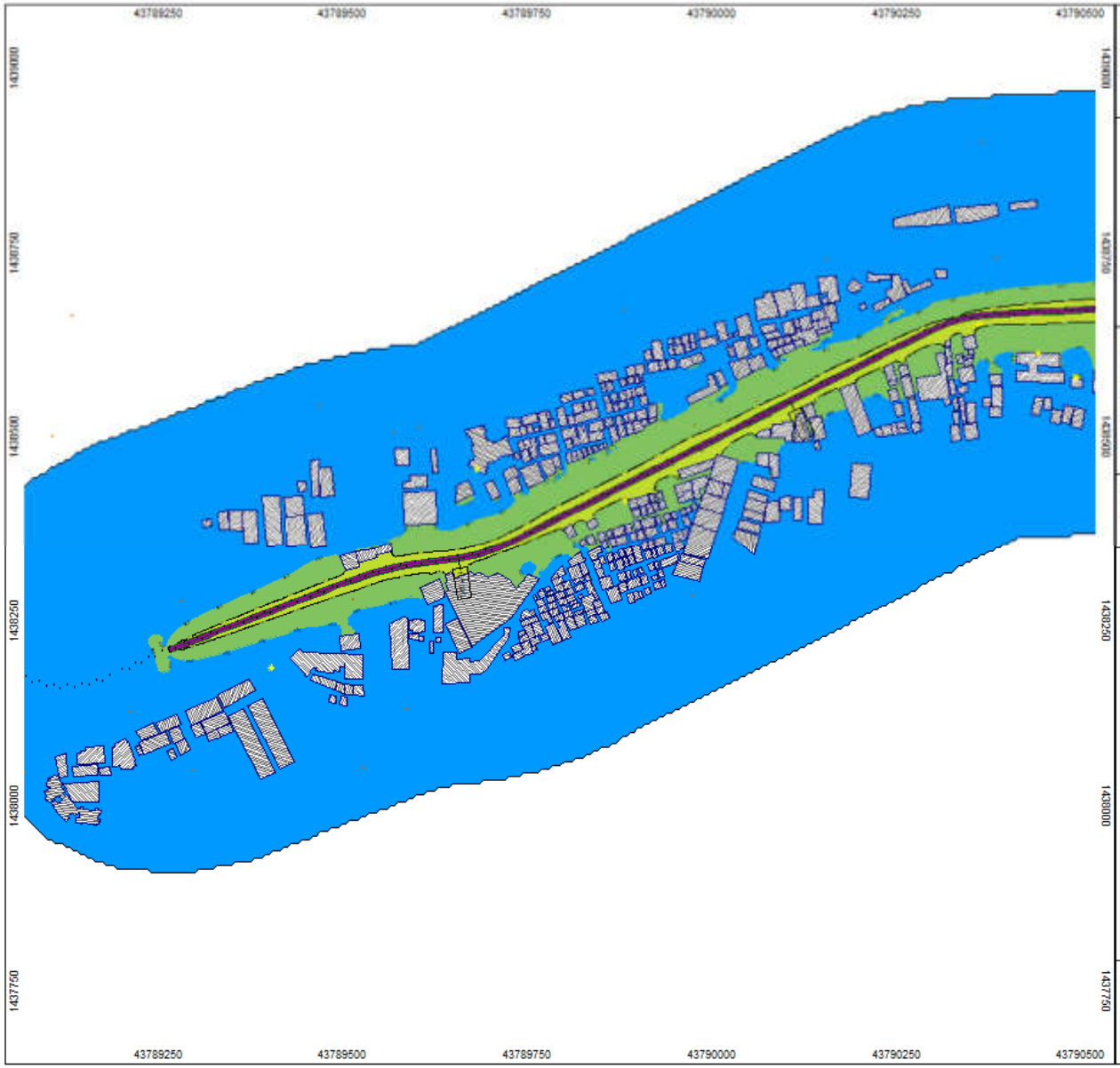

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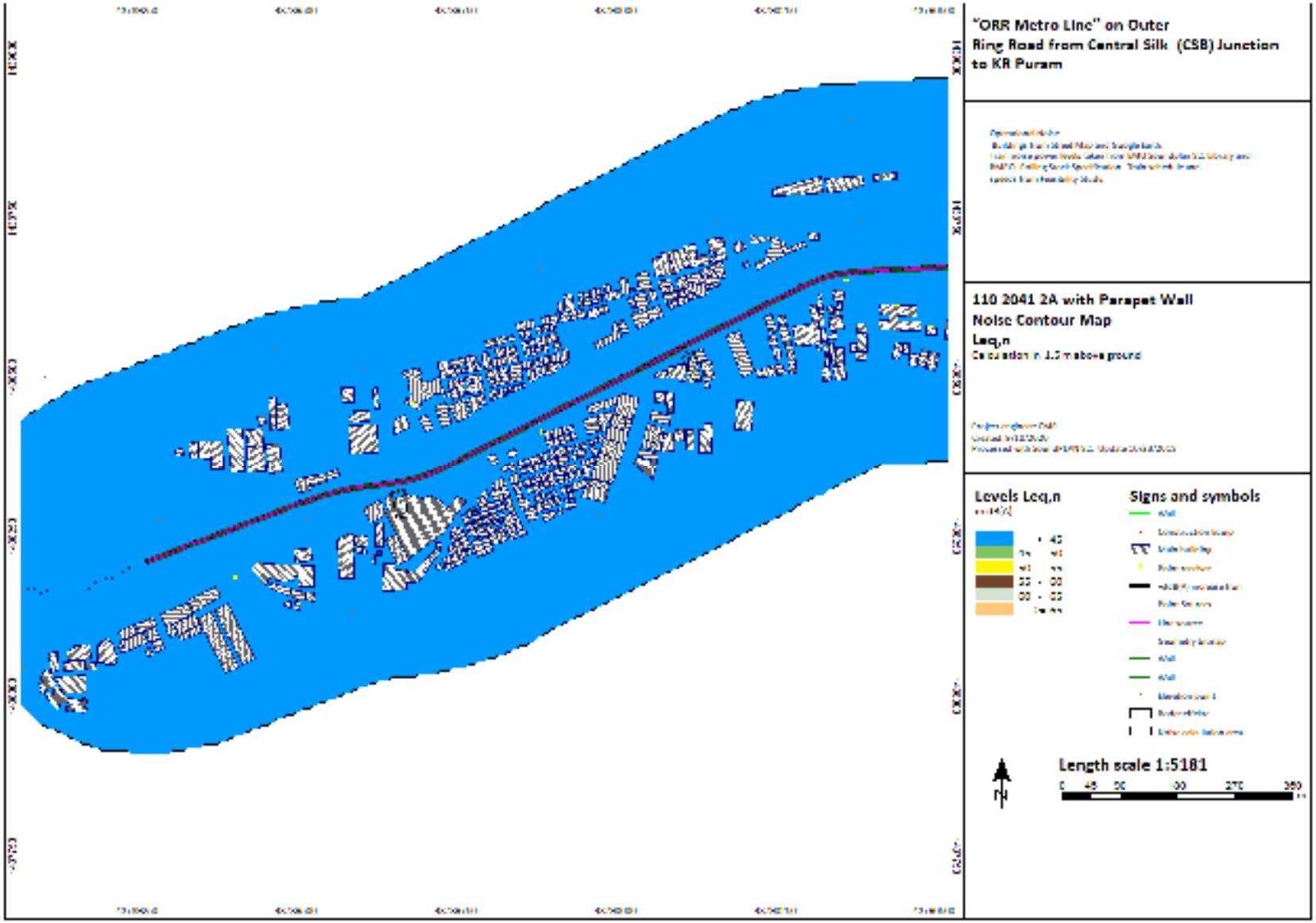
"ORR Metro Line" on Outer Ring Road from Central Silk (CSB) Junction to KR Puram
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KR Puram to Kempegowda International Airport

2024, 2031, 2041

KR Puram to Kempegowda International Airport

Operational Noise.
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120 2024 2B with Parapet Wall
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Leq,d

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Length scale 1:2887

0 25 50 100 150 200 m

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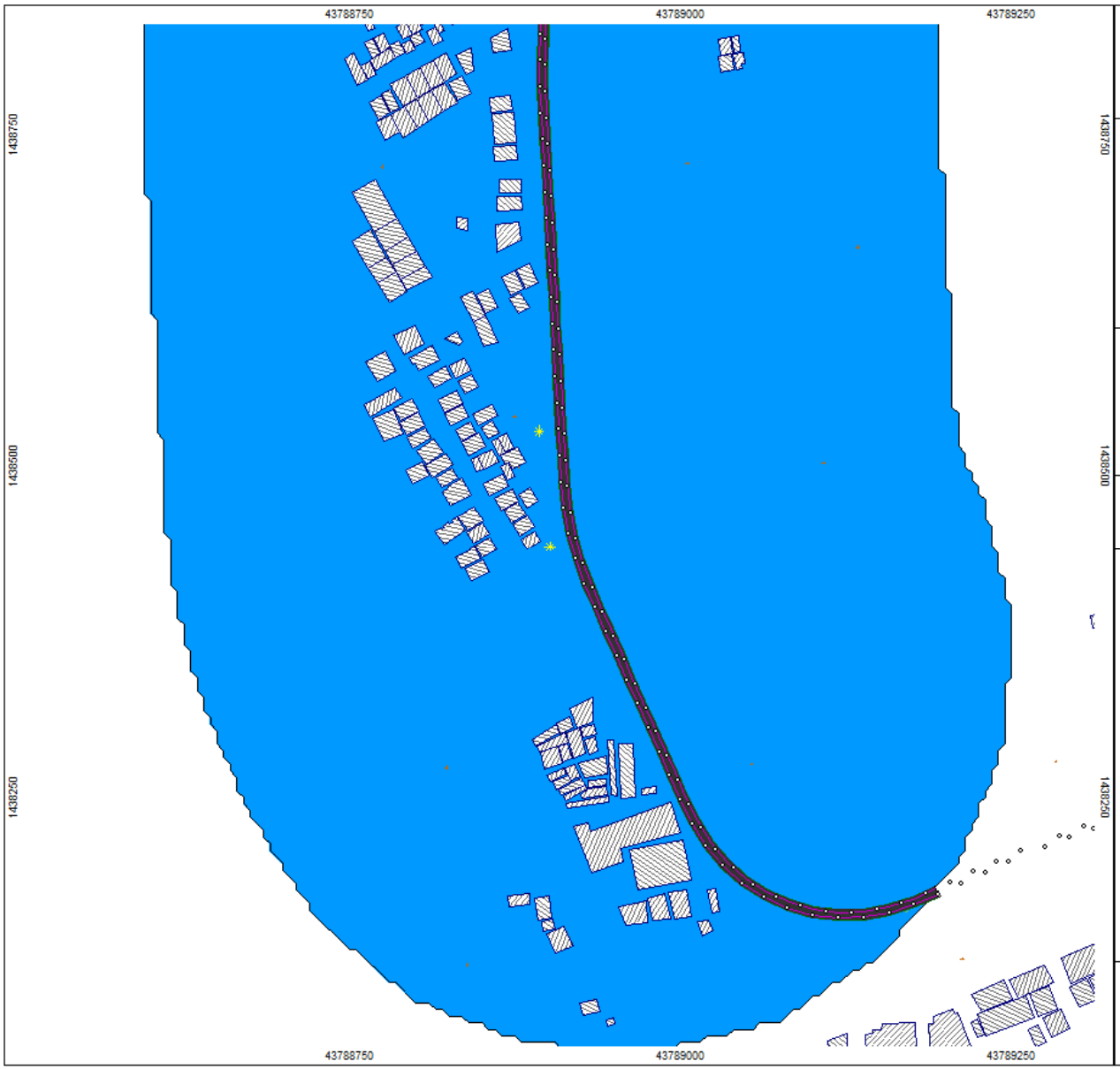

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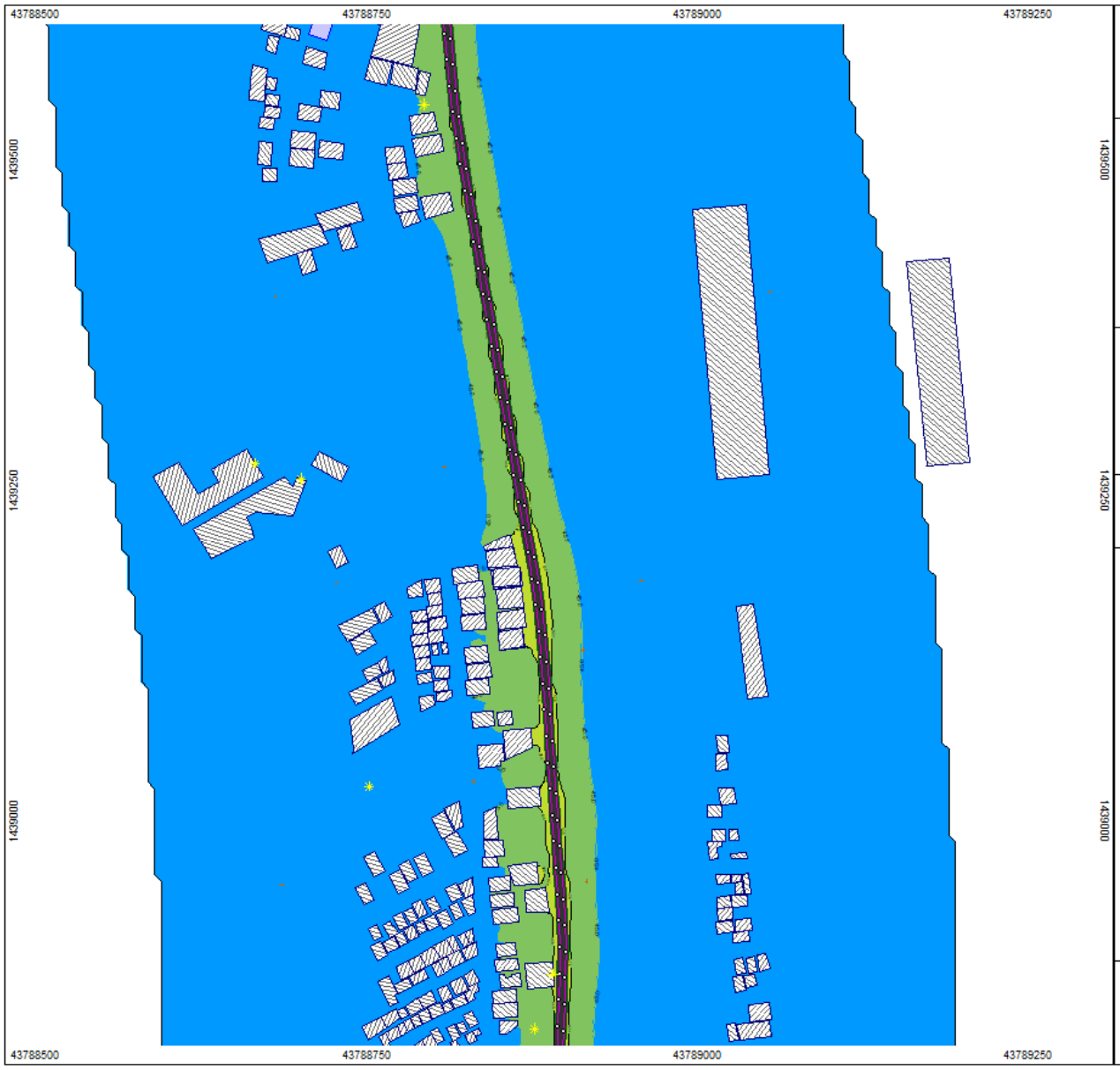

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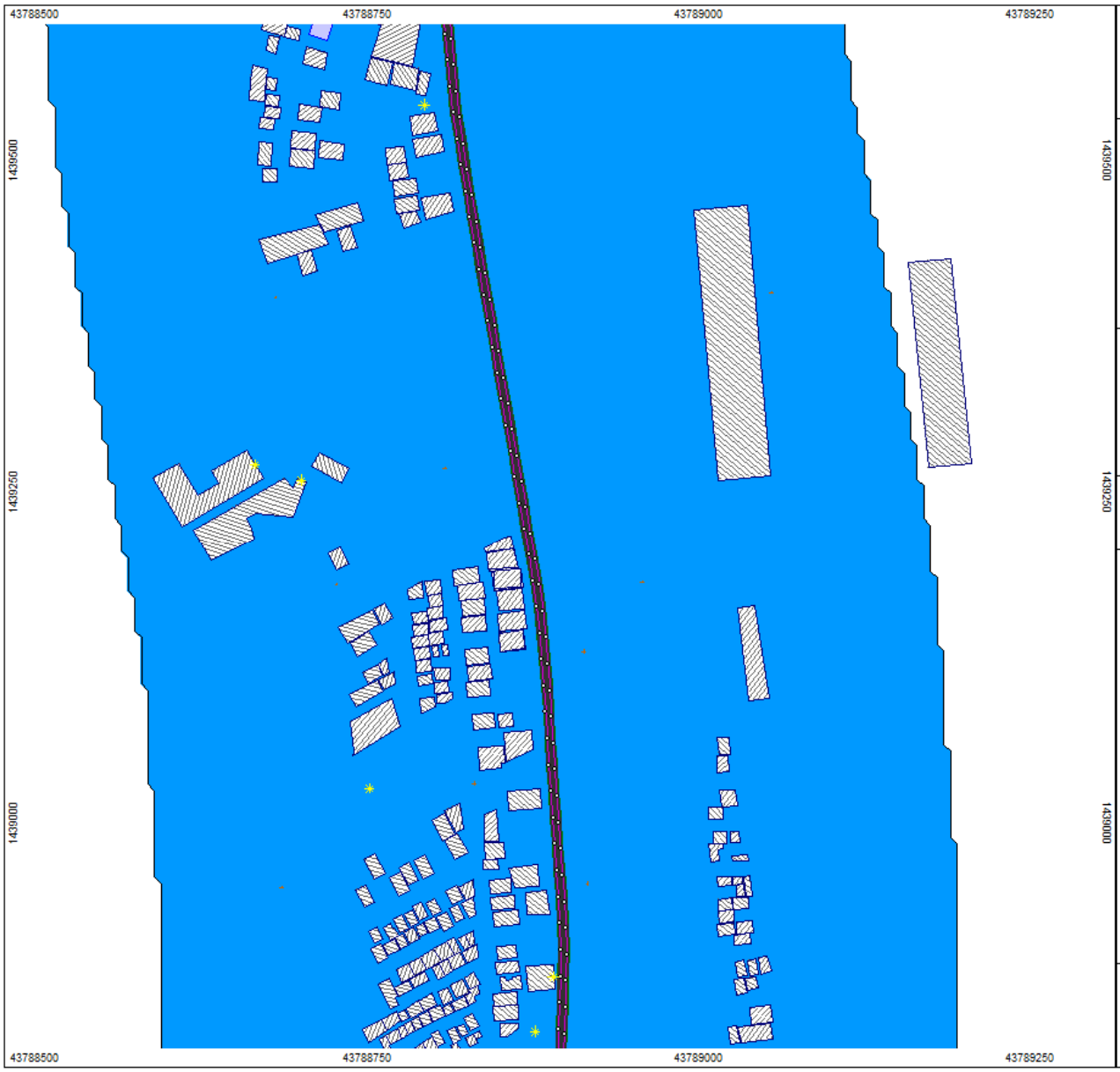

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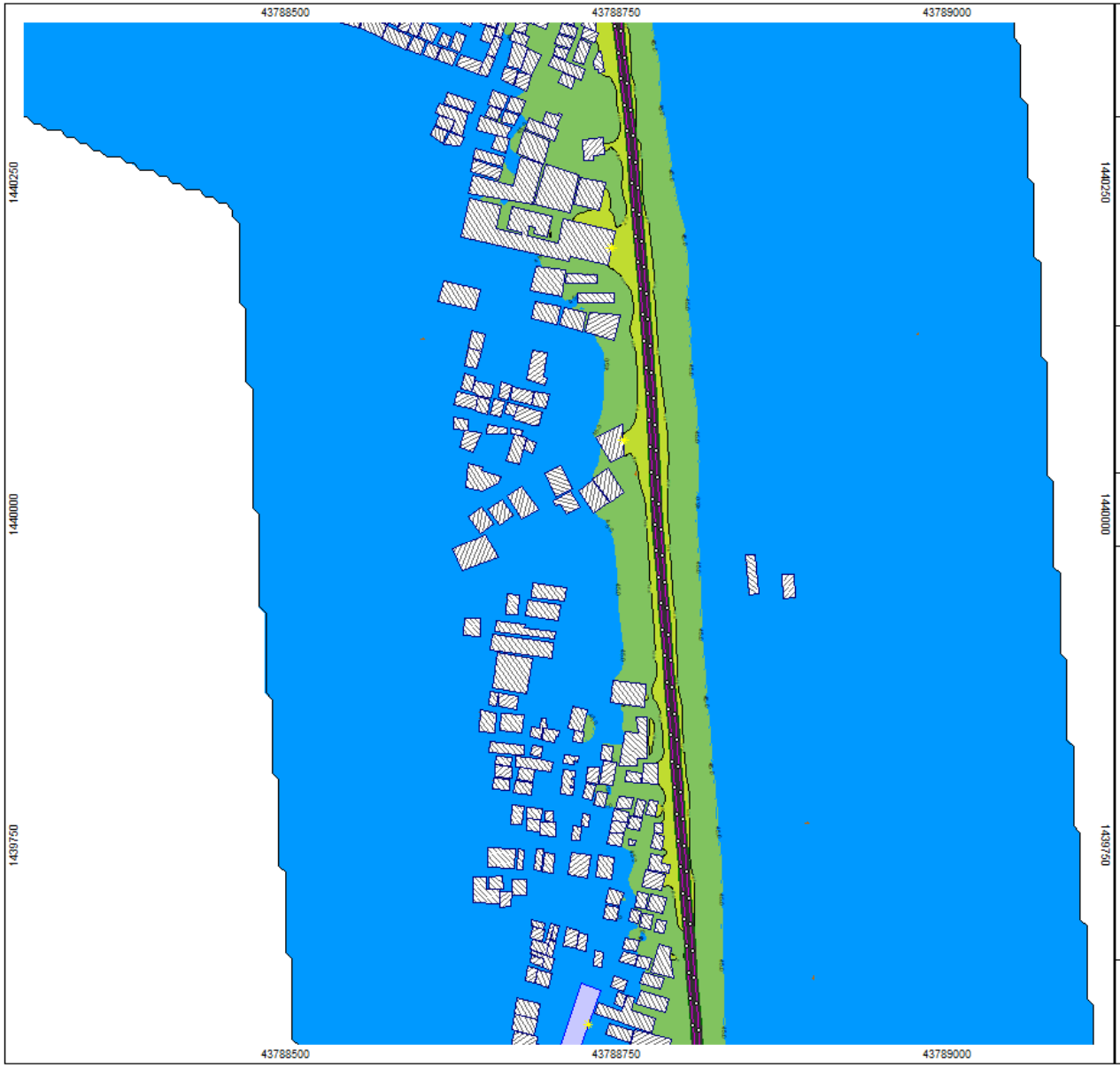

KR Puram to Kempegowda International Airport

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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
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Levels Leq,d
in dB(A)

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

Signs and symbols

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- Main building
- Point receiver
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- Point Sources
- Line source
- Geometry bitmap
- Wall
- Wall
- Elevation point
- Bodeneffekte
- Noise calculation area

N

Length scale 1:2887

0 25 50 100 150 200 m

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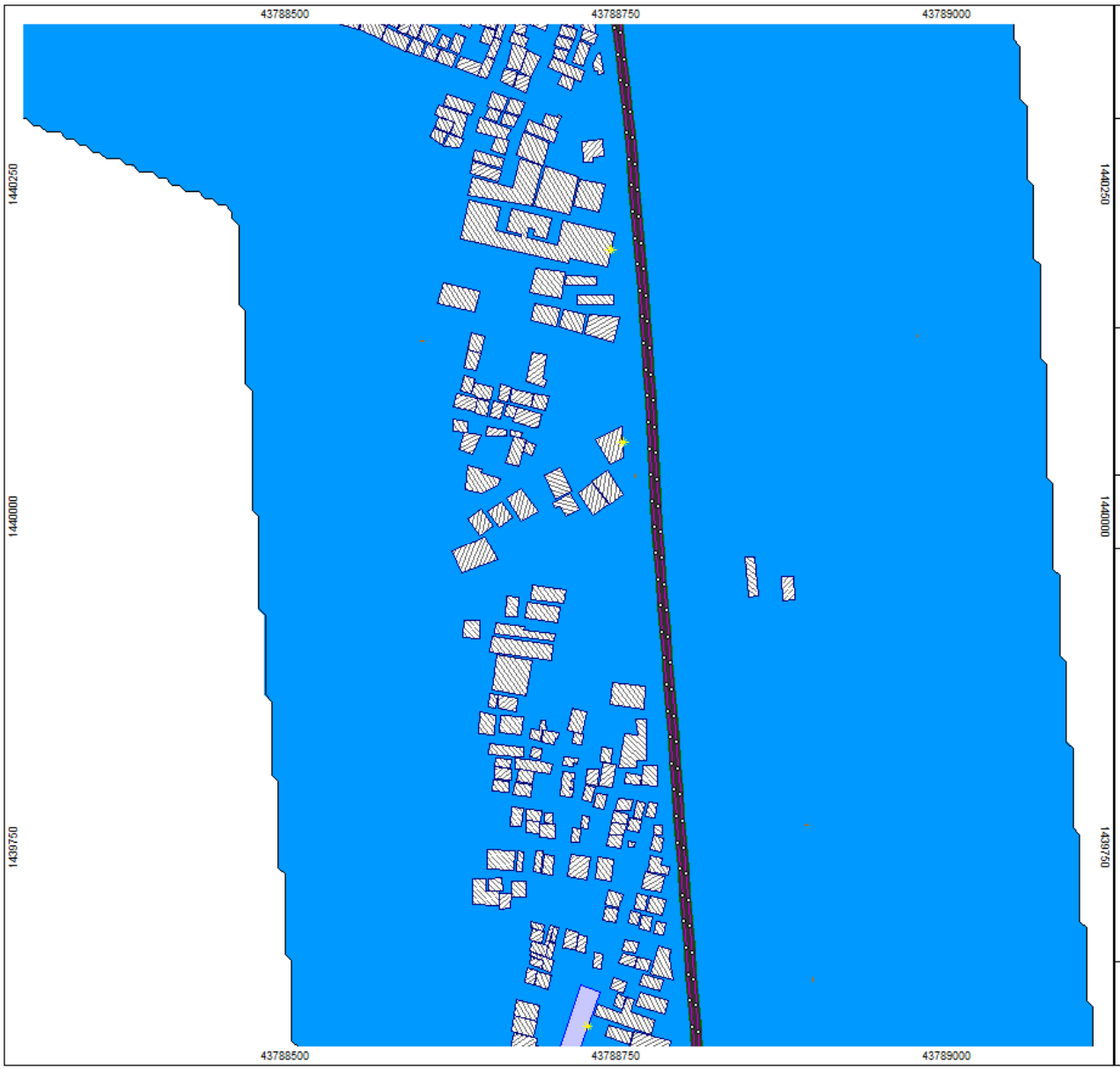

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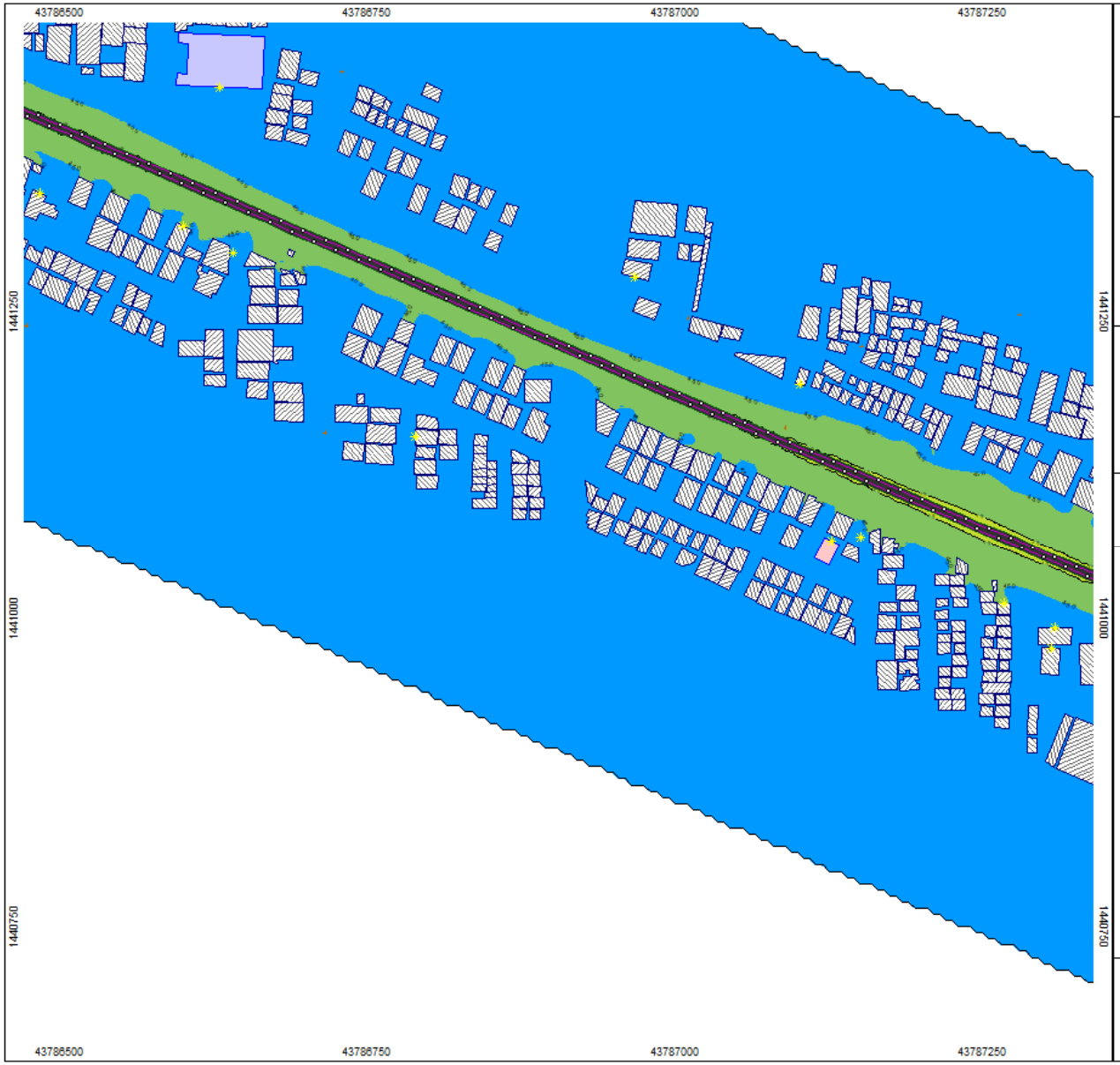

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Length scale 1:3101

0 25 50 100 150 200 m

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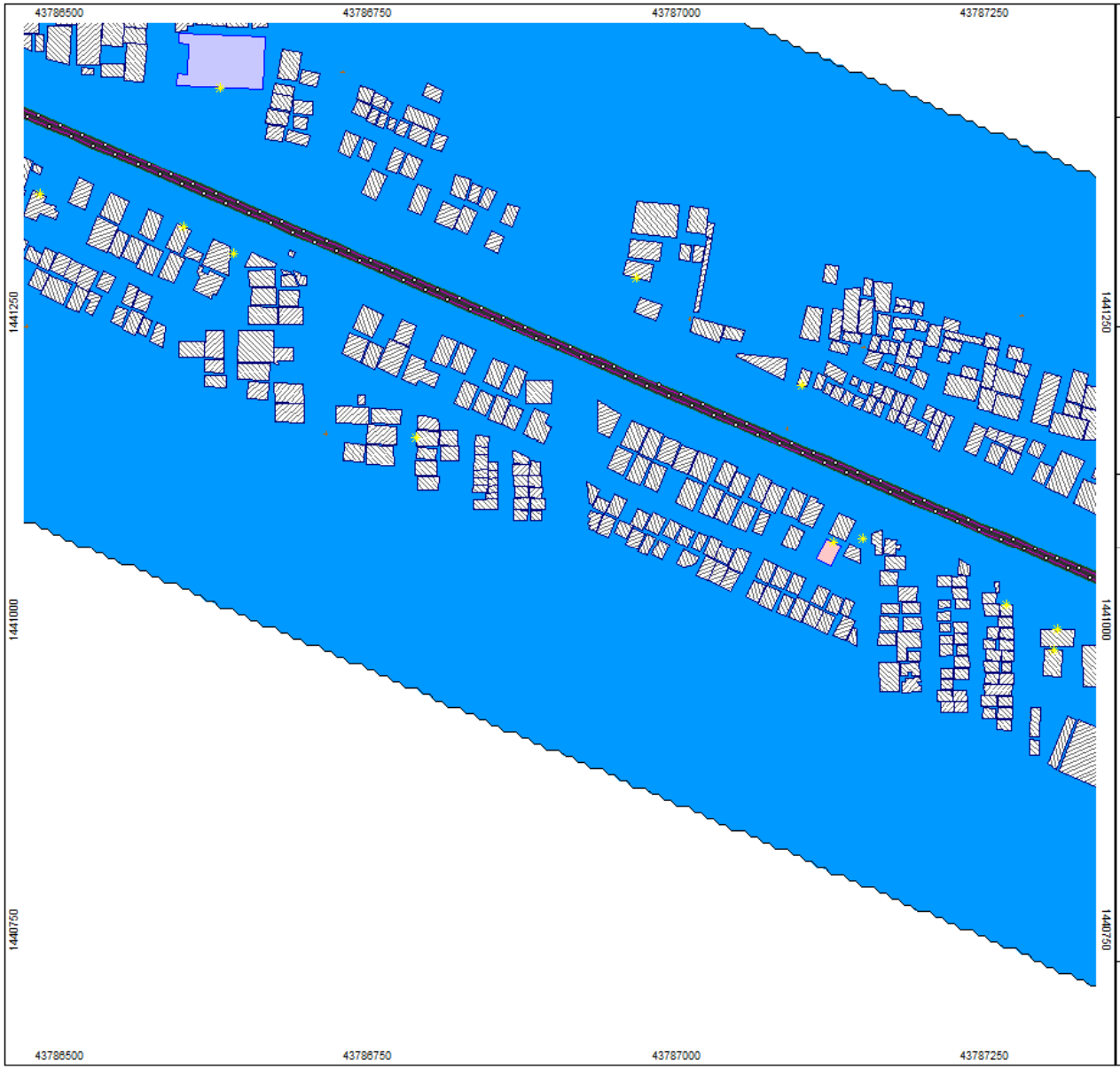

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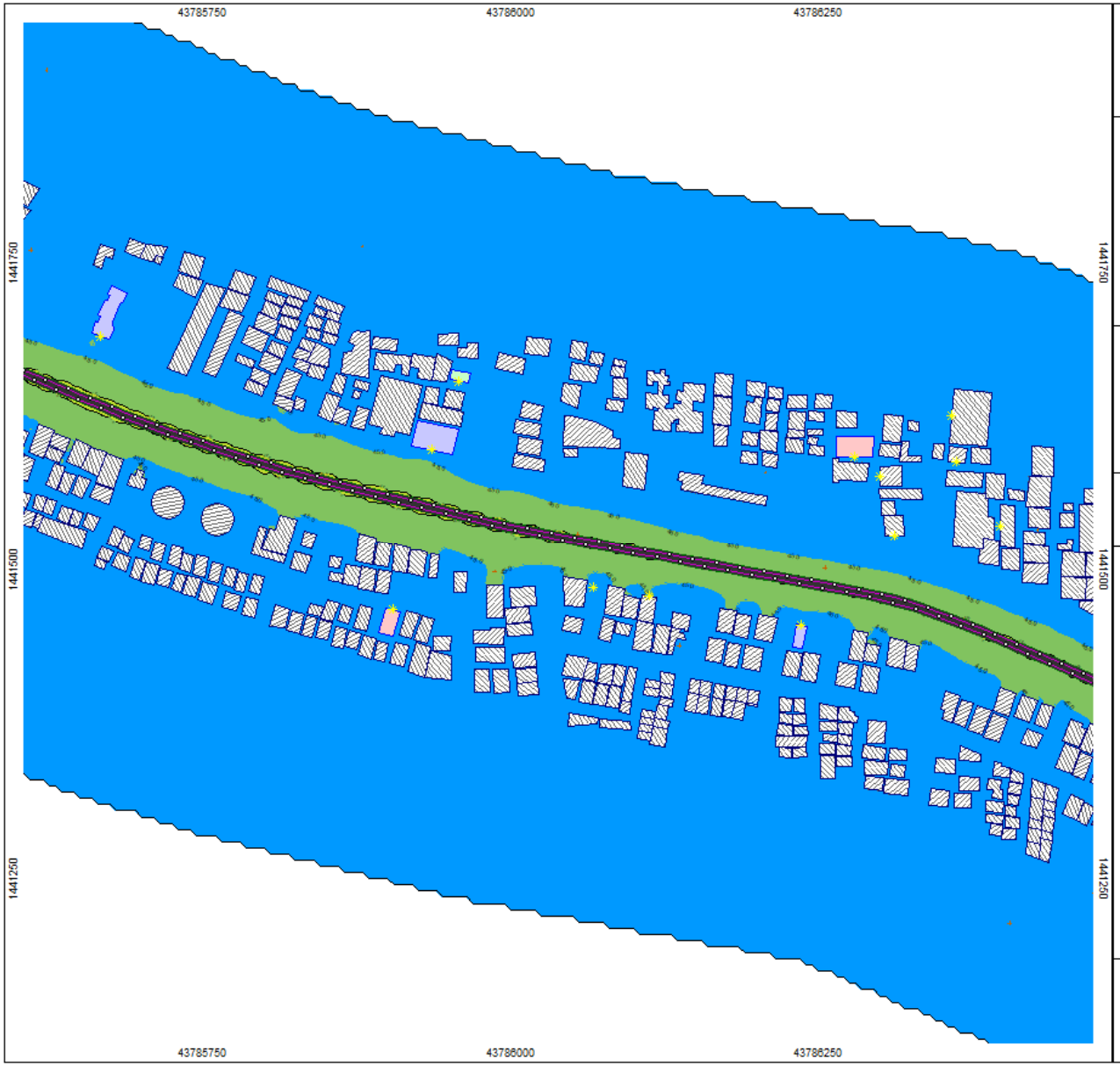

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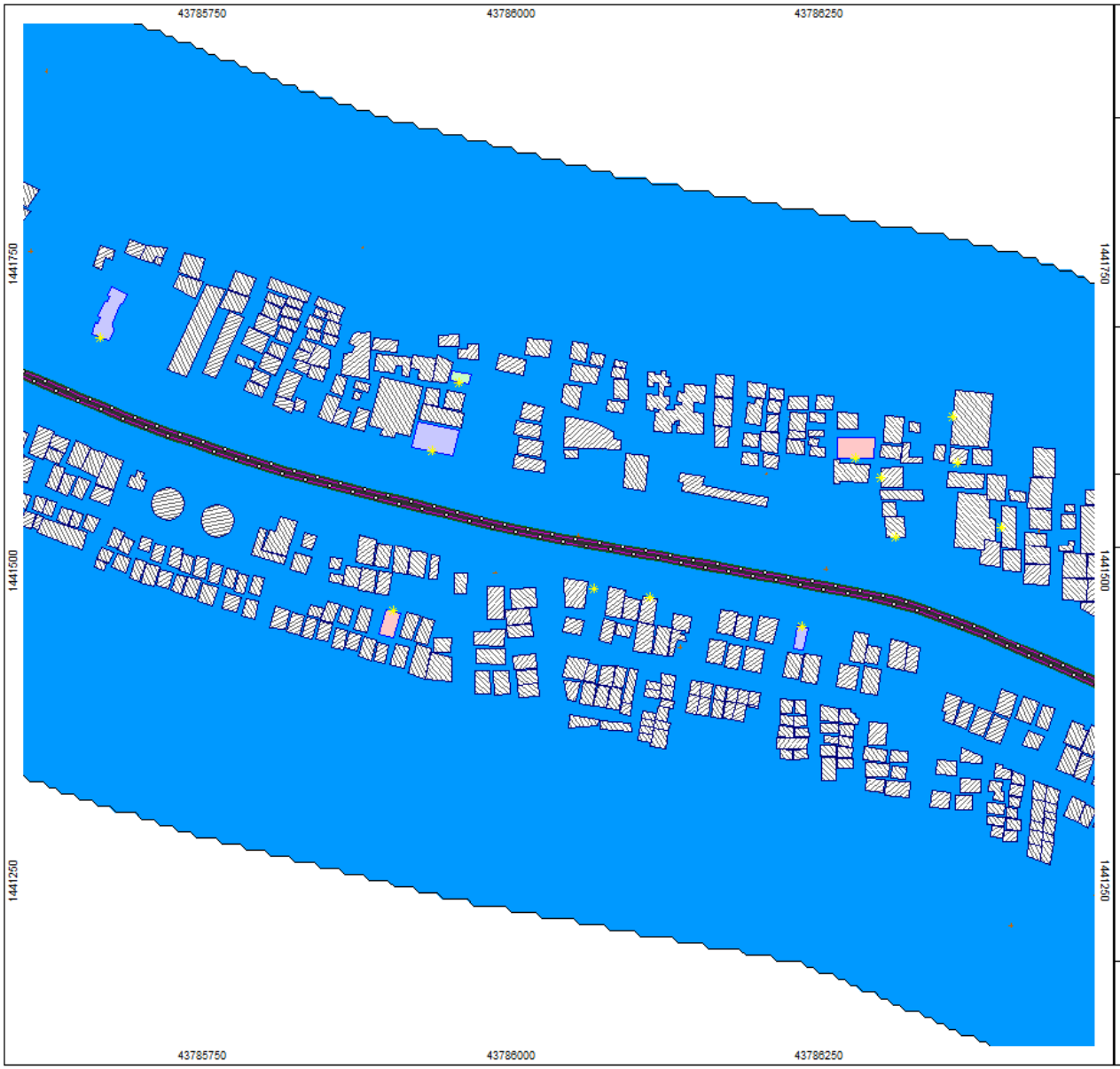

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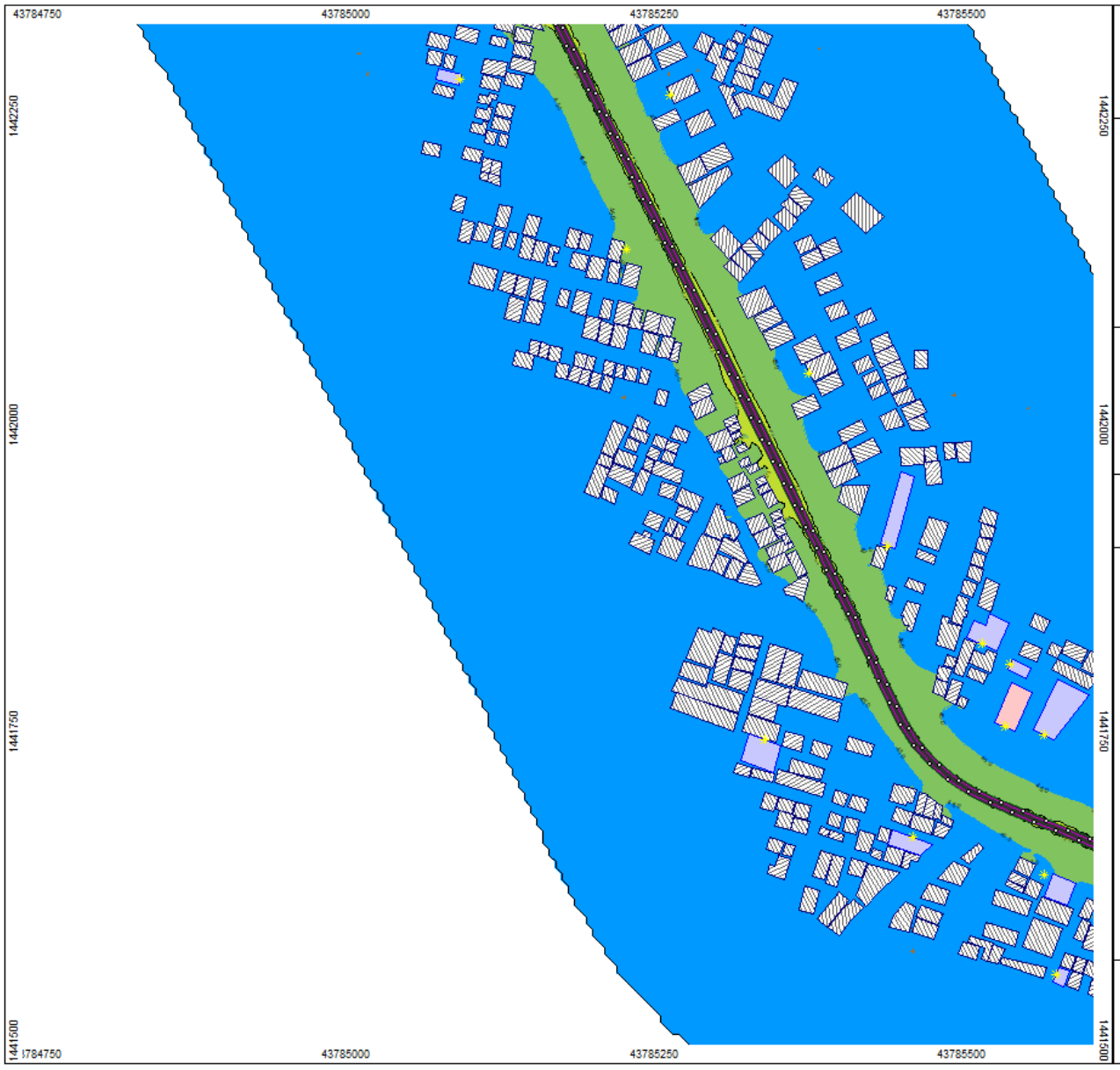

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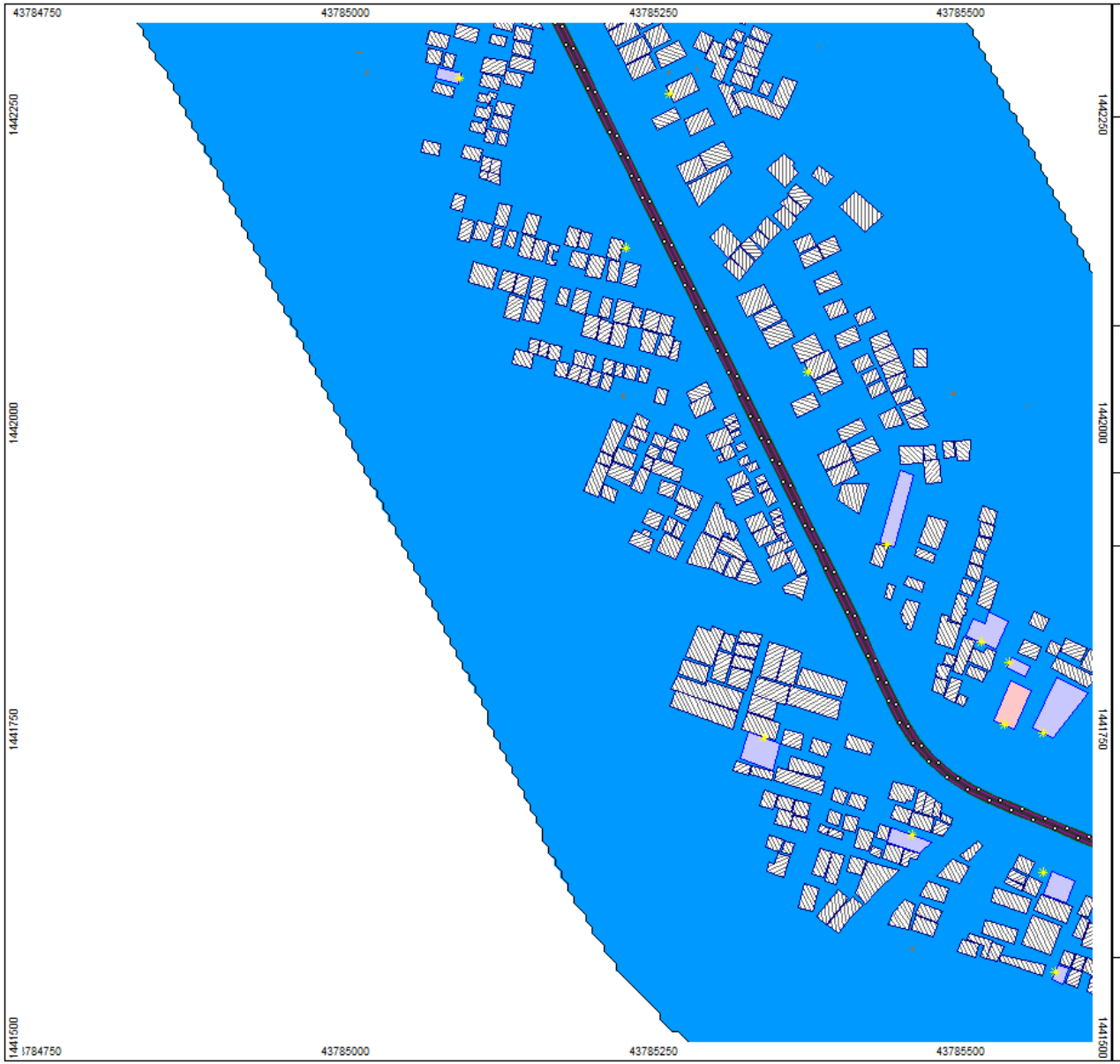

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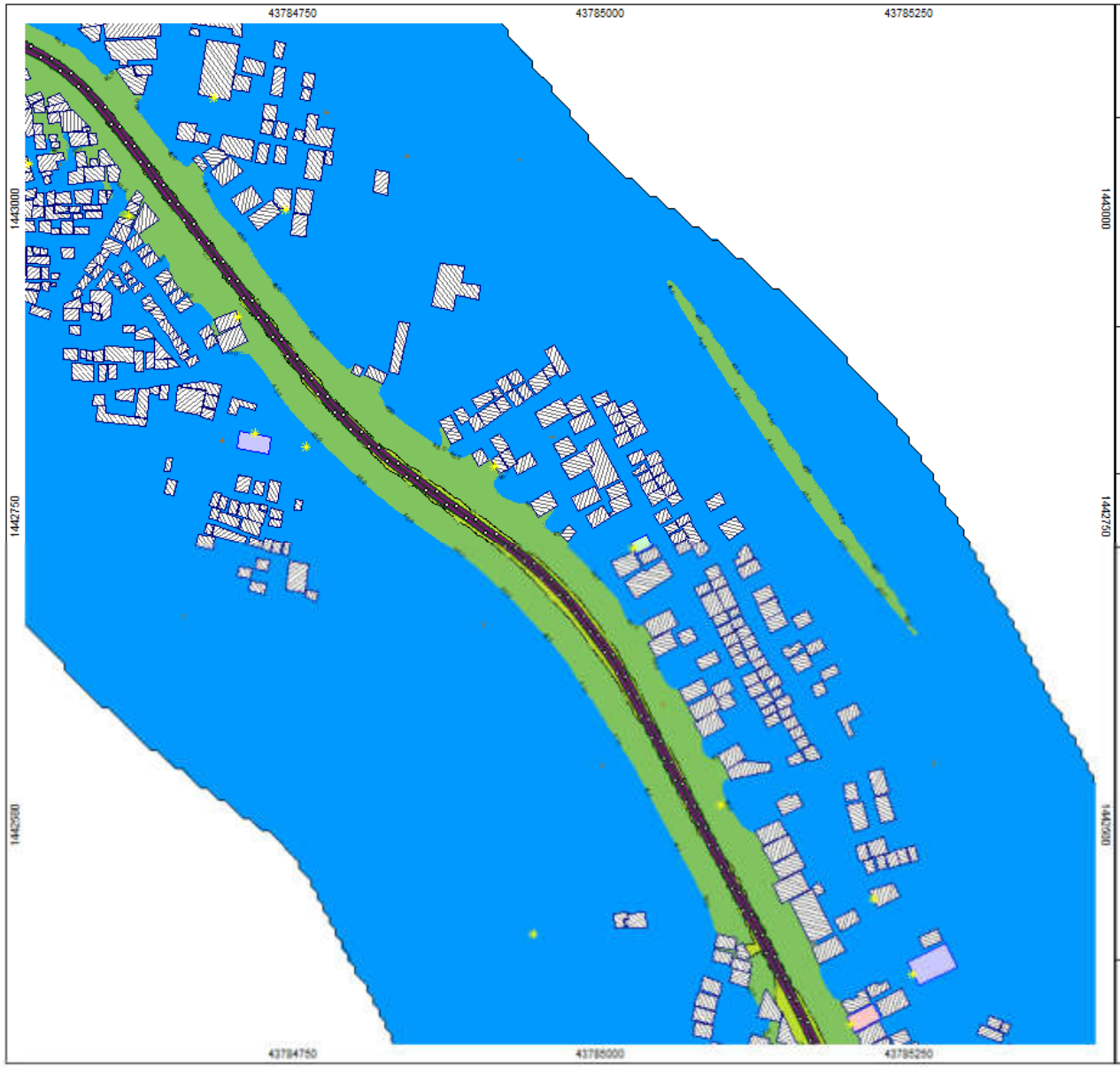

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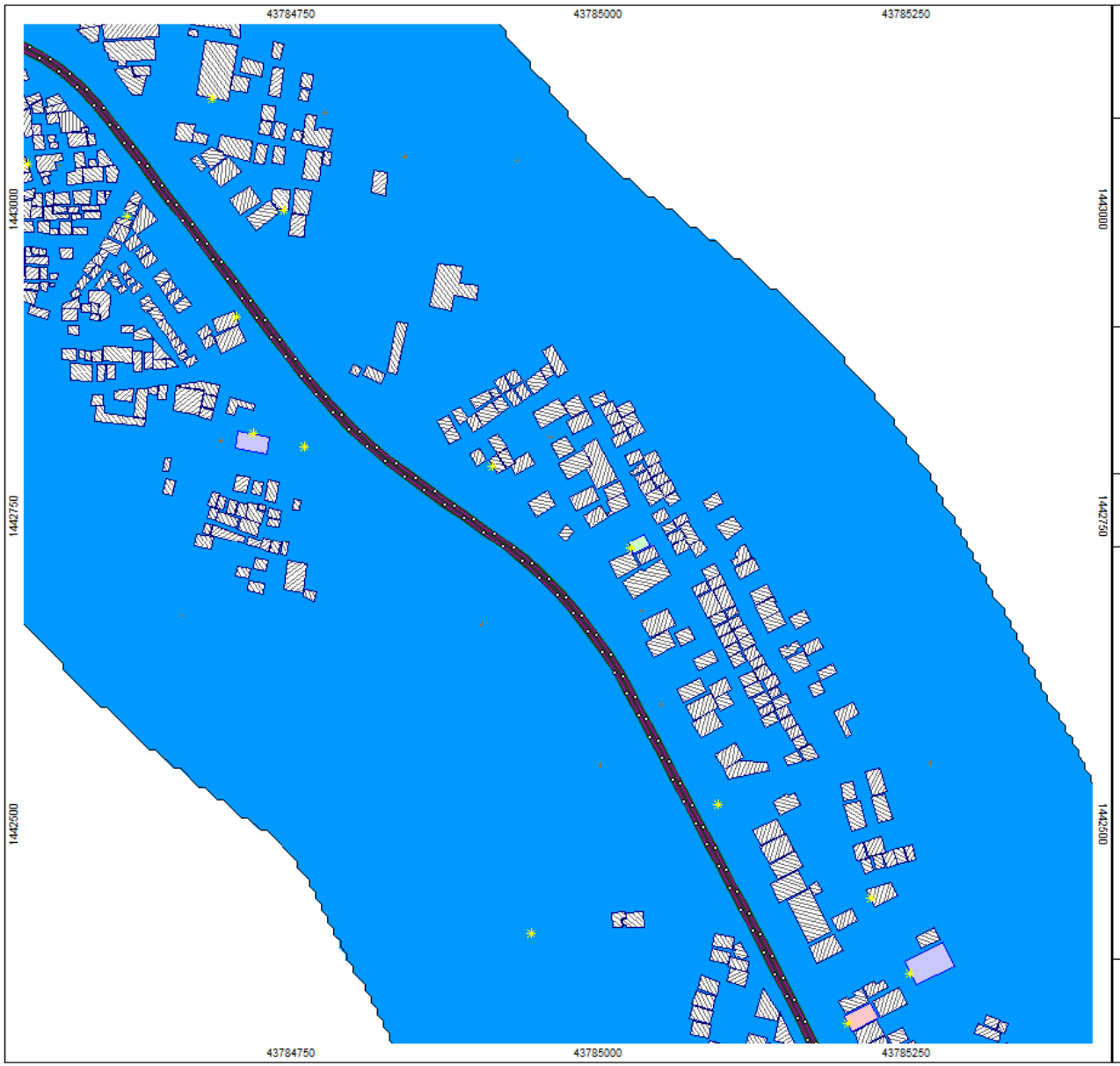

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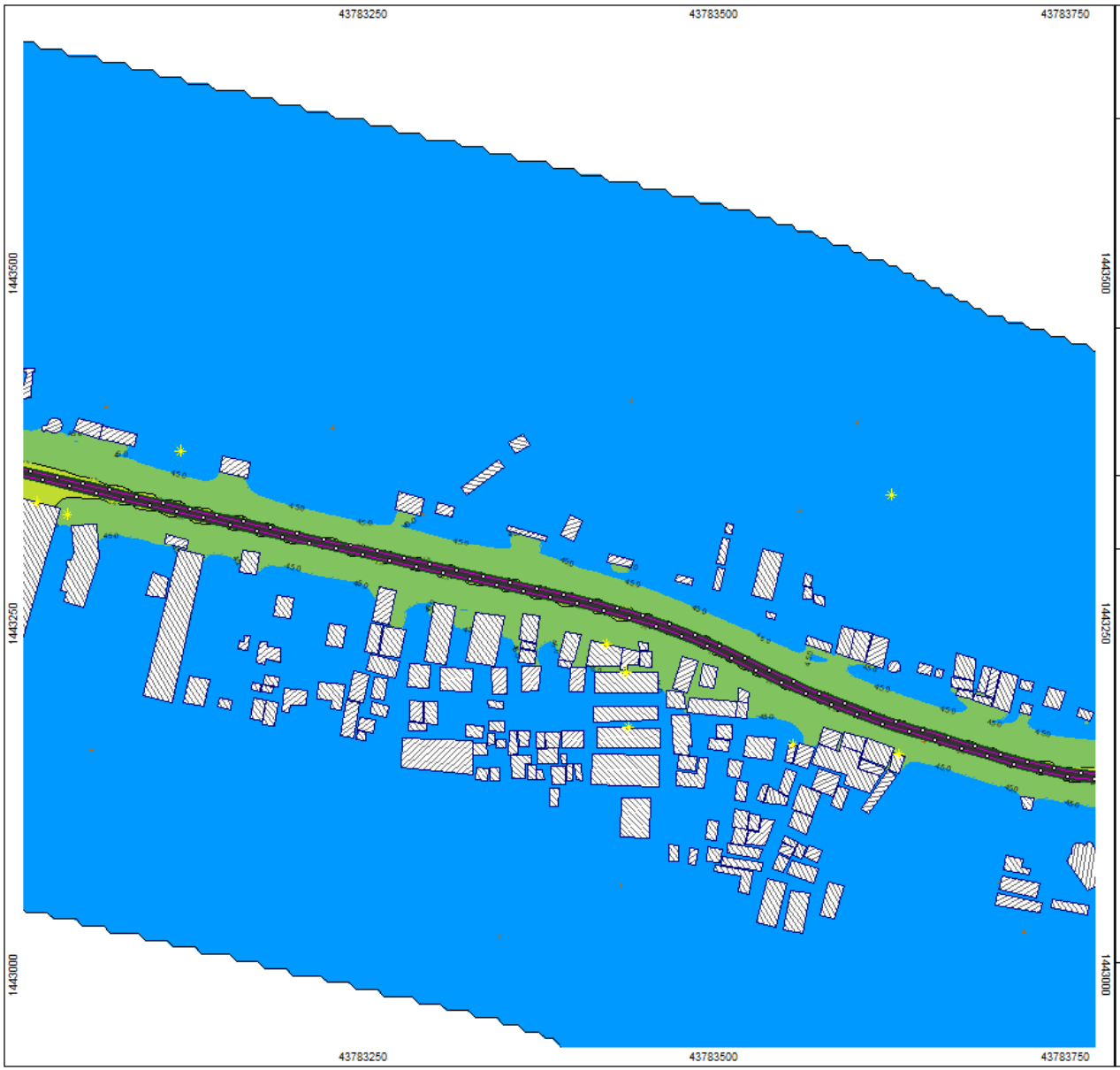

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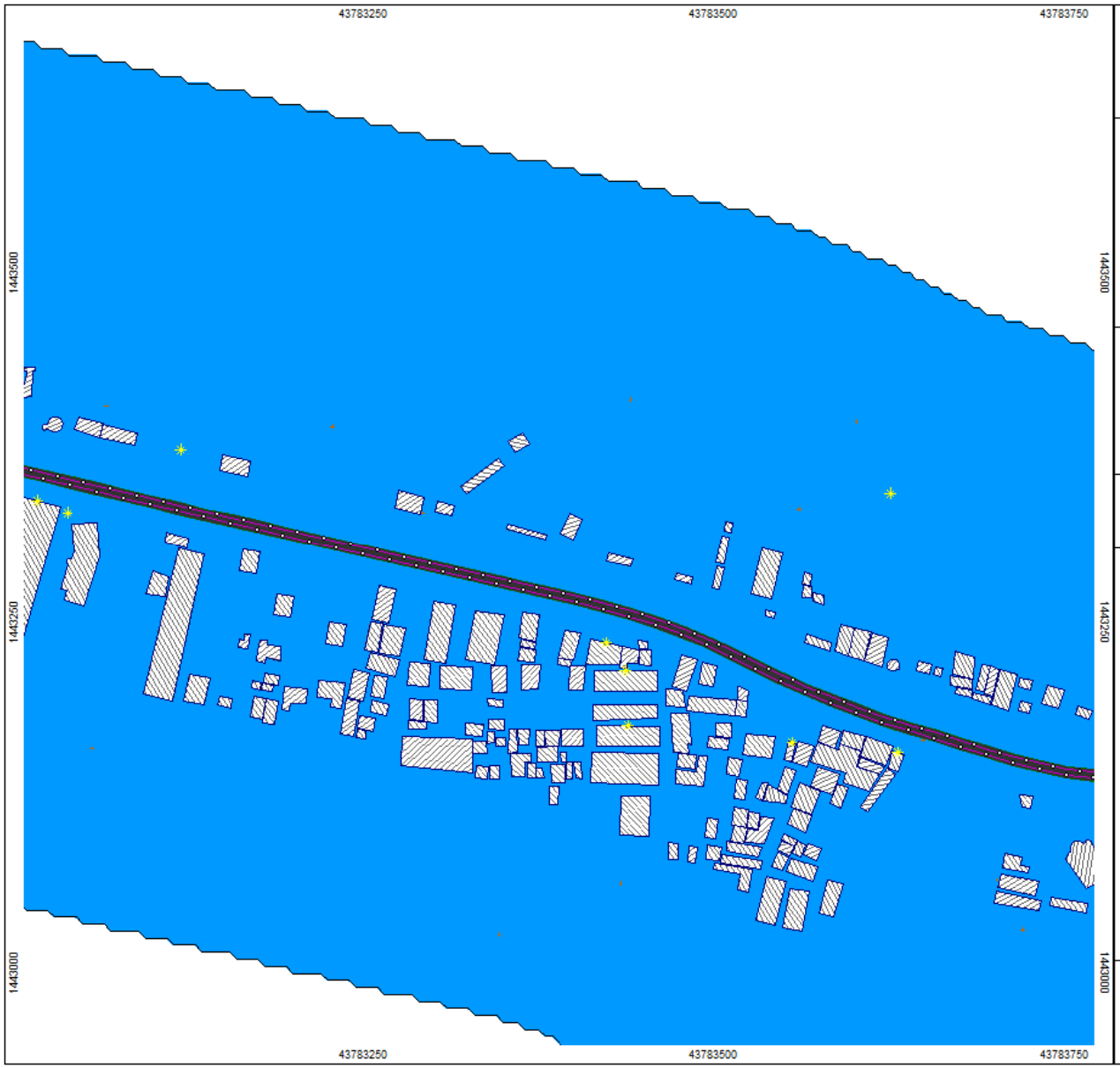

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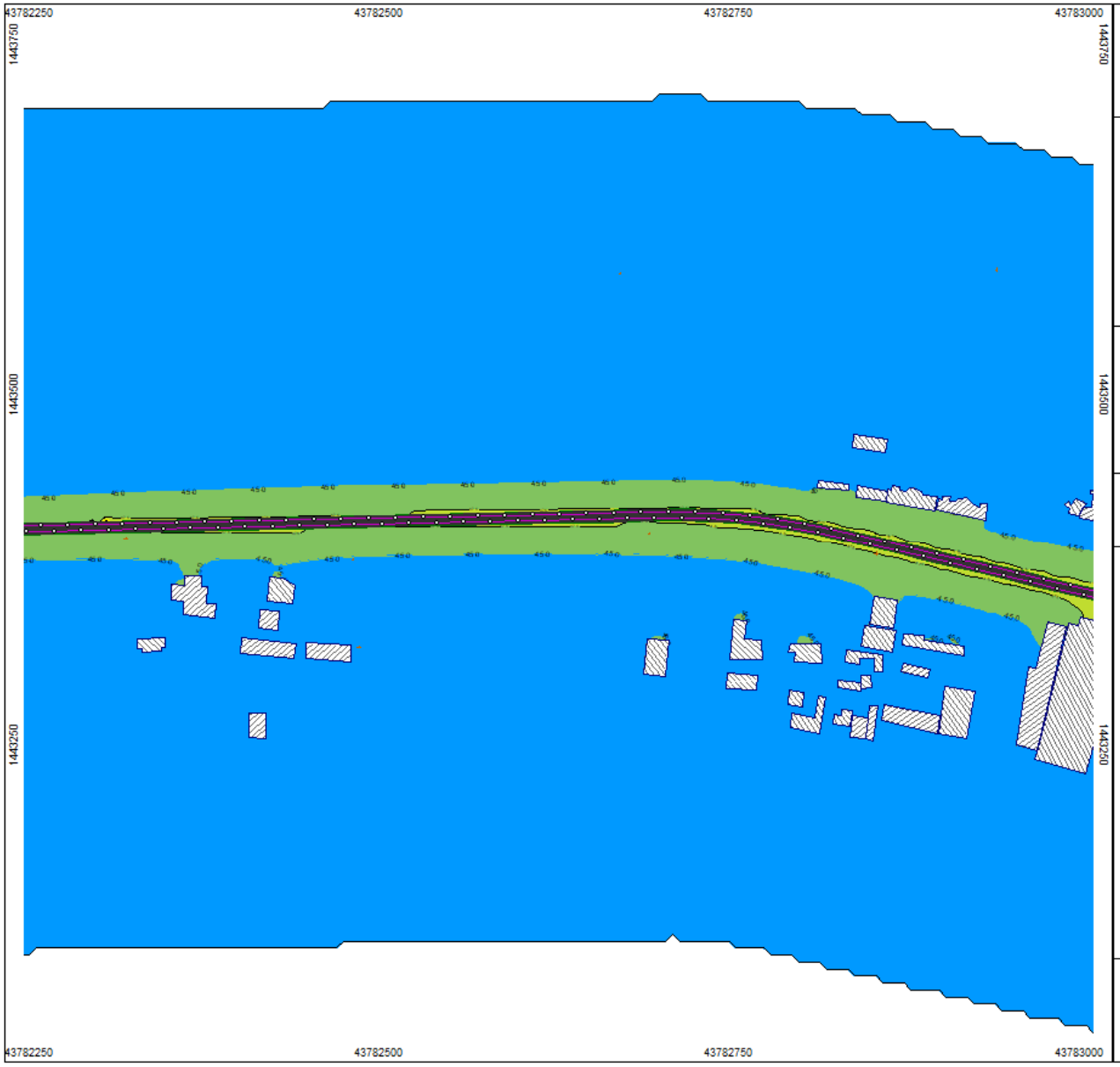

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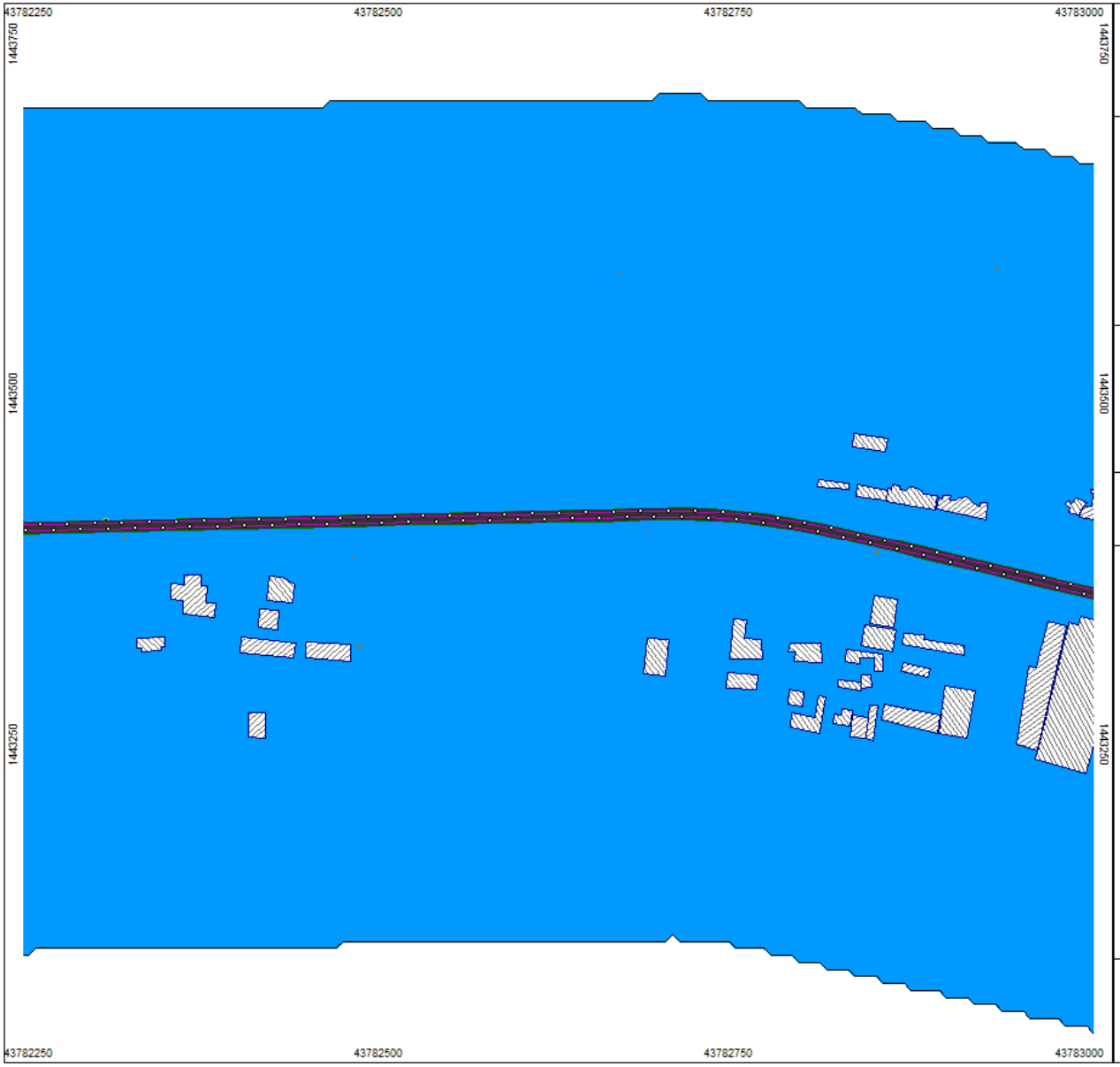

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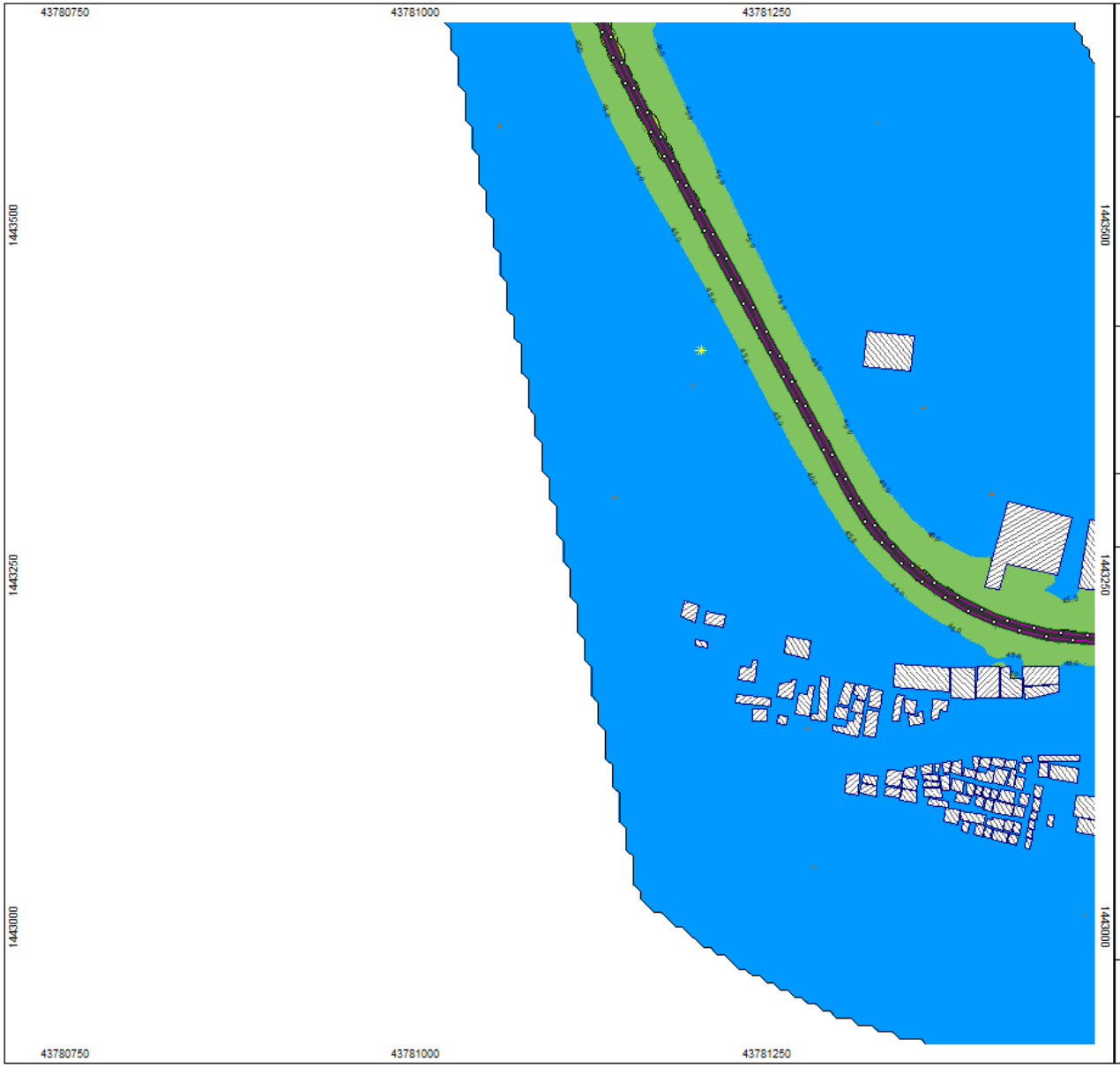

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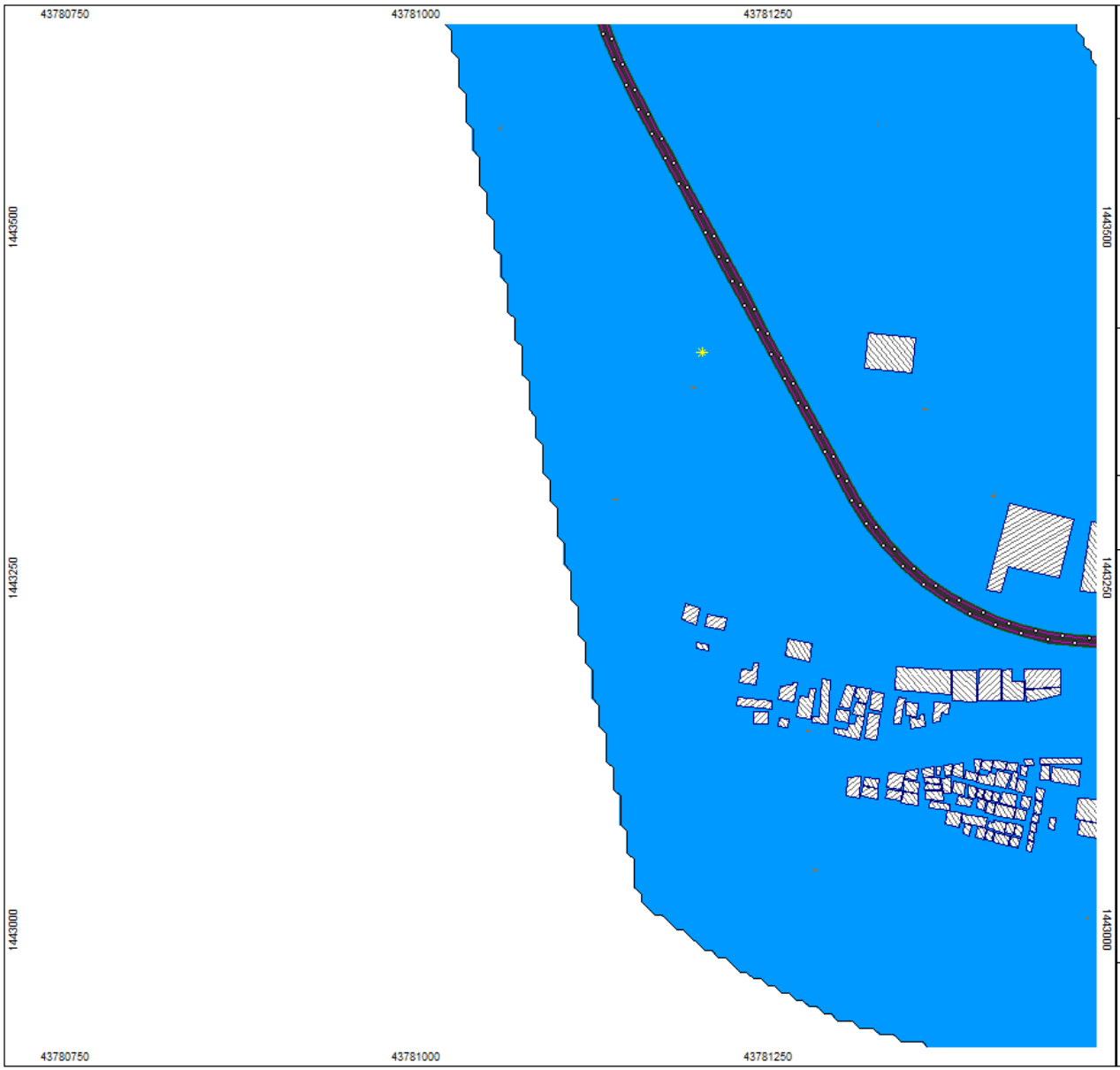

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- Bodeneffekte
- Noise calculation area

N

Length scale 1:2727

0 25 50 100 150 200

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KR Puram to Kempegowda International Airport

Operational Noise.
Buildings from Street Map and Google Earth.
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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
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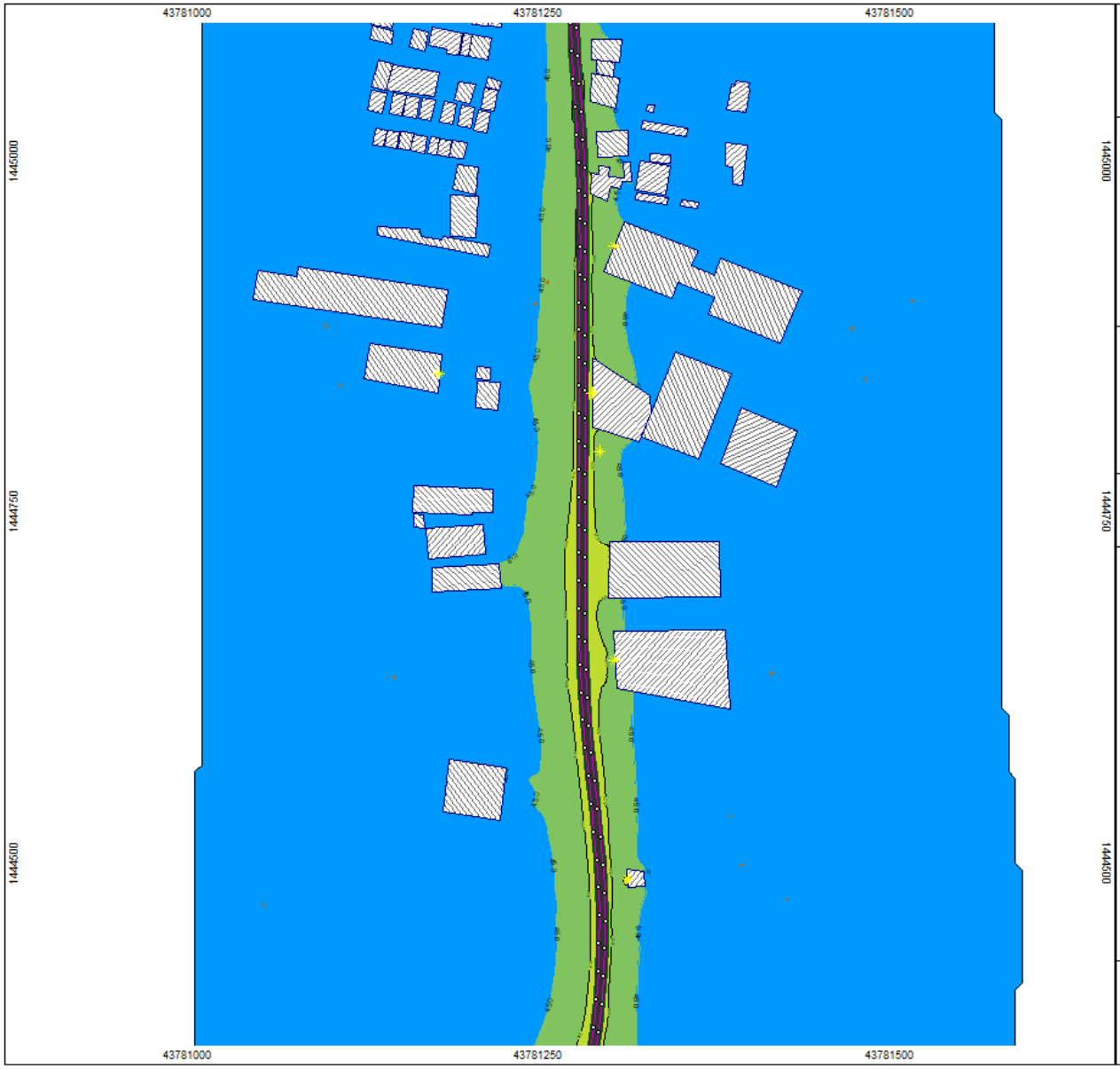

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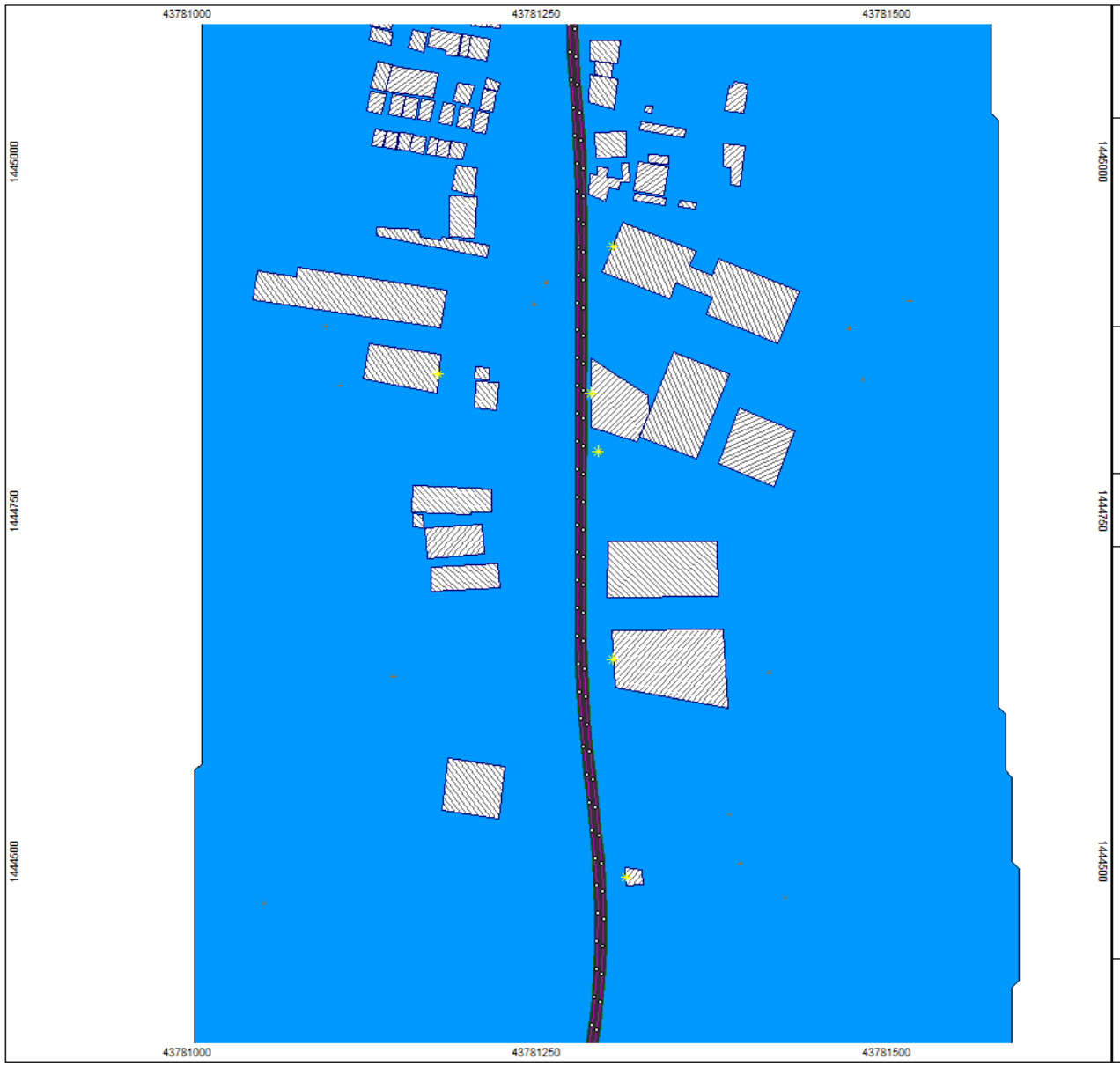

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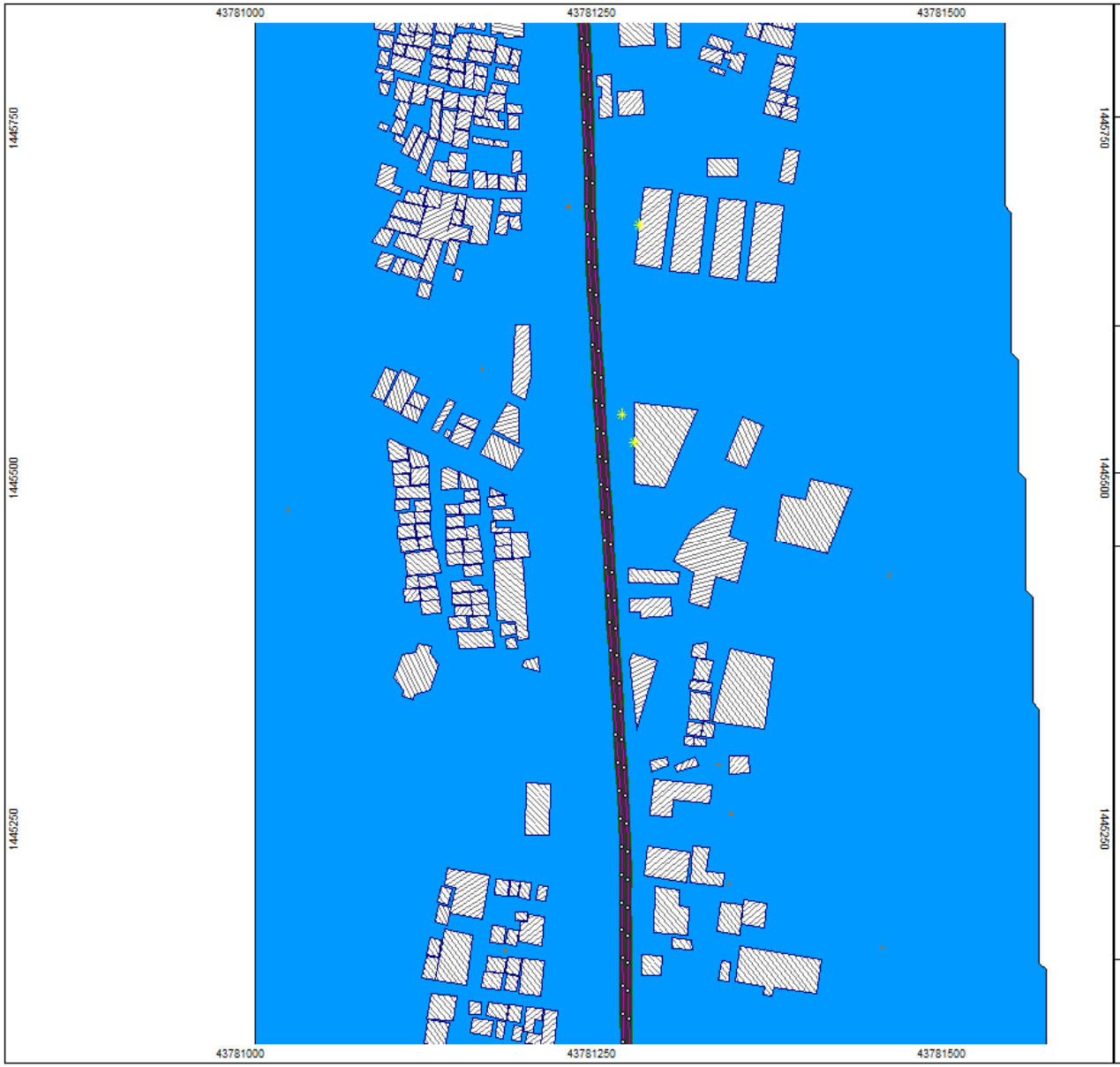

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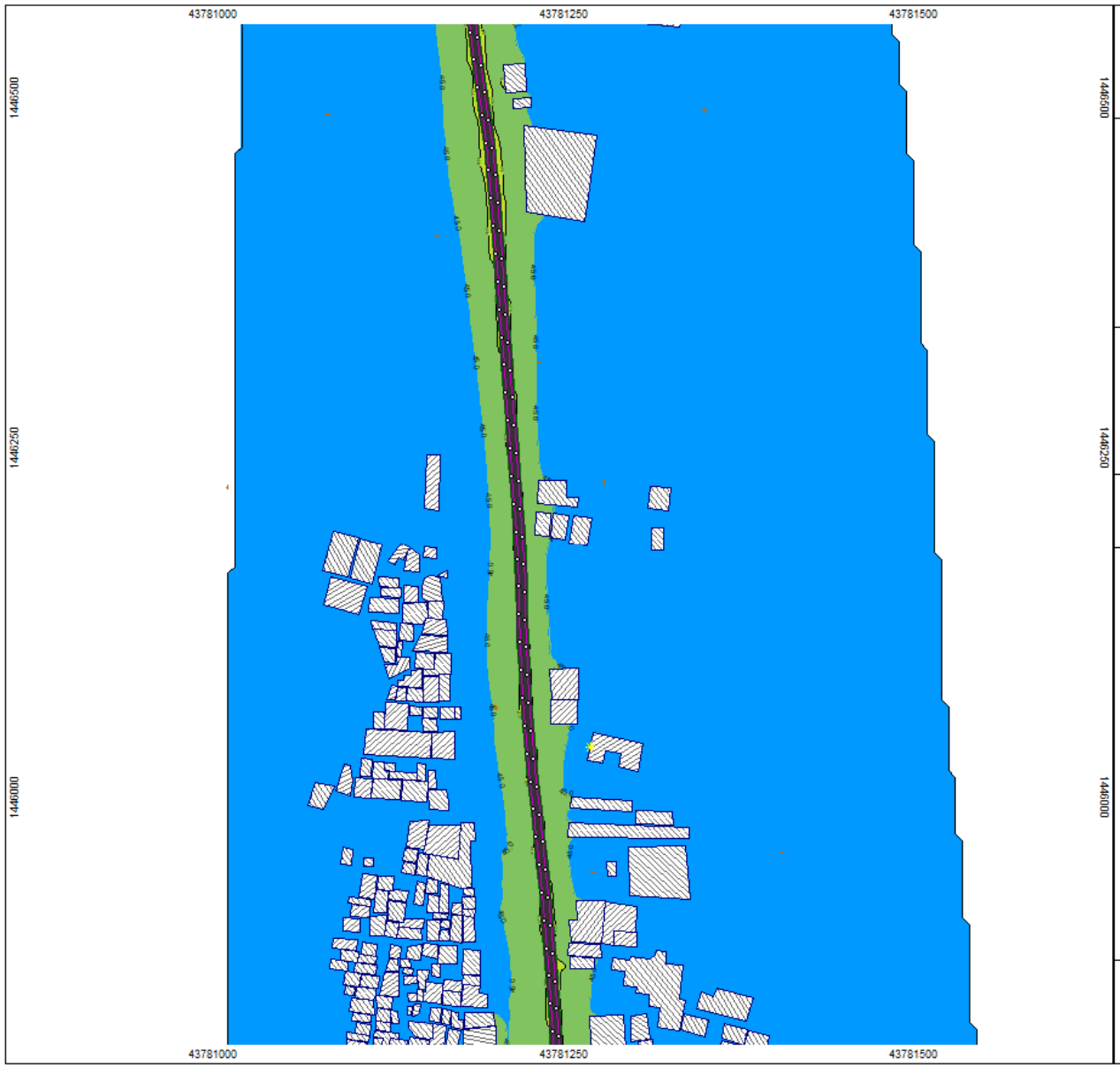

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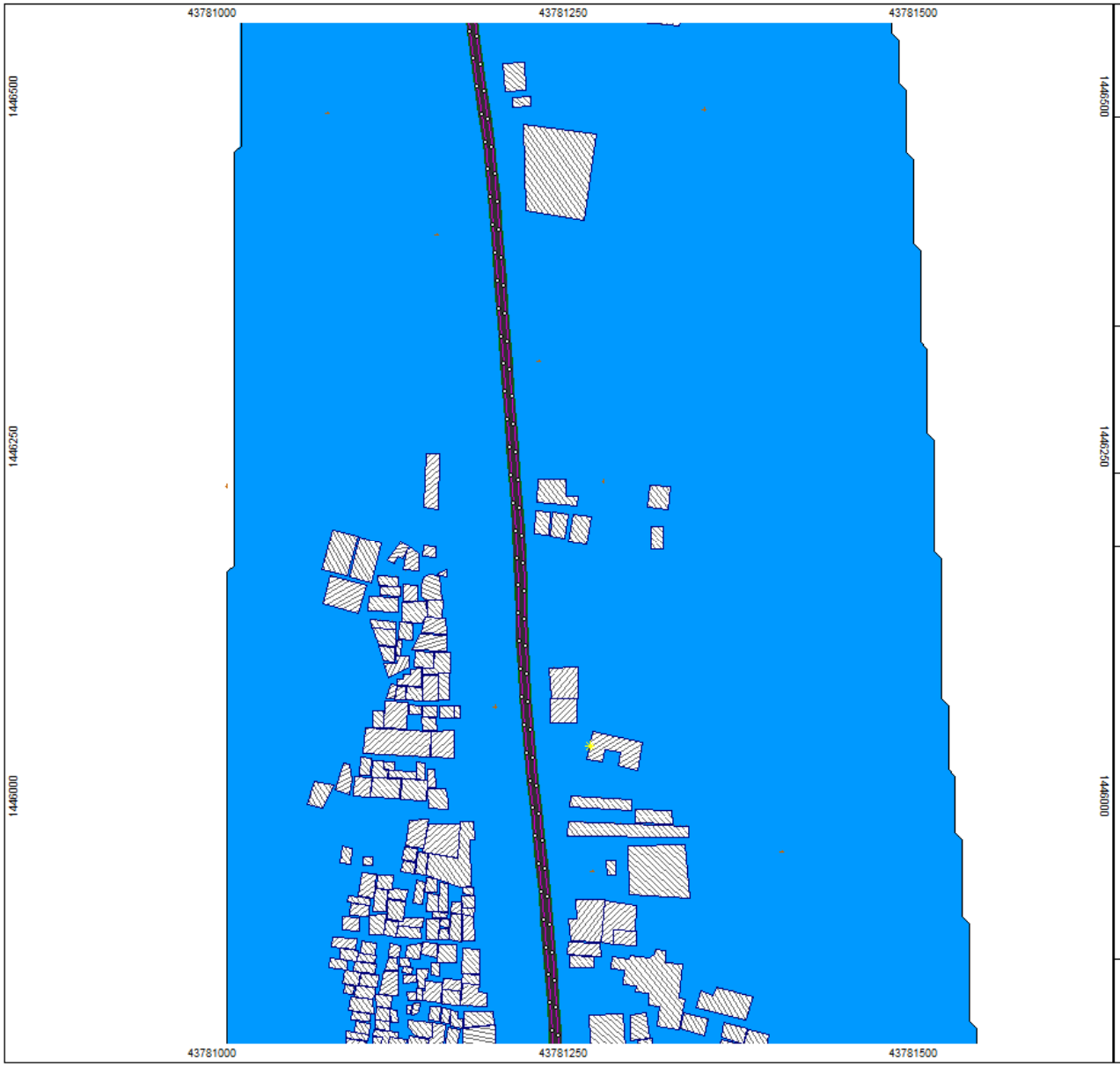

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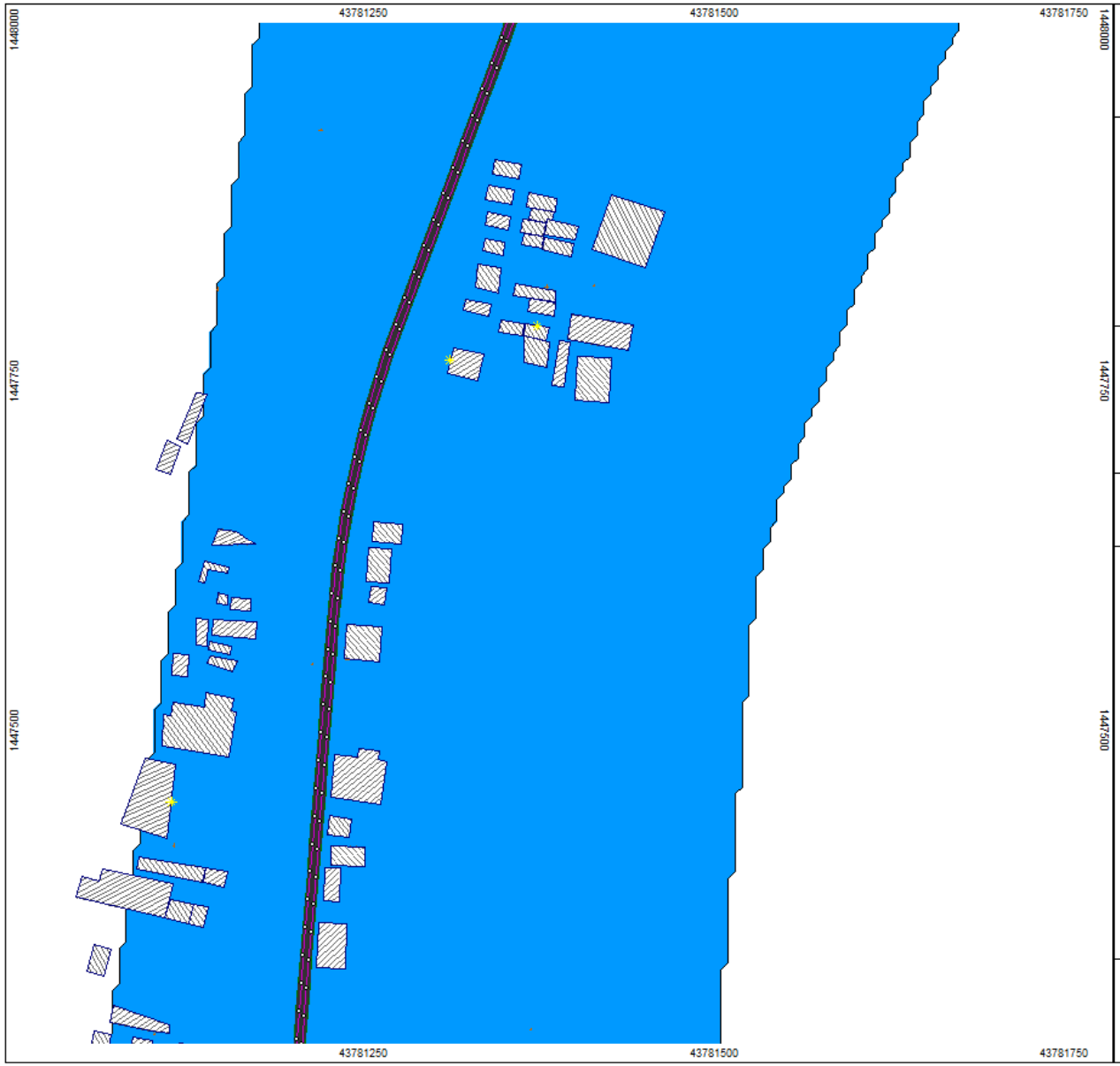

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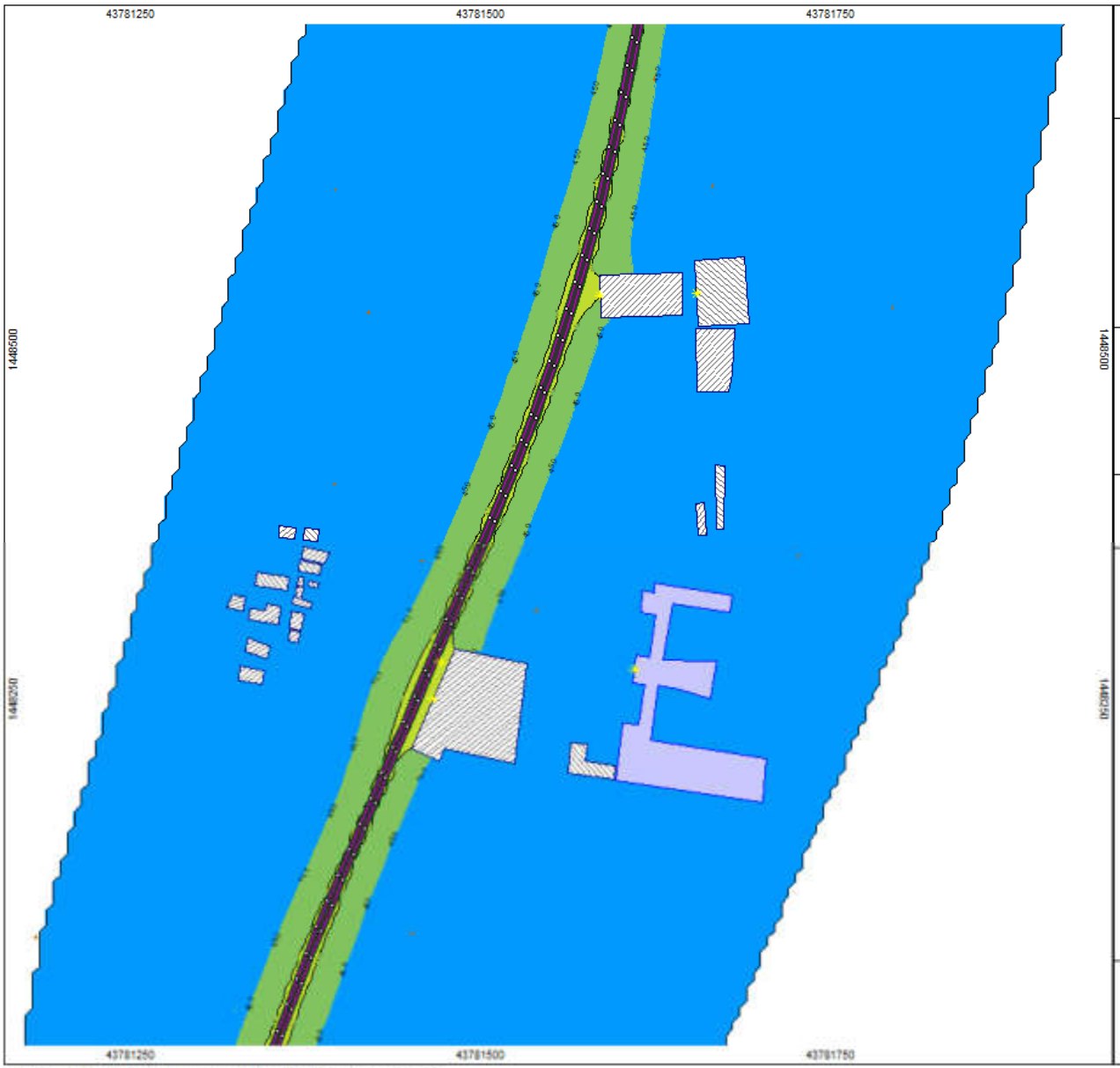

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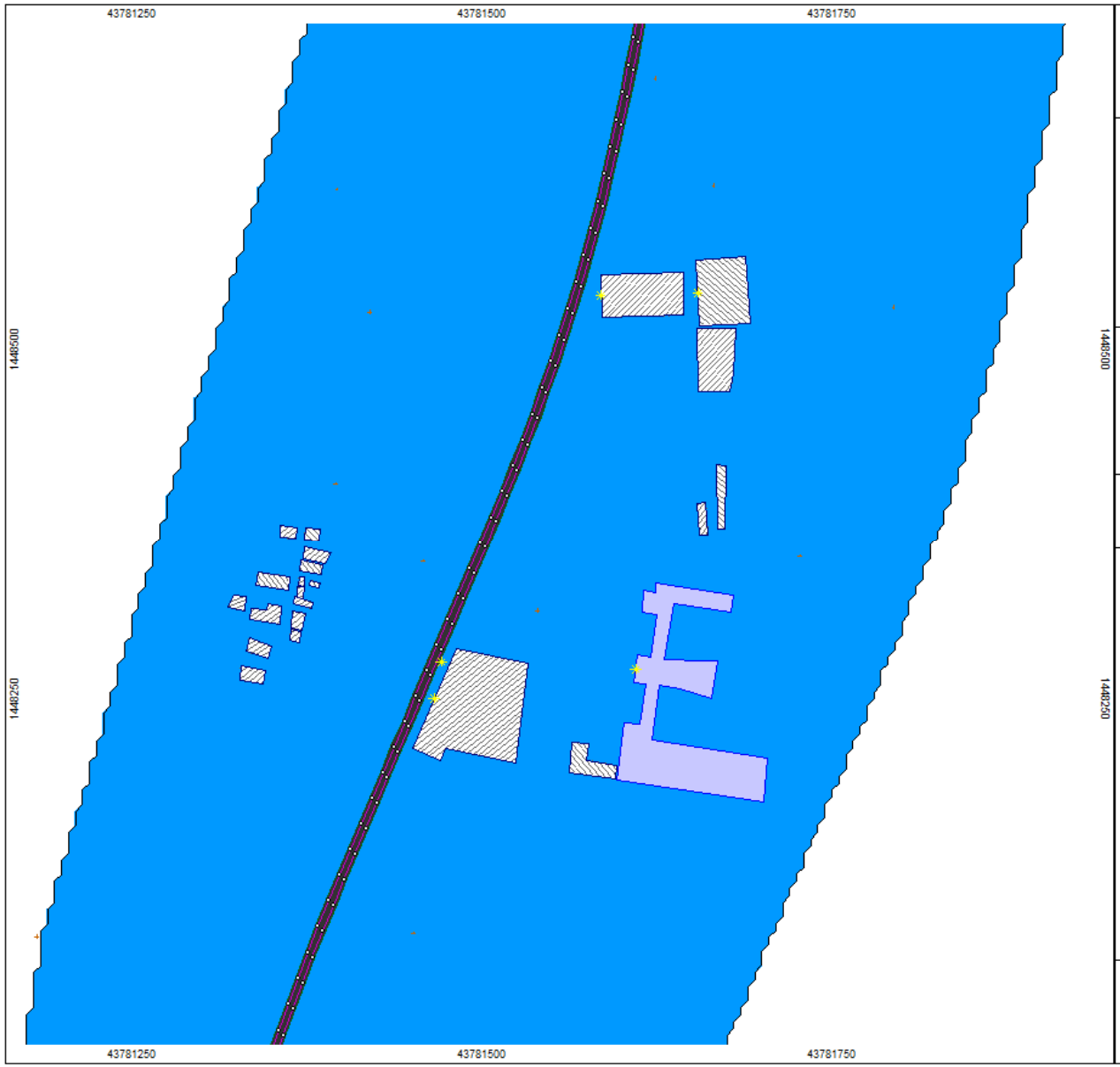

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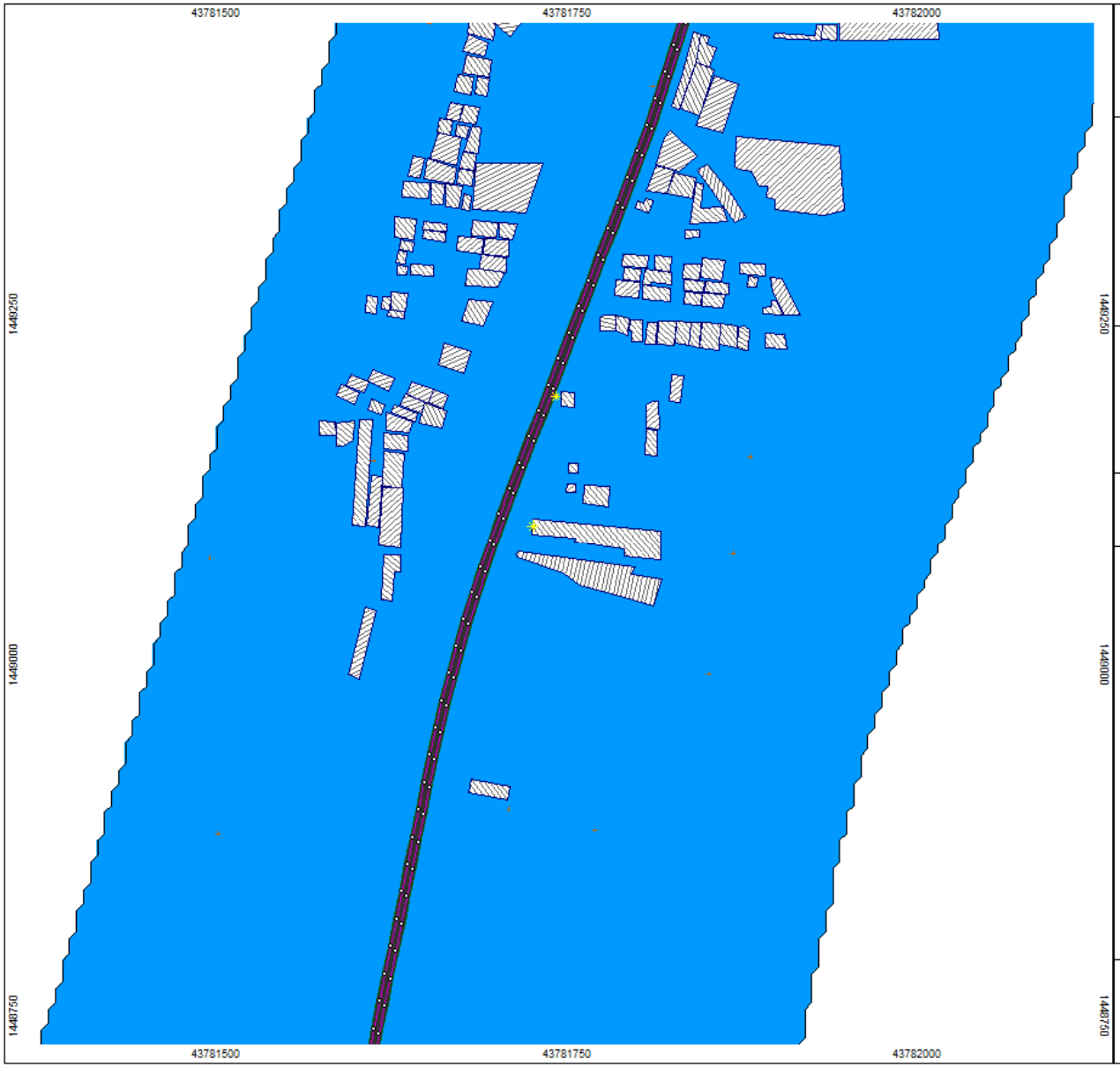

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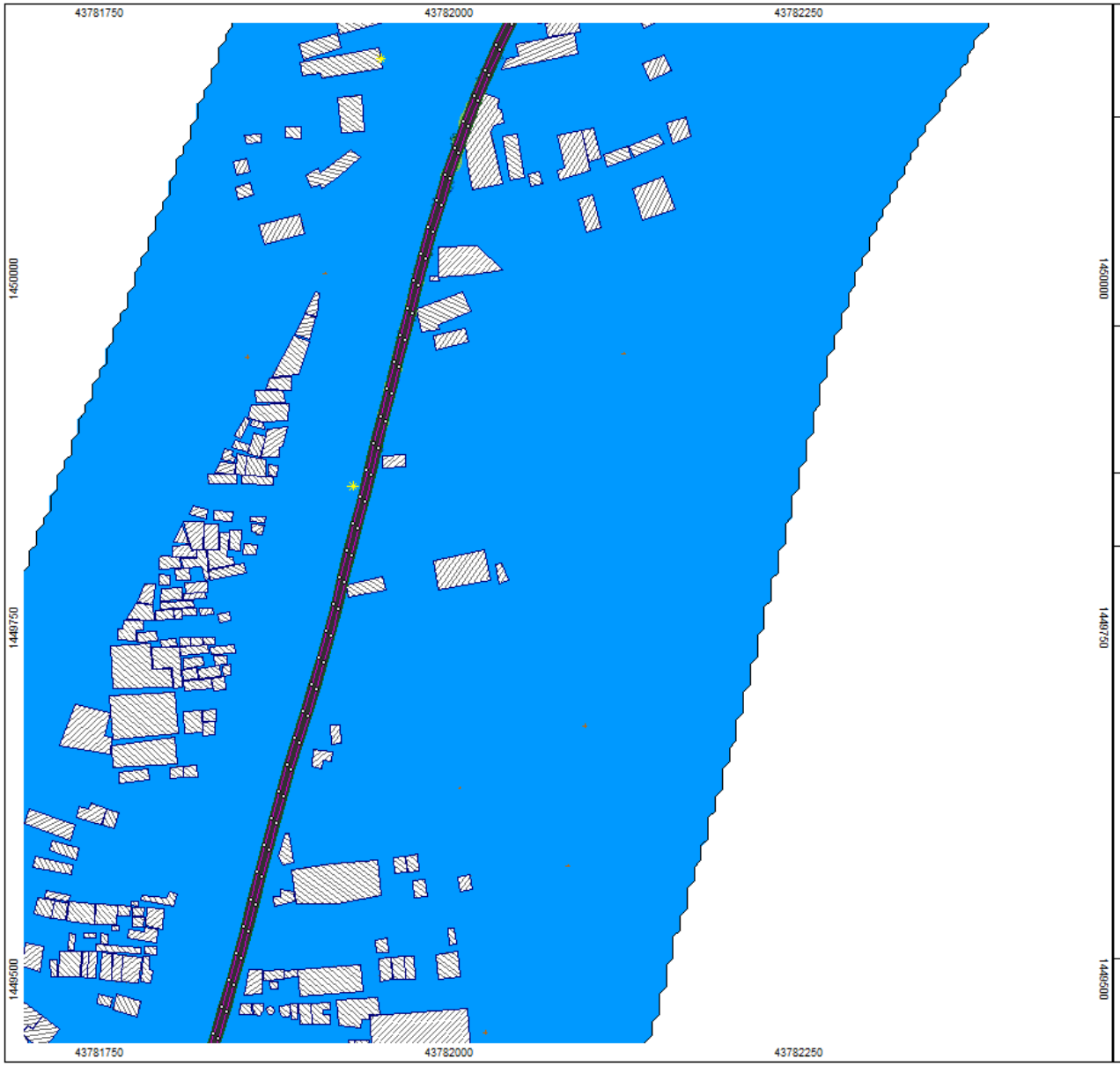

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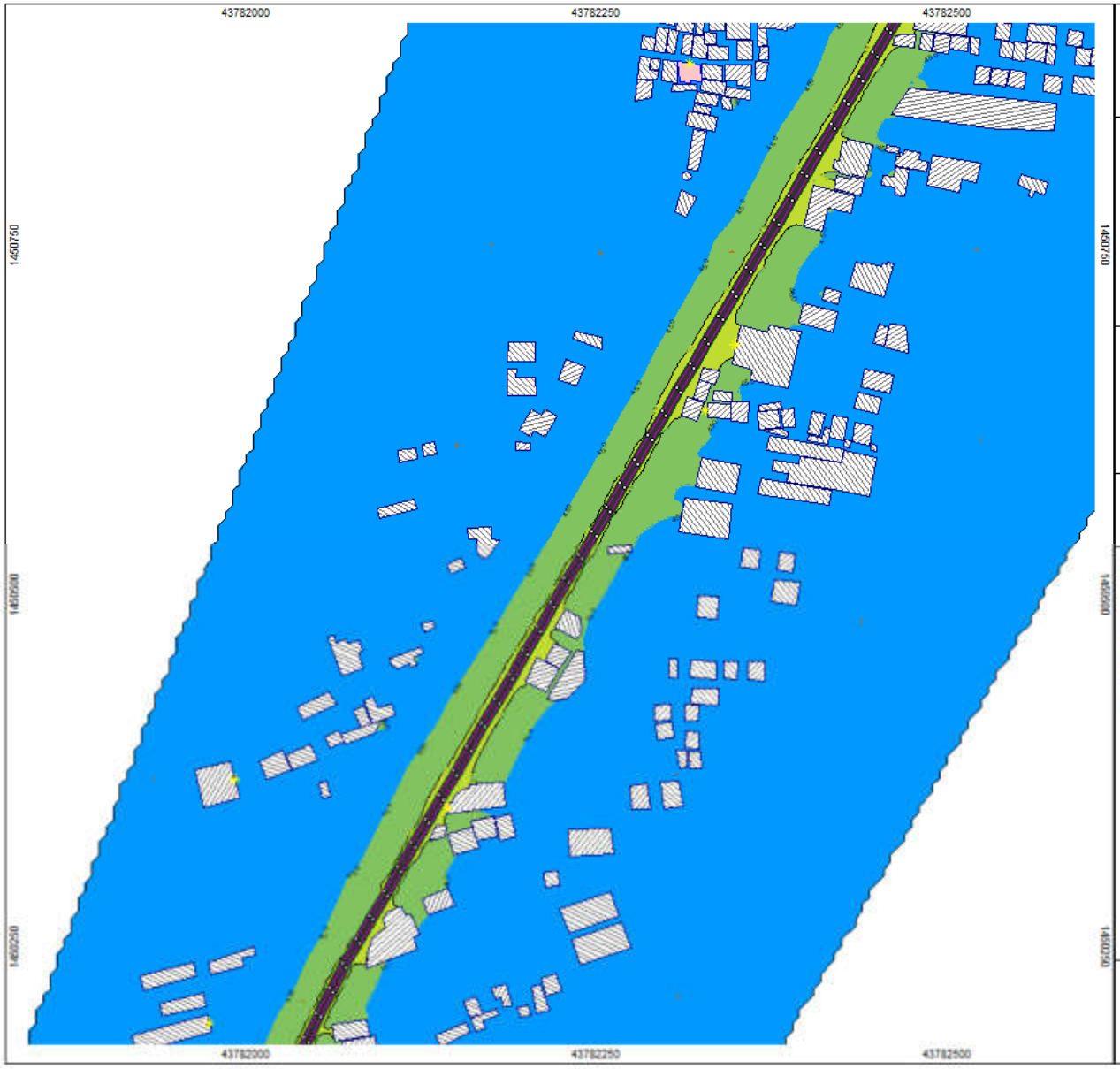

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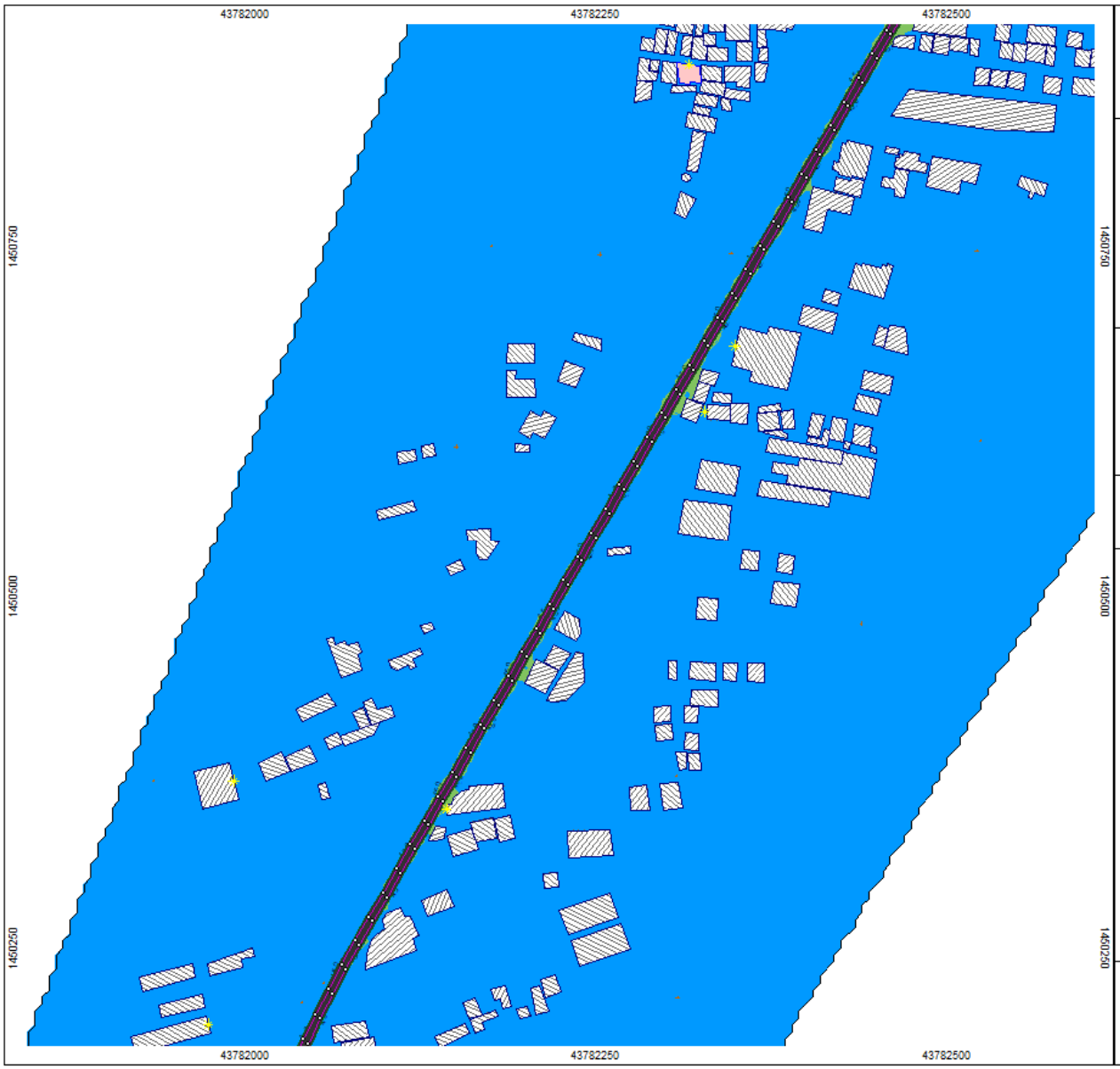

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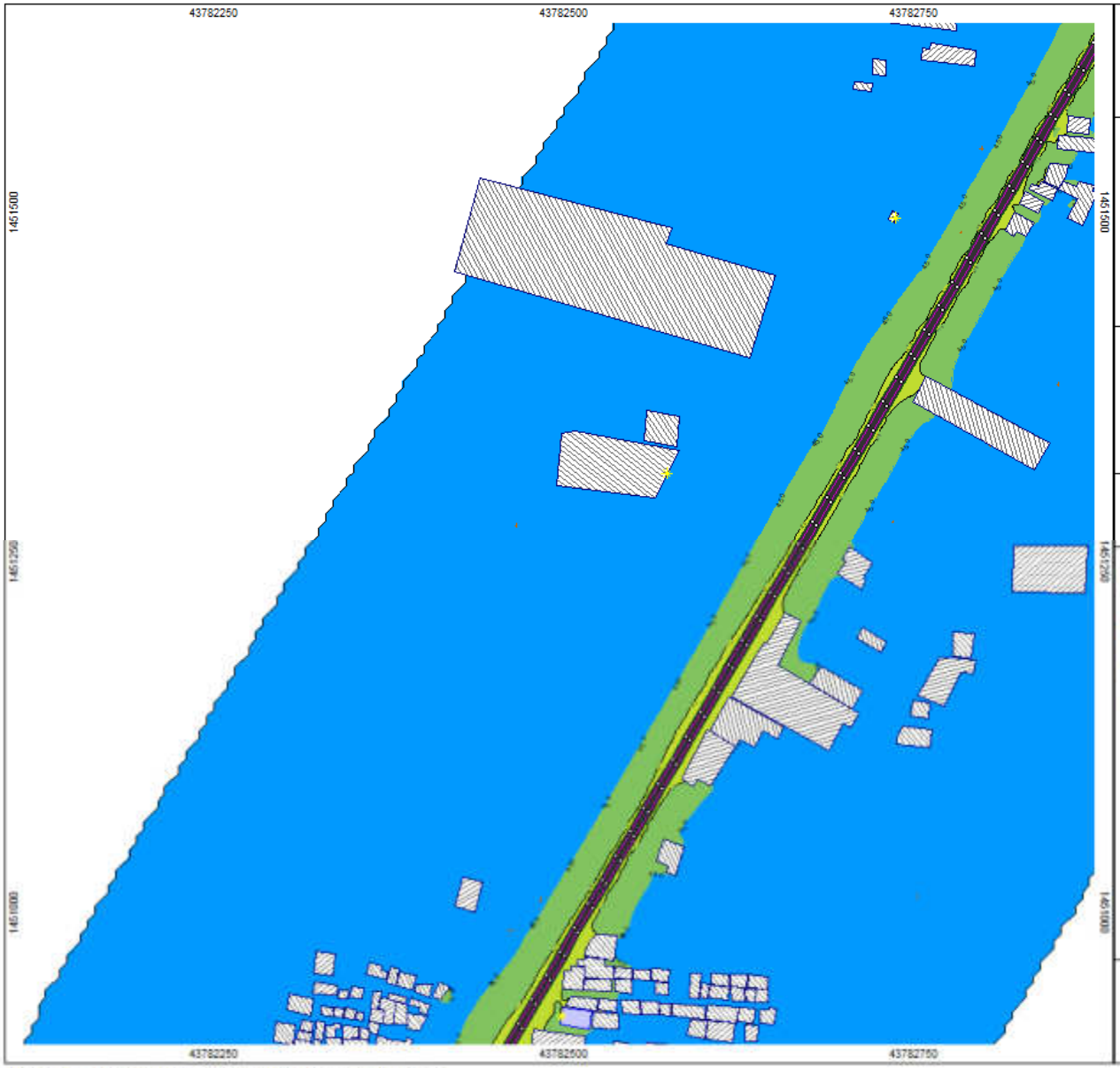

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120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d
Calculation in 1.5 m above ground

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

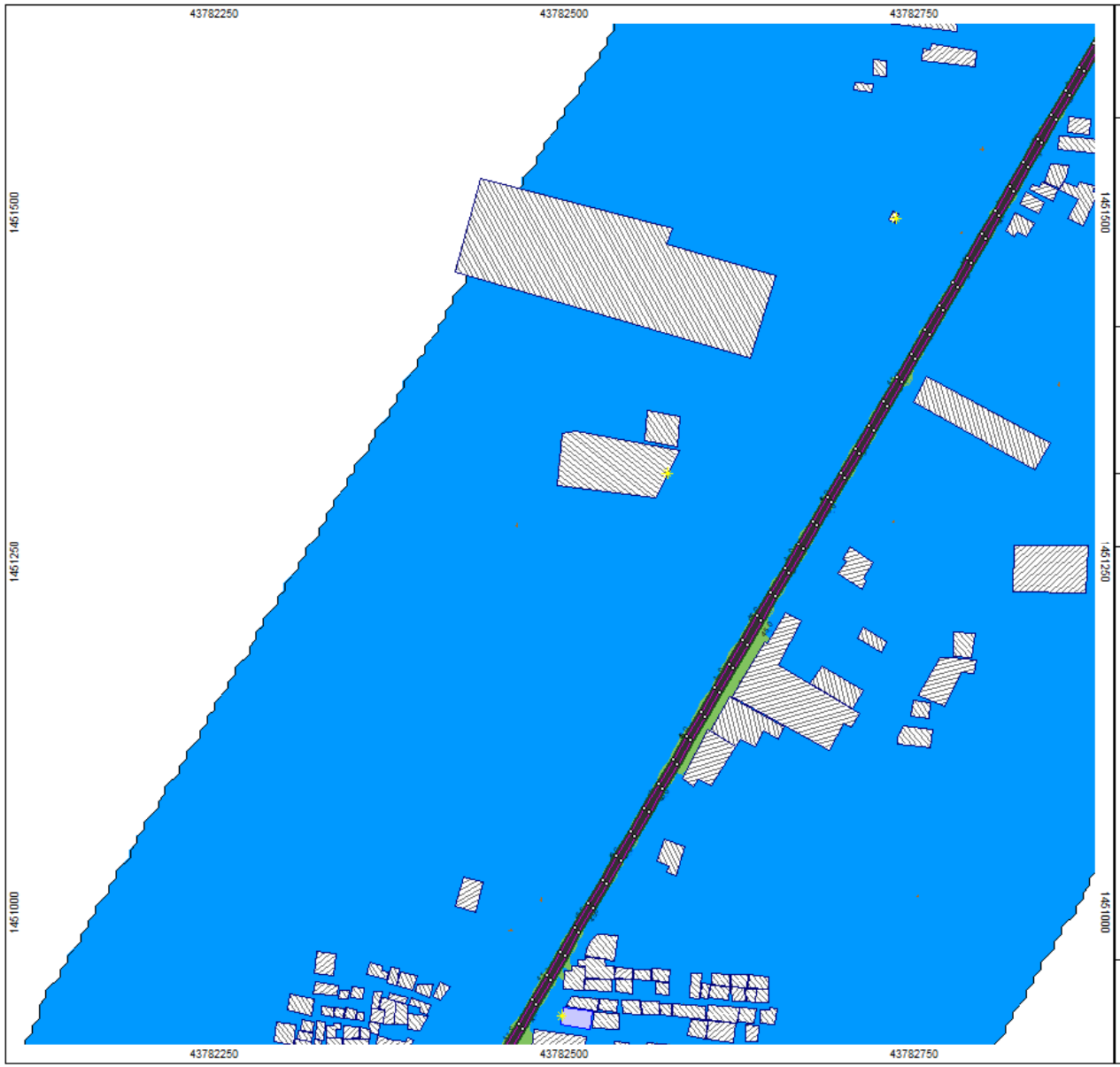
Signs and symbols

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

N

Length scale 1:2727

0 25 50 100 150 20



KR Puram to Kempegowda International Airport

Operational Noise.
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Project engineer: CMR
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in dB(A)

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	45 - 50
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	>= 65

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- Geometry bitmap
- Wall
- Wall
- Elevation point
- Bodeneffekte
- Noise calculation area

N

Length scale 1:2727

0 25 50 100 150 200

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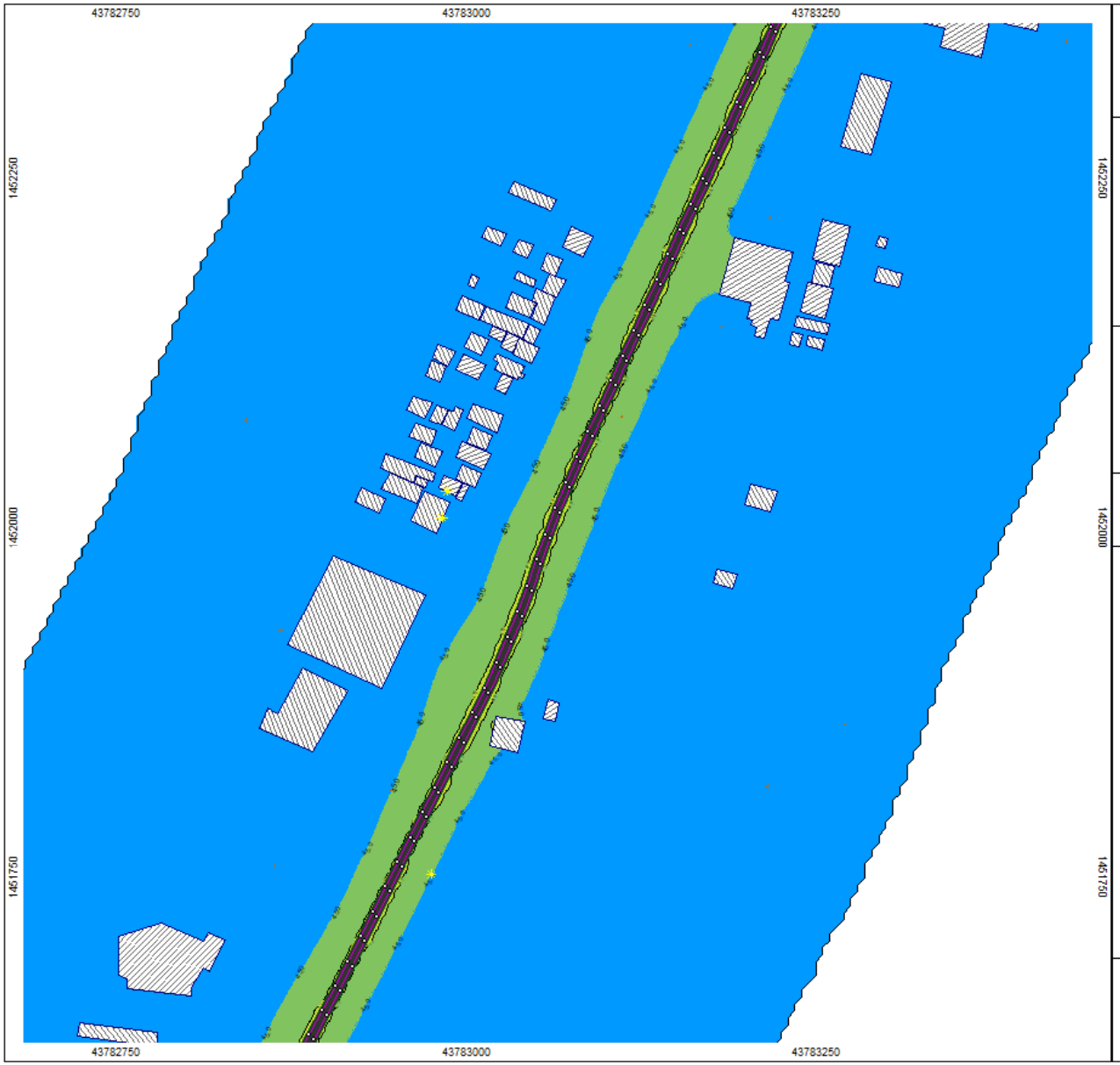

KR Puram to Kempegowda International Airport

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- Bodeneffekte
- Noise calculation area

Length scale 1:2727
0 25 50 100 150 200

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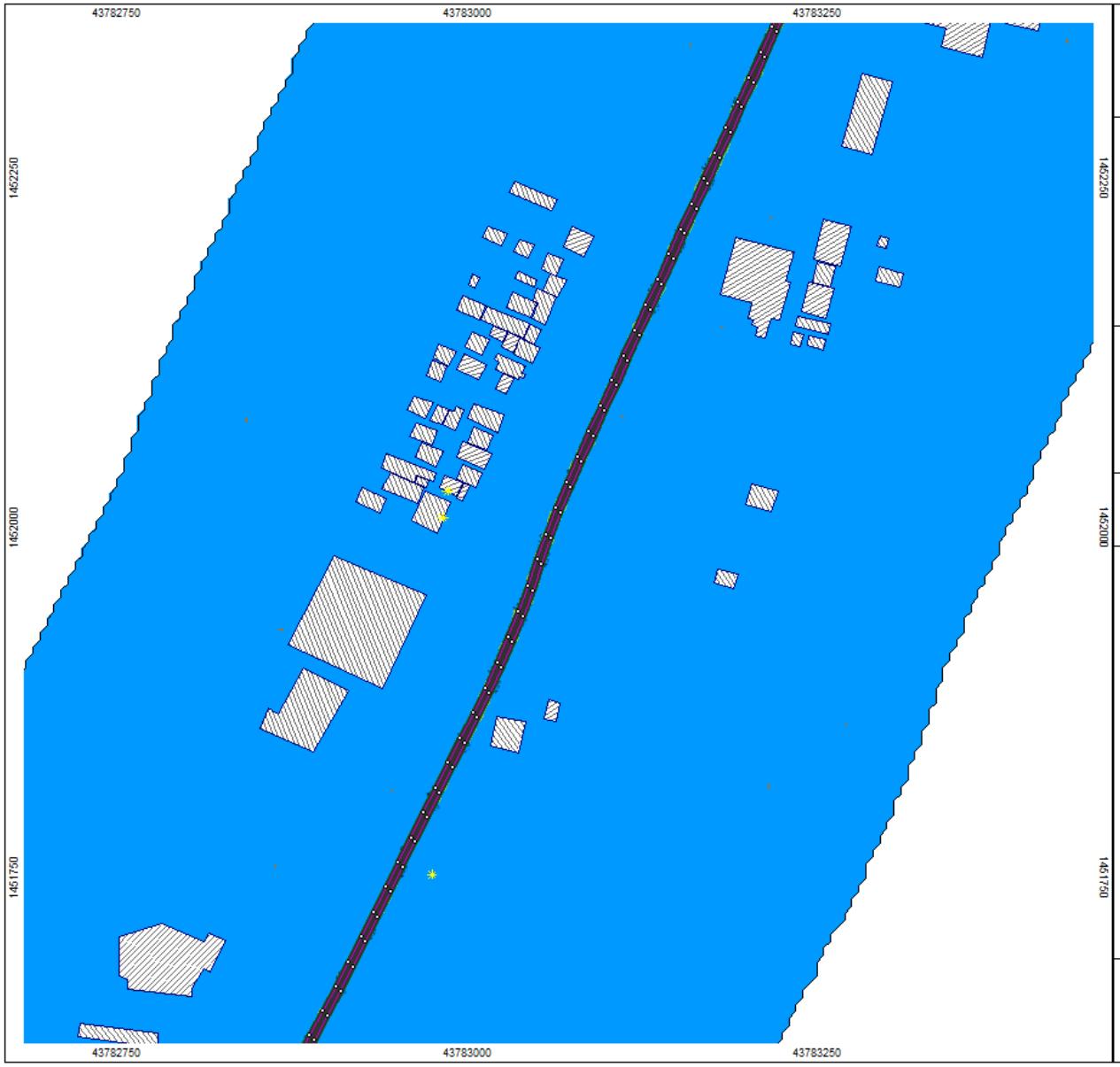

KR Puram to Kempegowda International Airport

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Length scale 1:2727

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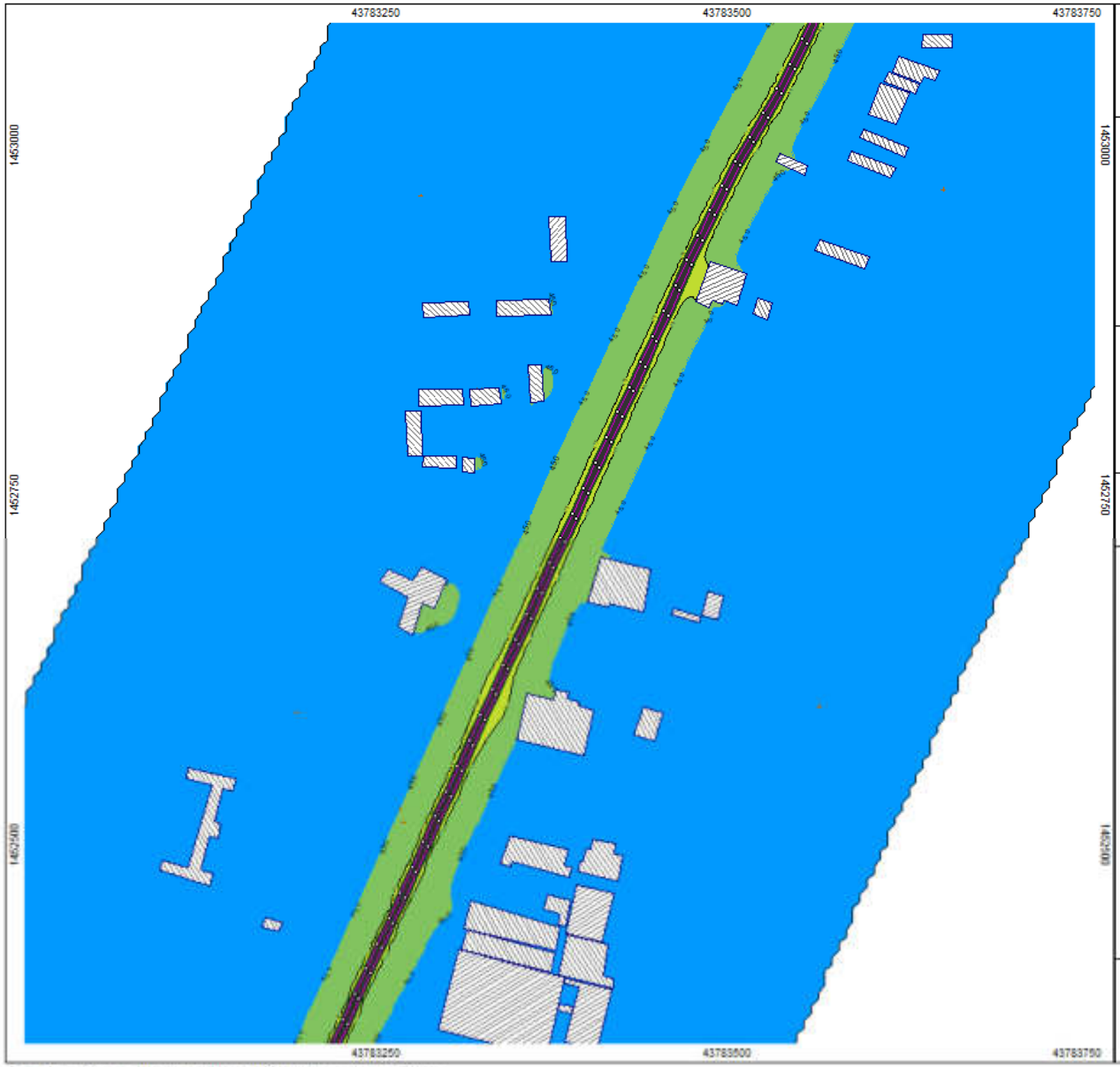

KR Puram to Kempegowda International Airport

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- Bodeneffekte

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Length scale 1:2727
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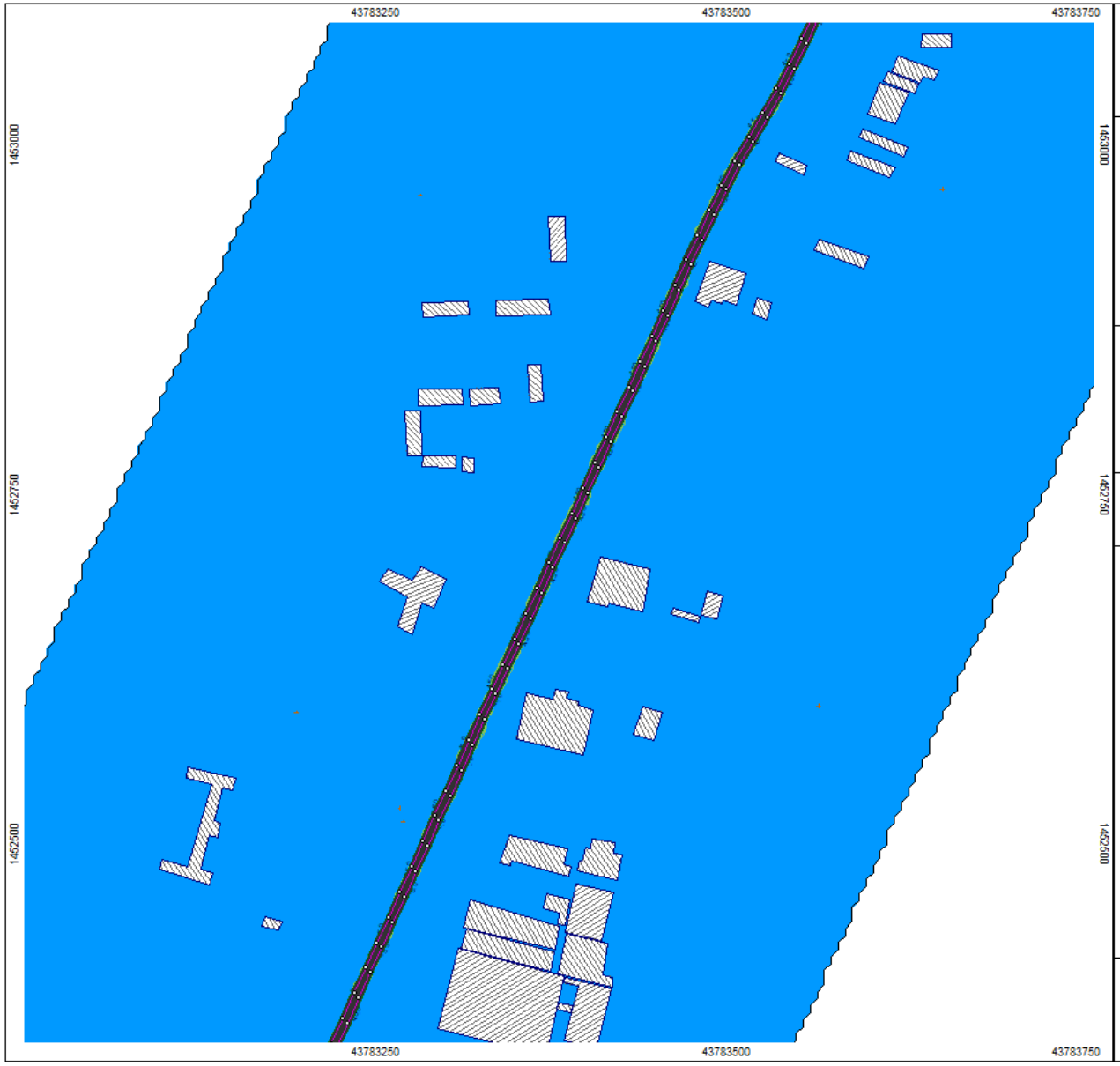

KR Puram to Kempegowda International Airport

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Levels Leq,n
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- Wall
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- Elevation point
- Bodeneffekte
- Noise calculation area

Length scale 1:2727

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KR Puram to Kempegowda International Airport

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Signs and symbols

- Wall
- Construction Equip
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- Point Sources
- Line source
- Geometry bitmap
- Wall
- Wall
- Elevation point
- Bodenreflexe

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Length scale 1:1008

0 5 10 20 30 40 m

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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,n
Calculation in 1.5 m above ground

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Signs and symbols

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- Line source
- Geometry bitmap
- Wall
- Wall
- Elevation point
- Bodeneffekte
- Noise calculation area

N

Length scale 1:1008

0 5 10 20 30 40 m

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KR Puram to Kempegowda International Airport

Operational Noise
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120 2024 2B with Parapet Wall
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- Line source
- Geometry bitmap
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- Elevation point
- Bodenoffskte

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Length scale 1:2109
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KR Puram to Kempegowda International Airport

Operational Noise.
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Length scale 1:2109

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Length scale 1:2109

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Length scale 1:2109

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Length scale 1:2109

0 20 40 80 120

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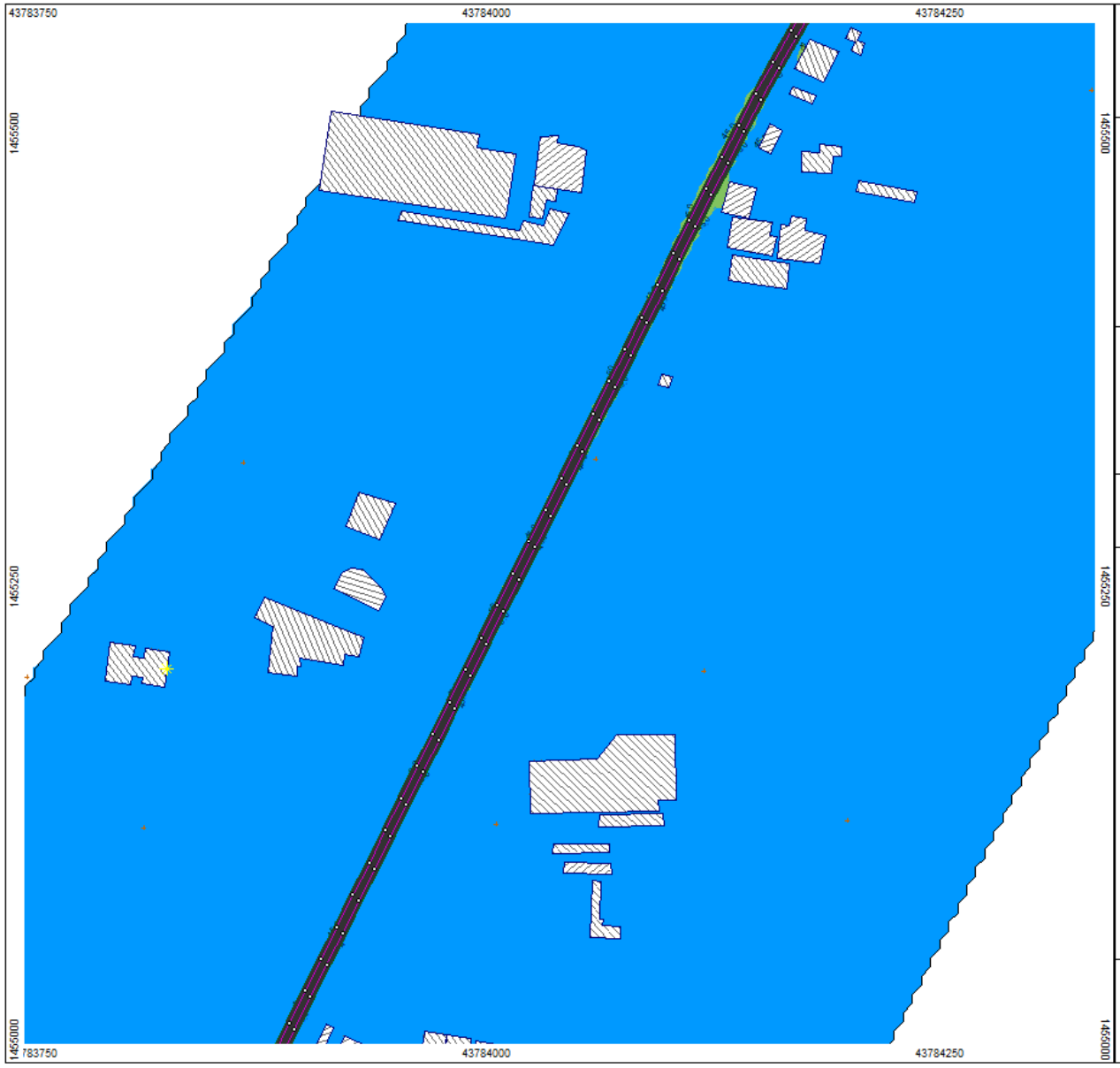

KR Puram to Kempegowda International Airport

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Length scale 1:2109

0 20 40 80 120 1

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KR Puram to Kempegowda International Airport

Operational Noise.
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Length scale 1:2109

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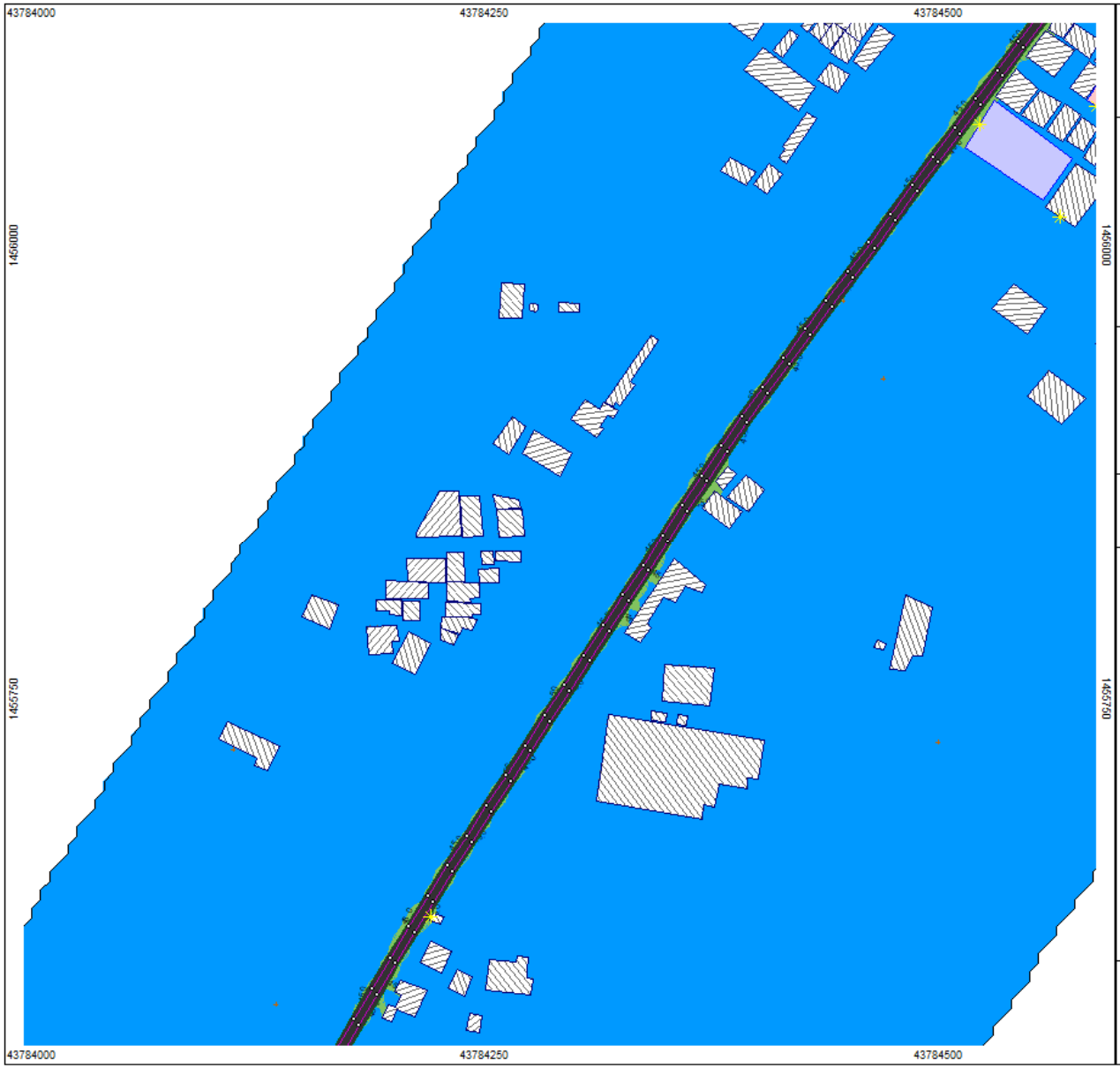

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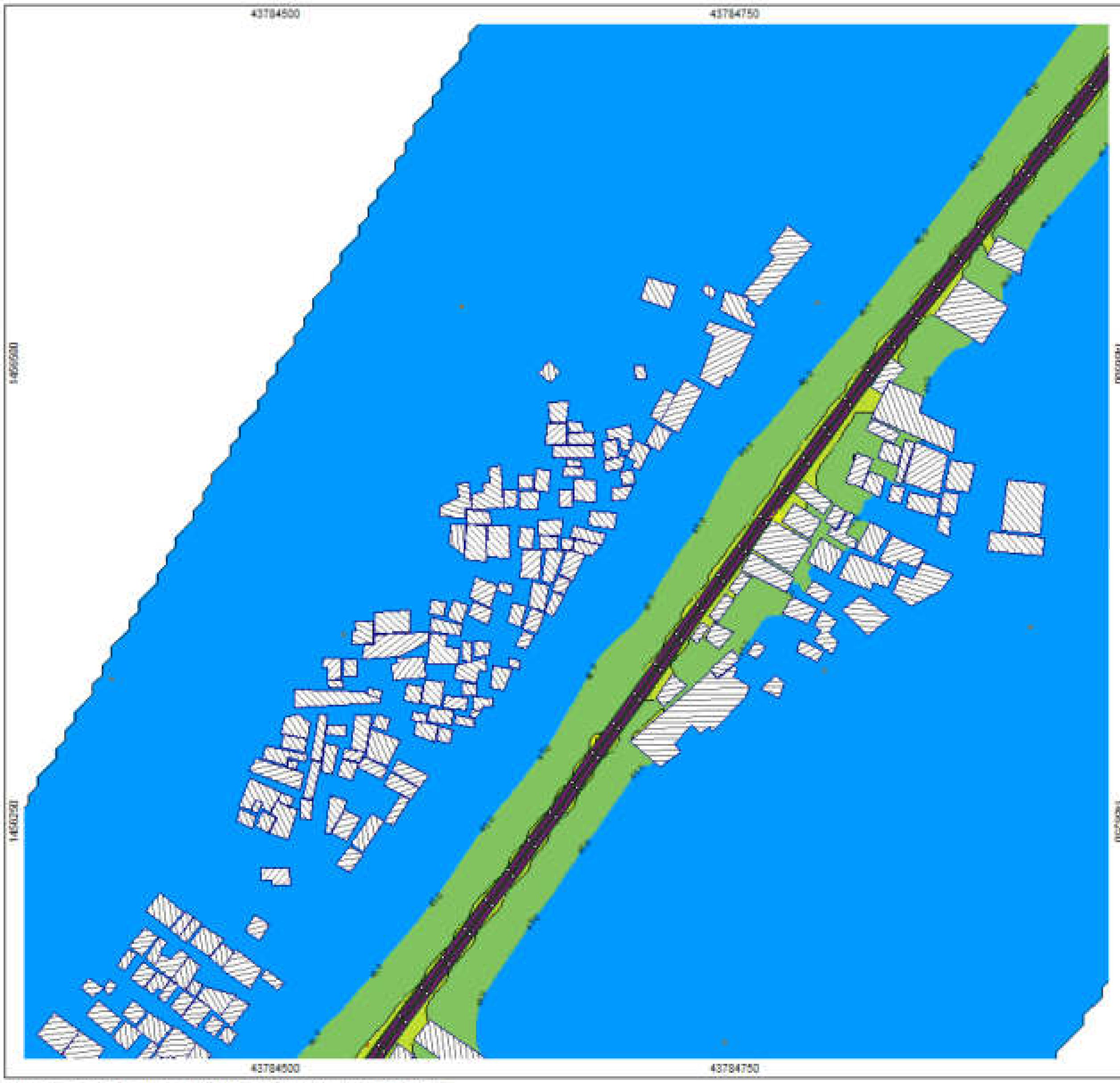

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Length scale 1:2109

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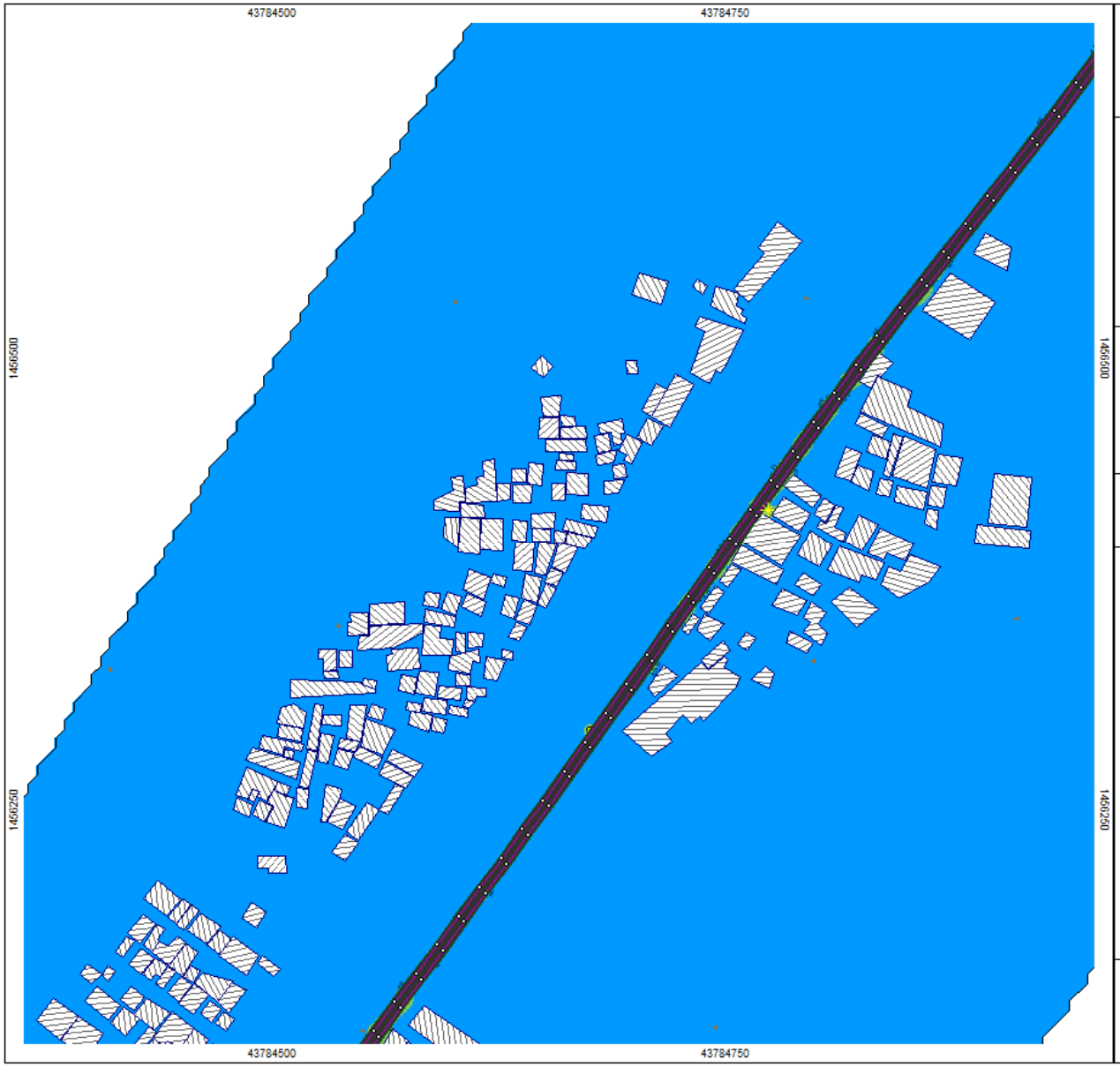

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Length scale 1:2109

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KR Puram to Kempegowda International Airport

Operational Noise.
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120 2024 2B with Parapet Wall
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- Line source
- Geometry bitmap
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- Elevation point
- Bodeneffekte

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Length scale 1:2109
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KR Puram to Kempegowda International Airport

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- Noise calculation area

Length scale 1:2109
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KR Puram to Kempegowda International Airport

Operational Noise.
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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
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Project engineer: CMR
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Levels Leq,d
in dB(A)

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- Wall
- Wall
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- Bodeneffekte
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N

Length scale 1:2109

0 20 40 80 120 1

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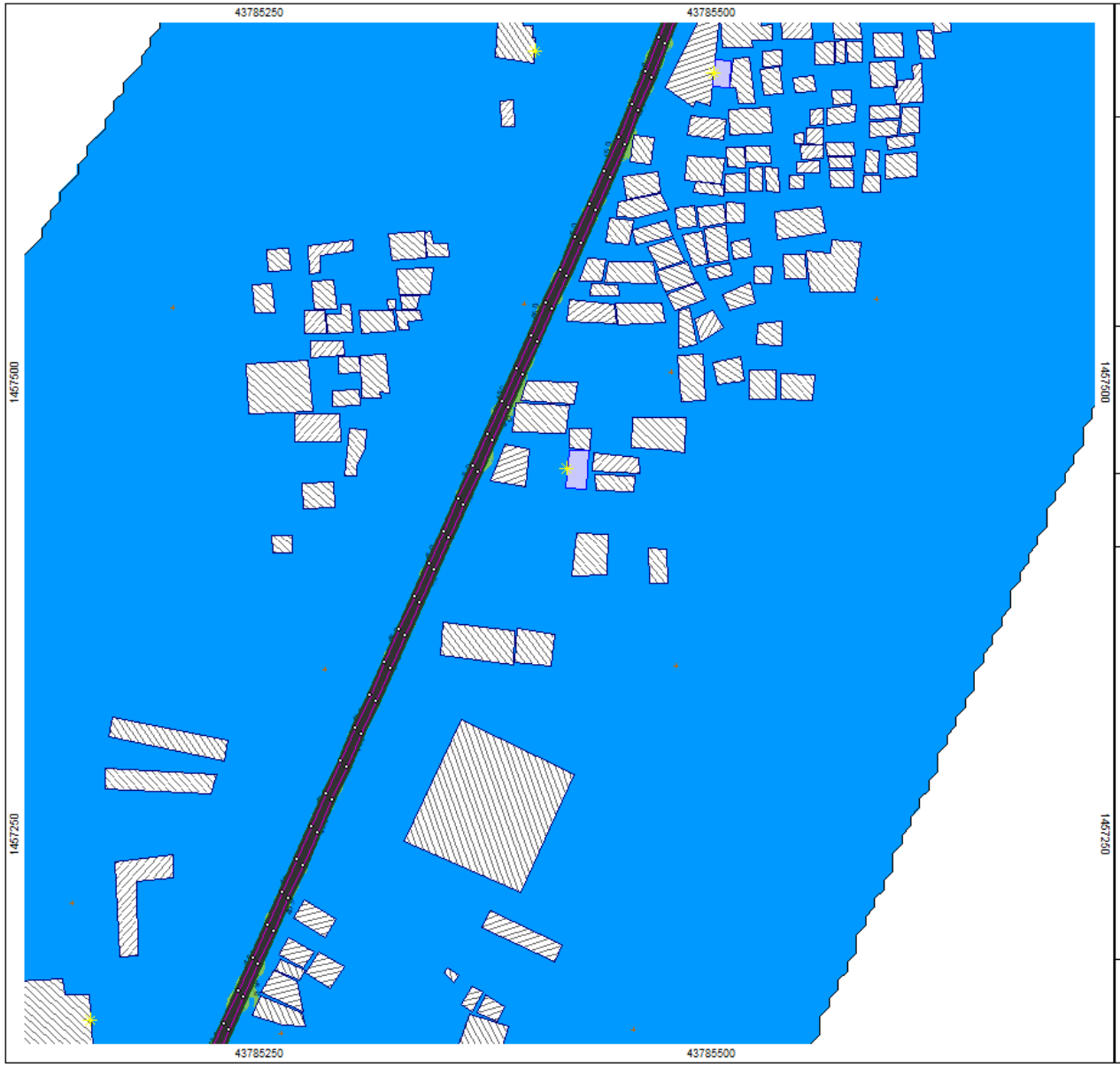

KR Puram to Kempegowda International Airport

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Length scale 1:2109

0 20 40 80 120 1

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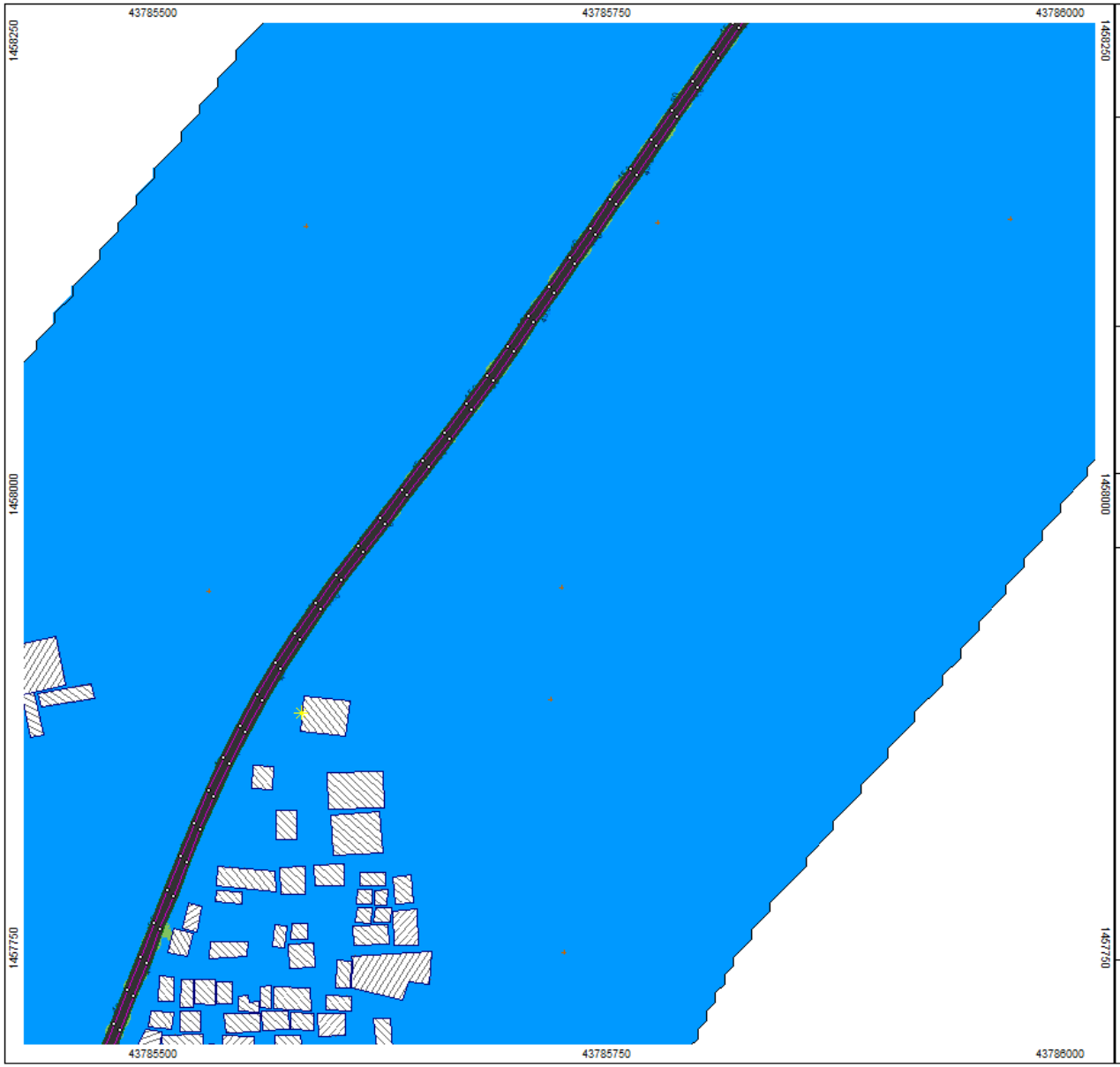

KR Puram to Kempegowda International Airport

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,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

N

Length scale 1:2109

0 20 40 80 120 1

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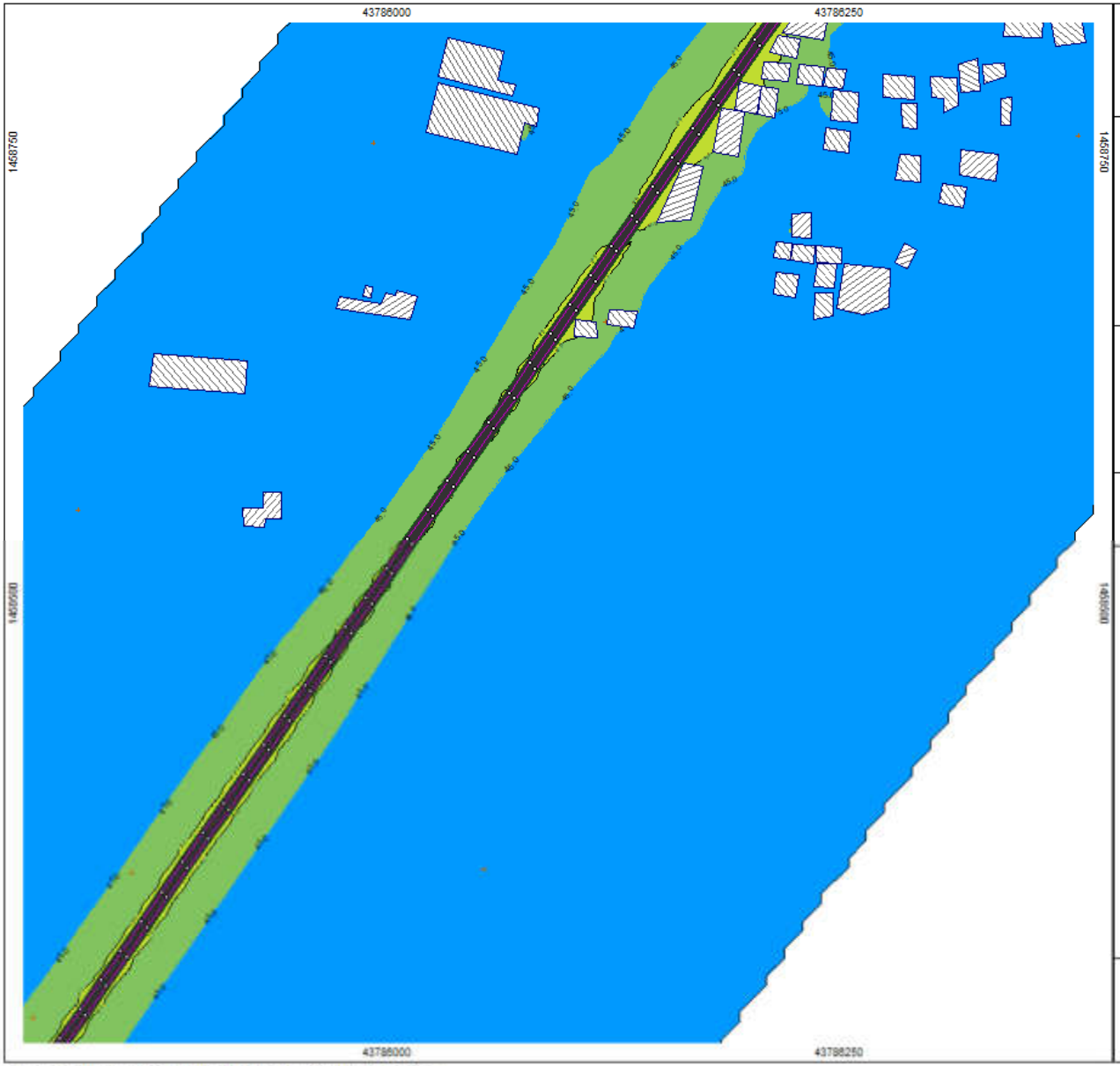

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Leq,d
Calculation in 1.5 m above ground

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
Wall
Elevation point
Barrier effects

Length scale 1:2109
0 20 40 80 120

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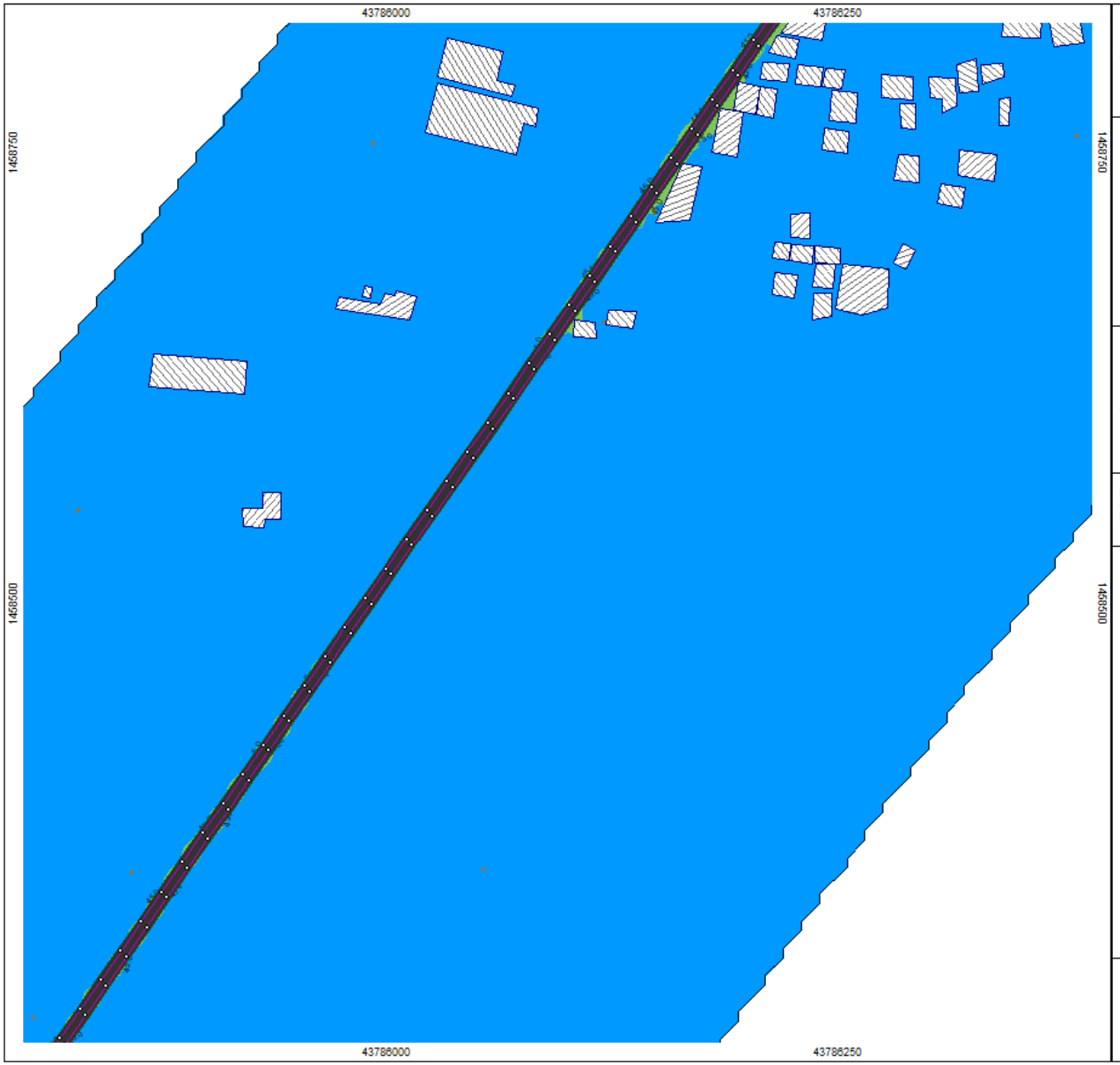

KR Puram to Kempegowda International Airport

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Signs and symbols

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Length scale 1:2109

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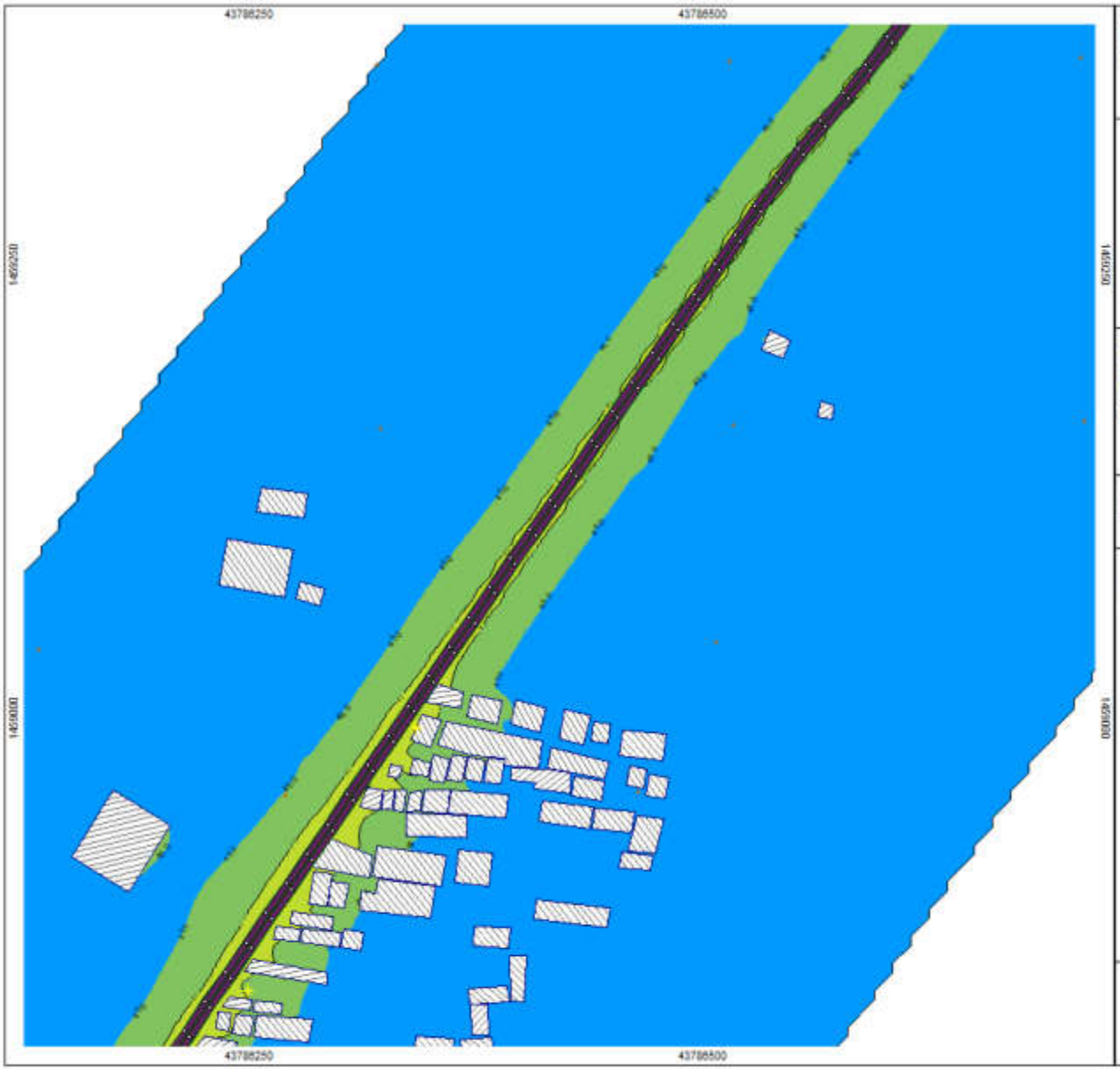

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Signs and symbols

- Wall
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- Point receiver
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- Point Sources
- Line source
- Geometry bitmap
- Wall
- Wall
- Elevation point
- Bodenoffekte

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Length scale 1:2109
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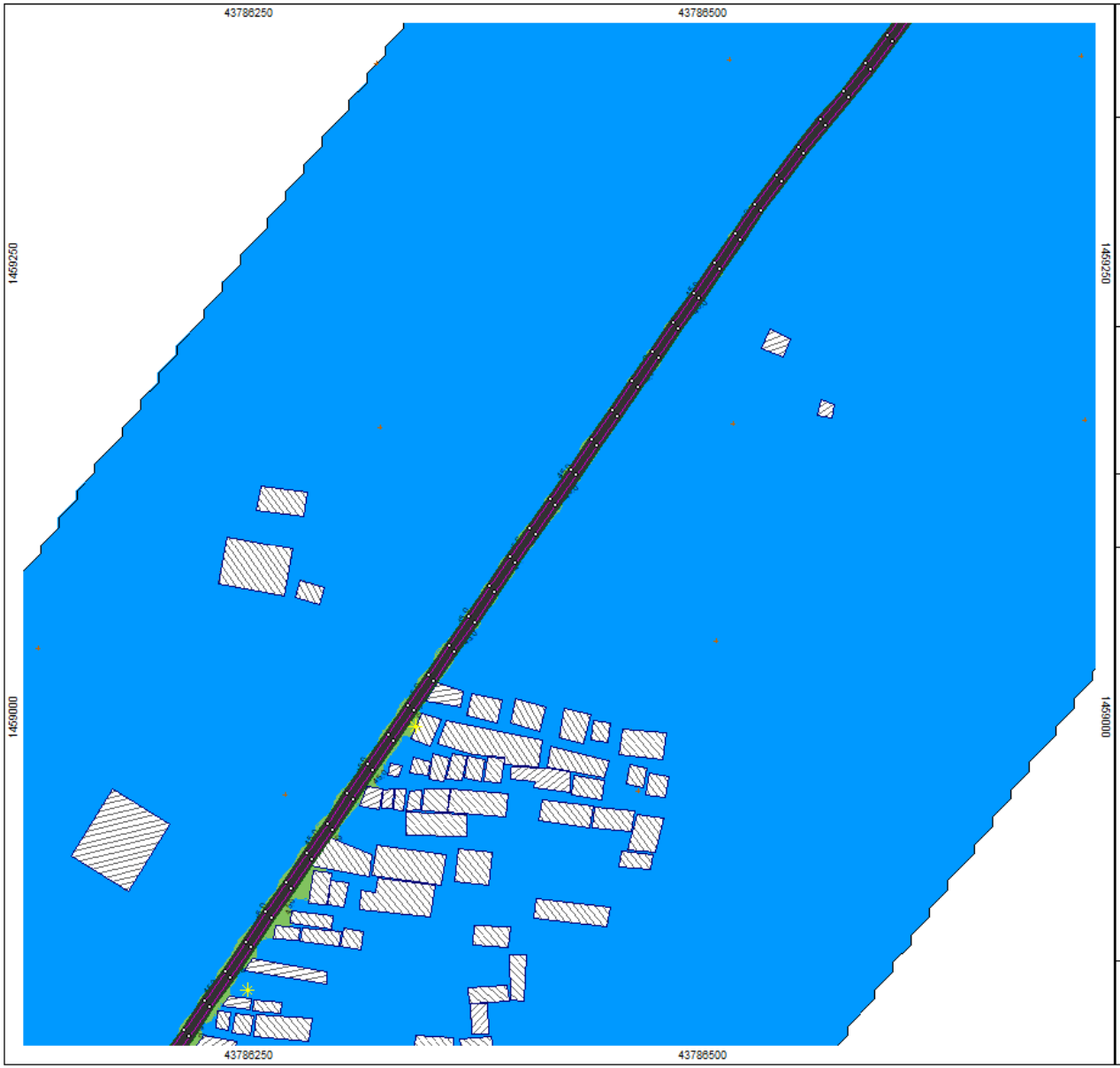

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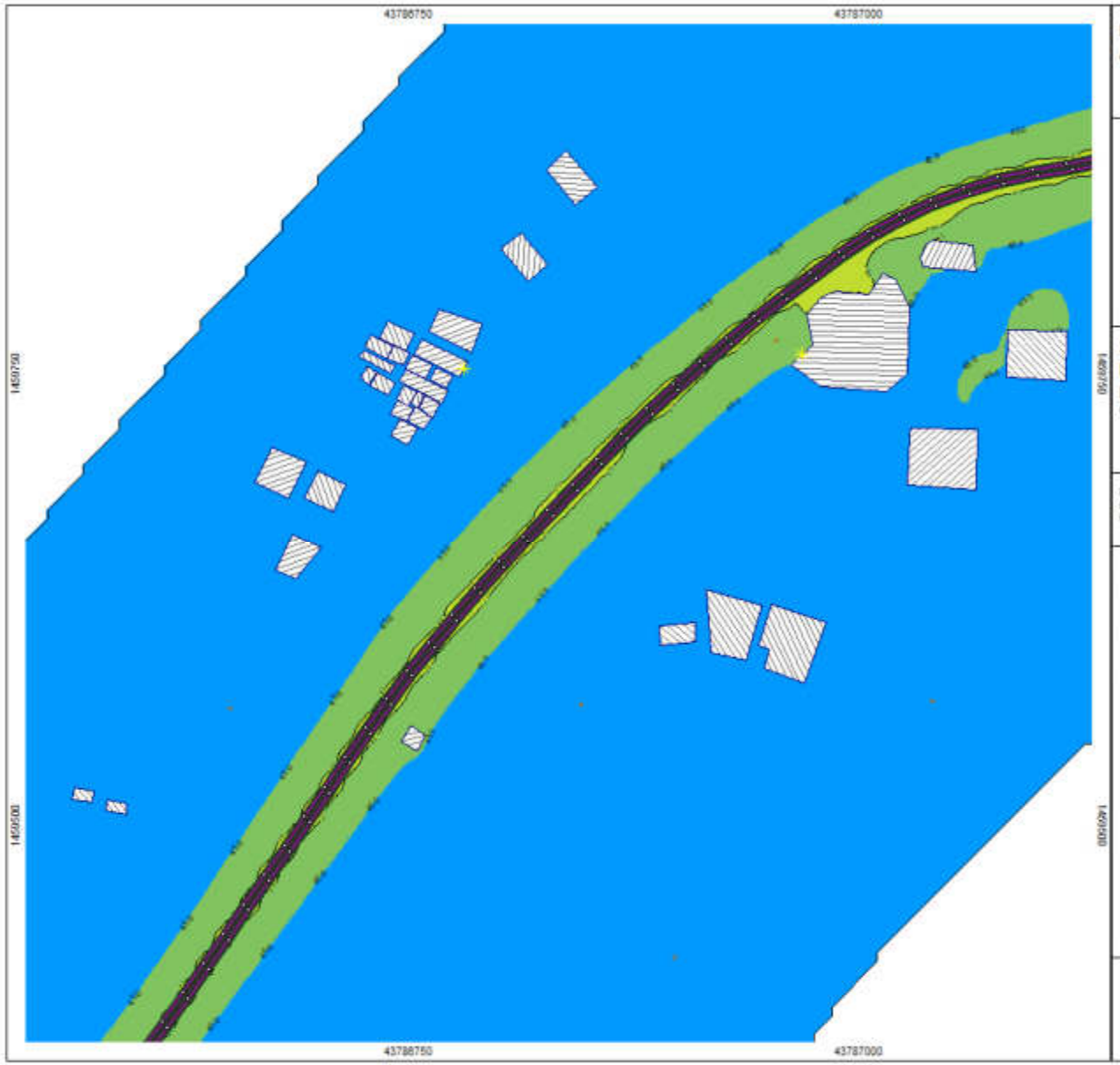

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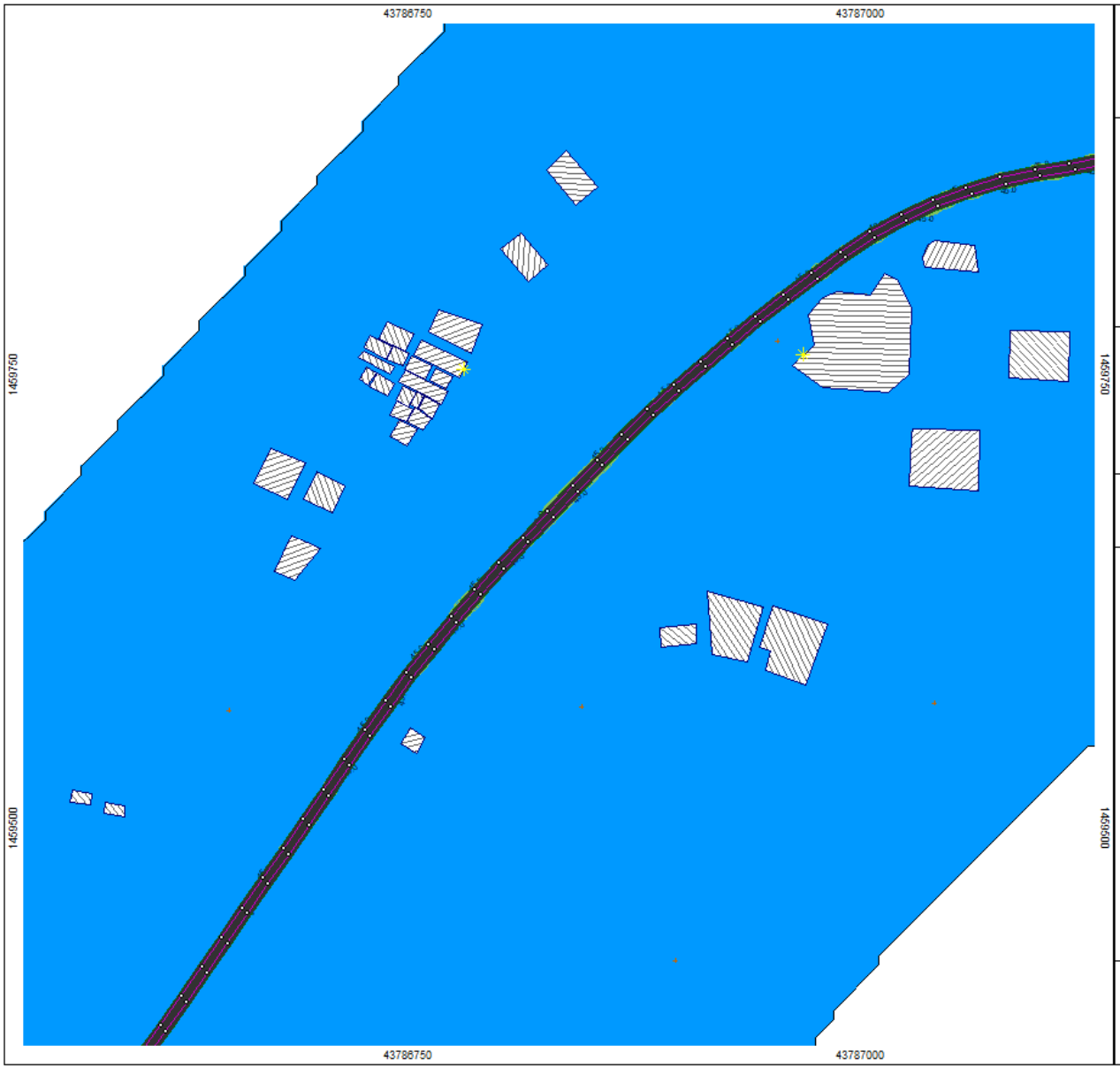

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