

**ACTION HISTORY OF RTI REQUEST No.WLIOI/R/E/21/00081****Applicant Name** Rohit Choudhury**Text of Application**

1. Provide me the copy of the site inspection report done by Dr.Bilal Habib and Ms.Akanksha Saxena from 27th to 30th September, 2021 of Deepor Beel at Guwahati City of Assam w.r.t Mitigation measures to avoid train-elephant collision. 2. Provide me the copy of all reports / suggestions made by Wildlife Institute of India to Government of Assam / Assam Forest Department w.r.t Mitigation measures to avoid train-elephant collision. 3. The information may be provided by email at rohitskaziranga@gmail.com

**Reply of Application**

Information provided in softcopy

SN.	Action Taken	Date of Action	Action Taken By	Remarks
1	RTI REQUEST RECEIVED	21/12/2021	Nodal Officer	
2	REQUEST FORWARDED TO CPIO	23/12/2021	Nodal Officer	Forwarded to CPIO(s) : (1) Monali Sen
3	REQUEST DISPOSED OF	04/01/2022	Monali Sen-(CPIO)	

[Print](#)

No. WII/RTI/CPIO/2021-22 (Qtr-III)/77

Date: 04<sup>th</sup> January, 2022

To,

Shri Rohit Choudhury  
C/o Shri D.P. Agarwal, Village- Gormur,  
P.O- Lokhujan, Bokakhat,  
District-Golaghat, Assam, Pin:785612  
Email: rohitskaziranga@gmail.com

Sub.: Information under RTI Act, 2005-reg.

Ref.: Your Online RTI No. WLIOI/R/E/21/00081 dated 21/12/2021

Sir,

Please refer to your application cited above under RTI Act, 2005. In this context, point-wise response to your queries is given below:

Information Sought under RTI	Reply
1. Provide me the copy of the site inspection report done by Dr.Bilal Habib and Ms.Akanksha Saxena from 27th to 30th September, 2021 of Deepor Beel at Guwahati City of Assam w.r.t Mitigation measures to avoid train elephant collision.	See the attached pdf soft copy of report as <b>Annexure-I</b> .
2. Provide me the copy of all reports / suggestions made by Wildlife Institute of India to Government of Assam / Assam Forest Department w.r.t Mitigation measures to avoid train-elephant collision.	

If you are not satisfied with the aforesaid reply, you may appeal to the **Appellate Authority i.e. "Director, Wildlife Institute of India, Post Box 18, Chandrabani, Dehradun – 248 001, Ph. 0135-2640910"**.

Thanking you,

Yours faithfully,



NO & CPIO (RTI)

Encl.: as above.



# Deepor Beel Railway Track Mitigation Plan

Mitigation measures for  
movement of Elephants from  
Rani and Garbhanga Reserve  
Forest to Deepor Beel across  
the Azara–Kamakhya Railway  
line in Guwahati, Assam

December, 2021







# Deepor Beel Railway Track Mitigation Plan

Mitigation measures for  
movement of Elephants from  
Rani and Garbhanga Reserve  
Forest to Deepor Beel across  
the Azara–Kamakhya Railway  
line in Guwahati, Assam

**December, 2021**

**WII Team**

**Dr. Bilal Habib  
Akanksha Saxena**



This mitigation plan was developed by Wildlife Institute of India based on request received from Northeast Frontier Railways to carry out a field visit for evaluating the suitability of the proposed mitigation measures on the second railway track vide letter No. W/362/Con/N-K/Misc./NGT; Dated 2<sup>nd</sup> July 2021.







## Introduction

Deepor Beel is a perennial water-body on one of the old channels of Brahmaputra River, on the outskirts of Guwahati city. It was declared as a Ramsar site in the year 2002. The Beel attracts a plethora of resident and migrant birds and other wildlife. The lake is also an important biological and economic resource for the local people and is also a source of revenue from tourism. Pollution and encroachment along the water body have been identified as important threats to the Beel. In addition to this, the Azara-Kamakhya railway line circumventing the southern boundary of the Beel poses a barrier to the movement of wildlife, particularly elephants, that move between the Rani Reserve Forest and Deepor Beel for water.

Regular movement of elephants from Rani Reserve Forest to Deepor Beel is reported. In the year 2021 alone, 43 events of the elephant movement have been recorded by the Forest Department (Deepor Beel Wildlife Range data), comprising of individuals and small – very large herds (2-101 individuals). The Department has thus identified 6 movement corridors regularly used by elephants to access Deepor Beel.

The railway track passing through the southern boundary of Deepor Beel is an impediment to the movement of elephants that regularly visit the Beel, and 13 elephants have been killed and 5 injured due to train hits on this segment (WII, 2018<sup>1</sup>). Even in the absence of train-induced mortality, railway tracks impose a barrier to animal movement, and wider physical track infrastructure and increased train traffic have the potential to impede this movement. Ultimately fragments habitat and cuts off access to resources such as water. Encroachment in the intervening land between the Rani Reserve Forest and Deepor Beel has also fragmented the habitat and contiguity of the elephant movement routes in this area. Additionally, the Maghuwapara Road running almost parallel to the railway line and crossing the line at two places (level crossings at chainages 166/850 and 167/380) also poses a barrier to animal movement, especially elephants. There is also a possibility of enhancement of human-elephant conflict in the given scenario.

With respect to the issues concerning the protection and conservation of Deepor Beel, a case was filed in the National Green Tribunal (NGT), East Zone, under O.A. No.19/2014 (now O.A. No.472 of 2018) and violation of the Environment (Protection) Act, 1986 and Municipal Solid Waste (Management and Handling) Rules, 2000 in September 2014. The Northeast Frontier Railway (NFR) was made a respondent in the case citing reasons of elephant-train collision and speed restriction of 30 kmph was imposed on the trains passing through the section.

The railway line is proposed to be upgraded to a double-track line under the New Bongaigoan-Goalpara-Kamakhya doubling work (176 km). The doubling work was stopped by the NGT, East Zone, vide order dated 18.01.2018, and the NFR was directed to include mitigation measures on the railway segment to prevent potential elephant-train collisions.

On the request of the Chief Wildlife Warden of Assam, Dr. Bivash Pandav of WII had visited the site in January 2019. As per the site visit regarding mitigation measures to avoid elephant-train collisions, WII had suggested realignment of the railway track from Azara station near pillar no. 163/4 to the level crossing near Assam Engineering College at pillar no. 172/0, or the construction of a tunnel under the hilly stretch

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<sup>1</sup> WII. 2018. Railway Lines in Elephant Habitats: With Specific reference to Deepor Beel, Assam.



between gates no. 273 and 274 in the existing railway track (vide letter No. WII/DWII/Misc./03/2018 dated 16<sup>th</sup> January 2019).

Both were found to be unfeasible from the financial and technical point of view of the railways. Subsequently, NFR has proposed the construction of the second railway track on an elevated track of 2.17 km length for elephant movement. The plan was subsequently discussed in a meeting held by the Chief Secretary, Assam, on 25<sup>th</sup> June 2021, where the Railways were directed to consult WII to examine the feasibility of the proposed measures. Northeast Frontier Railway requested WII to carry out a field visit to evaluate the feasibility of the proposed mitigation measures on both railway tracks vide letter No.W/362/Con/N-K/Misc./NGT dated 2<sup>nd</sup> July 2021.

A field visit by the WII team was subsequently carried out during 27<sup>th</sup> – 30<sup>th</sup> September 2021. The entire length of the railway track was surveyed, and the locations and structural dimensions of all proposed mitigation measures, encroachments along the railway line, and the possibility of barrier because of the Maghuwapara Road running parallel to the railway track were reviewed on the field. Consultations concerning the design, location, and dimensions were also conducted with railway officials and site engineers. Given below are our findings and recommendations.





## Mitigation measures proposed by NFR

A total of four mitigation measures have been proposed by NFR, the details of which are given below (Table 1 and Figure 1). The height of all structures is  $\geq 7$  m.

**Table 1.** Details of mitigation measures proposed by NFR on the Azara-Kamakhya section of railway line passing through Deepor Beel, Guwahati, Assam

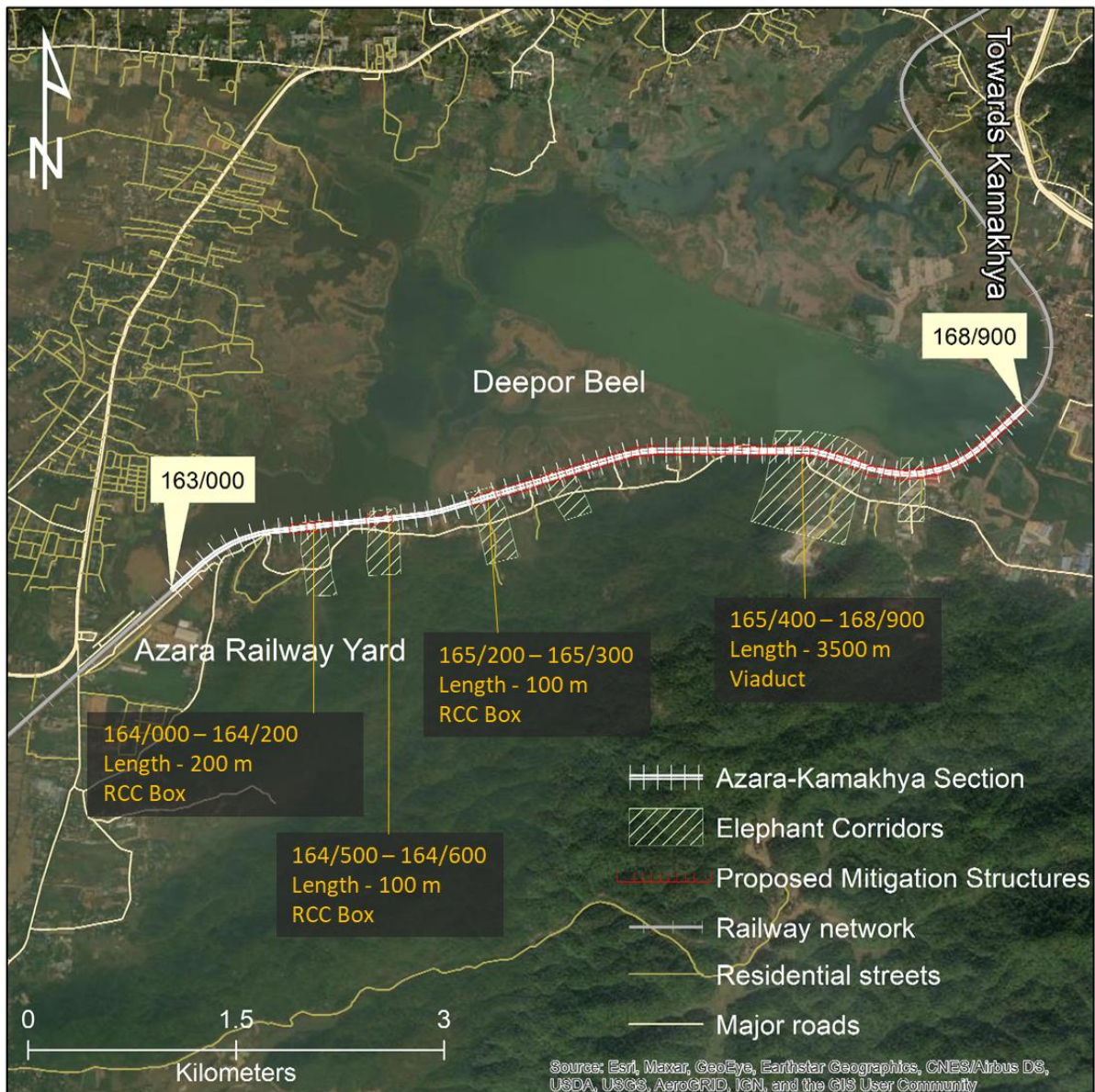
S. No.	Structure Type	Structure width (m)	Chainage (km)
1.	RCC	200	164/000 – 164/200
2.	RCC	100	164/500 – 164/600
3.	RCC	100	165/200 – 165/300
4.	Viaduct	3500	165/400 – 168/900

In addition to these structures, segment-wise recommendations to mitigate the combined barrier effect of double railway track and Maghuwapara road are provided in the sections below. Underpasses on the road sections parallel to the underpasses on the railway track and guide walls are recommended in order to:

- enhance the efficacy of the railway underpasses,
- direct animal movement towards underpasses, and
- mitigate human-elephant conflict in the long-term.







**Figure 1.** Railway track, elephant corridors and mitigation measures proposed by NFR for doubling of railway track between Azara – Kamakhya (Chainage 163/000 – 168/900) passing through the southern boundary of Deepor Beel, Guwahati, Assam.

## 1. Chainage 164/000 – 164/200

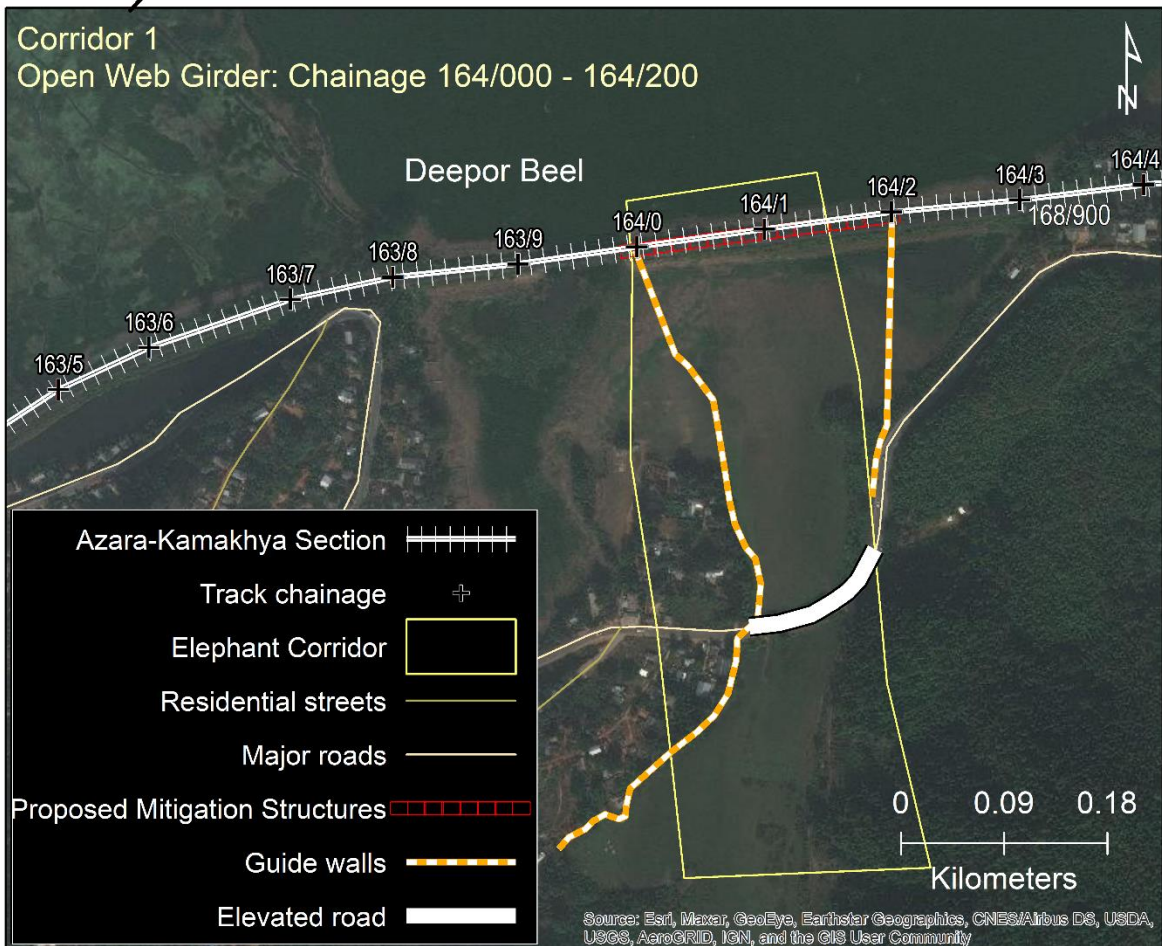
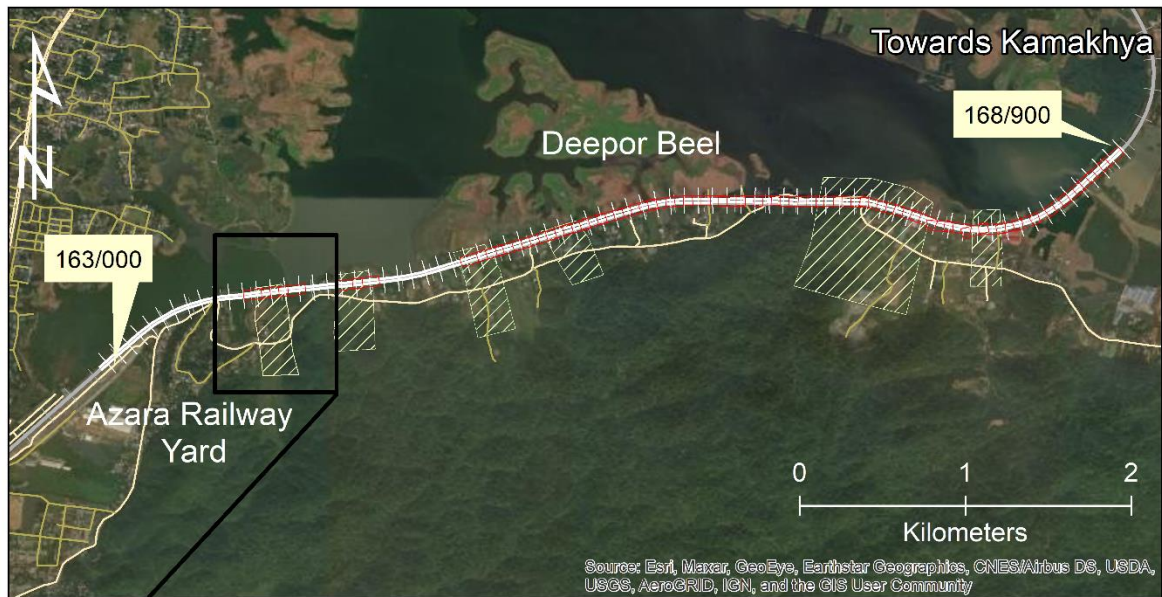
One mitigation structure (RCC box) measuring 200 m wide and 7 m high has been proposed on the first corridor (Chainage 164/000 – 164/150). Additionally, an underpass measuring 150 m wide and 7 m high on the road parallel to the railway track is recommended. It is also recommended to install guide walls to direct animal movement first towards the road underpass and then towards the railway track underpass. ***It is recommended to construct the underpasses as RCC structures with a span of 12 m and pillar-type divisions.*** The details of the proposed and recommended mitigation measures are provided in Table 2 and Figure 2.

**Table 2.** Details of mitigation measures proposed by NFR and recommended by WII on Chainage 164/000 – 164/200 of the Azara-Kamakhya section of railway line passing through Deepor Beel, Guwahati, Assam

S. No.	Mitigation Measure	Chainage/GPS location	Dimensions (m) Width x height
1.	Underpass on railway track	164/000 – 164/200	200 x 7
2.	Underpass on road	Start: 26° 6'19.29"N 91°37'43.23"E End: 26° 6'17.33"N 91°37'39.70"E	150 x 7
3.	Guide walls	.kml provided (I.GW1 & I.GW2)	570 (west side) 220 (east side)







**Figure 2.** Railway track, elephant corridors and mitigation measures proposed by NFR and recommended by WII for doubling of railway track between chainage 164/000 – 164/200 of the Azara – Kamakhya railway line passing through the southern boundary of Deepor Beel, Guwahati, Assam.



## 2. Chainage 164/500 – 164/600

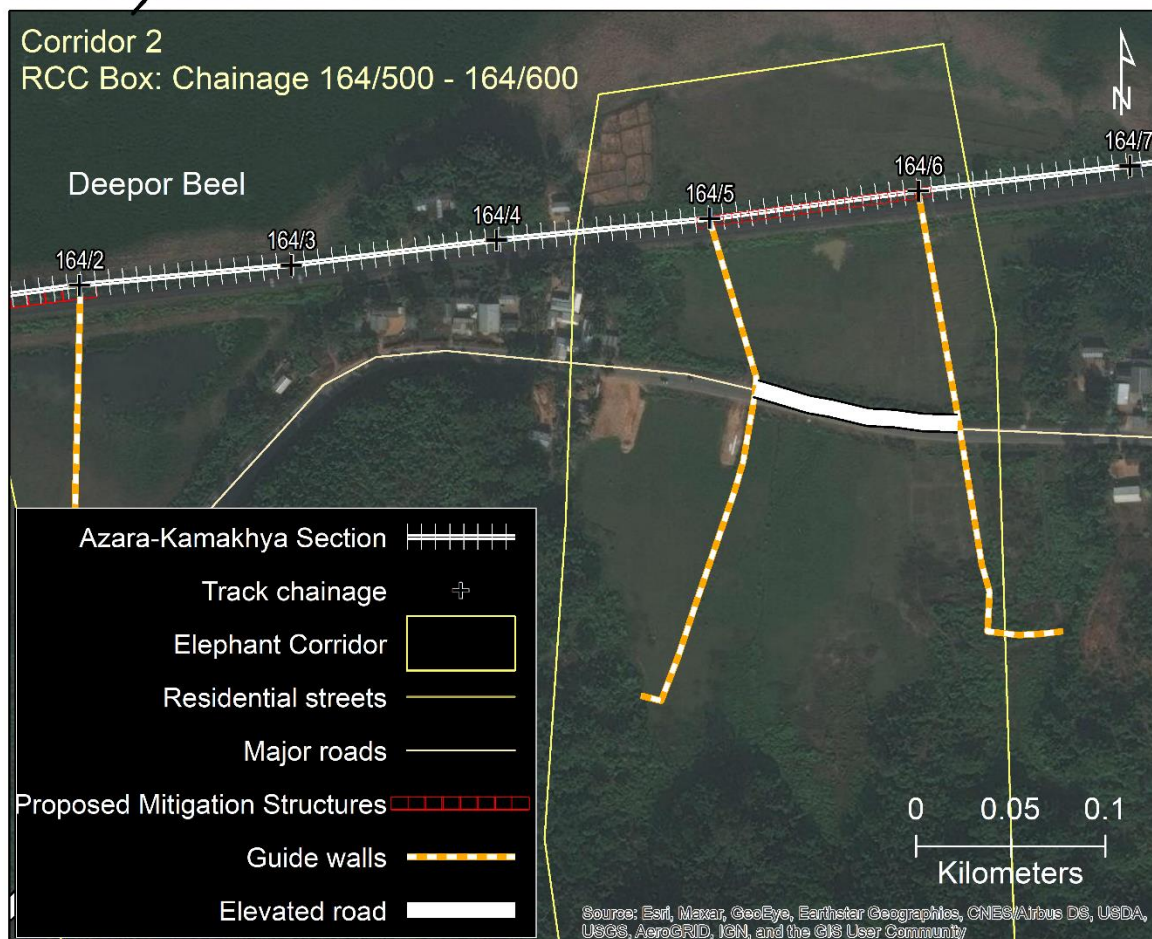
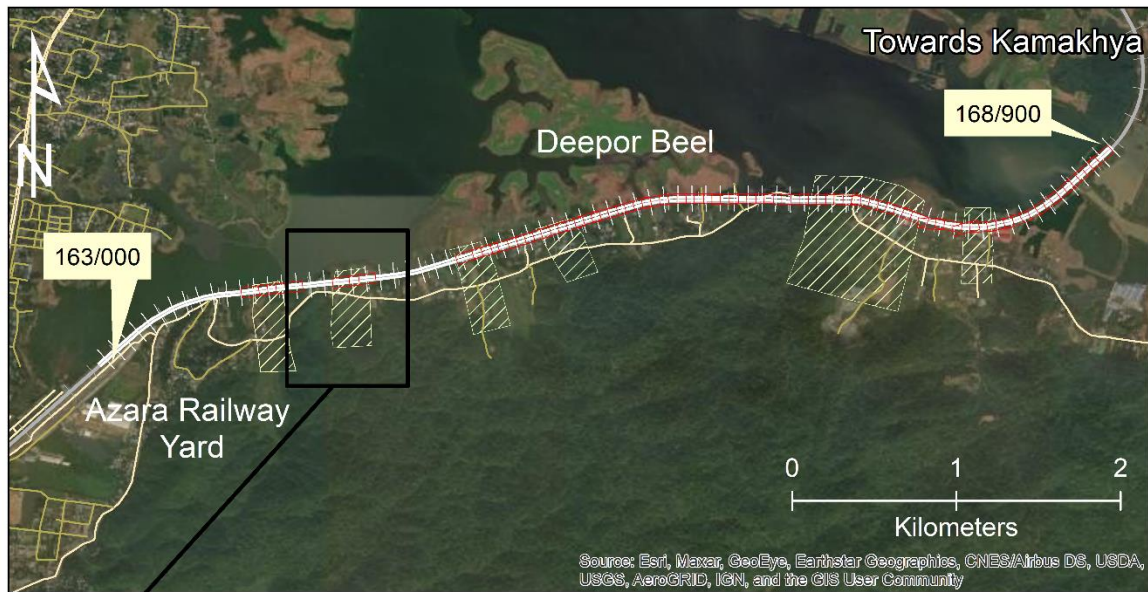
One mitigation structure (RCC box) measuring 100 m wide and 7 m high has been proposed on the second corridor (Chainage 164/400 – 164/600). Additionally, an underpass measuring 100 m wide and 7 m high on the road parallel to the railway track is recommended. It is also recommended to install guide walls to direct animal movement first towards the road underpass and then towards the railway track underpass. ***It is recommended to construct the underpasses as RCC structures with a span of 12 m and pillar-type divisions.*** The details of the proposed and recommended mitigation measures are provided in Table 3 and Figure 3.

**Table 3.** Details of mitigation measures proposed by NFR and recommended by WII on Chainage 164/500 – 164/600 of the Azara-Kamakhya section of railway line passing through Deepor Beel, Guwahati, Assam

S. No.	Mitigation Measure	Chainage/GPS location	Dimensions (m) Width x height
1.	Underpass on railway track	164/500 – 164/600	100 x 7
2.	Underpass on road	Start: 26° 6'25.71"N 91°37'58.73"E End: 26° 6'26.24"N 91°37'55.24"E	100 x 7
3.	Guide walls	.kml provided (II.GW1 & II.GW2)	246 (west side) 146 (east side)







**Figure 3.** Railway track, elephant corridors and mitigation measures proposed by NFR and recommended by WII for doubling of railway track between chainage 164/500 – 164/600 of the Azara – Kamakhya railway line passing through the southern boundary of Deepor Beel, Guwahati, Assam.



### 3. Chainage 165/200 – 165/300

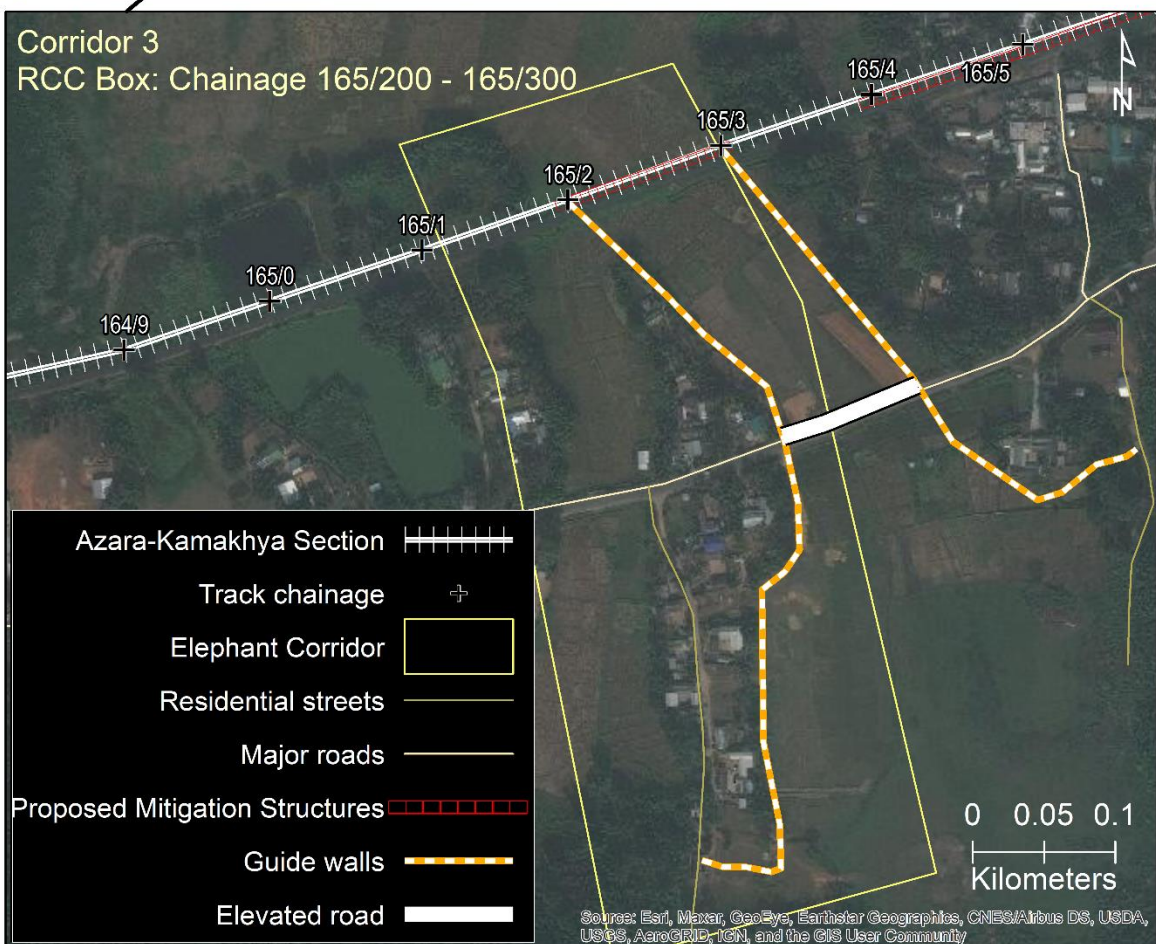
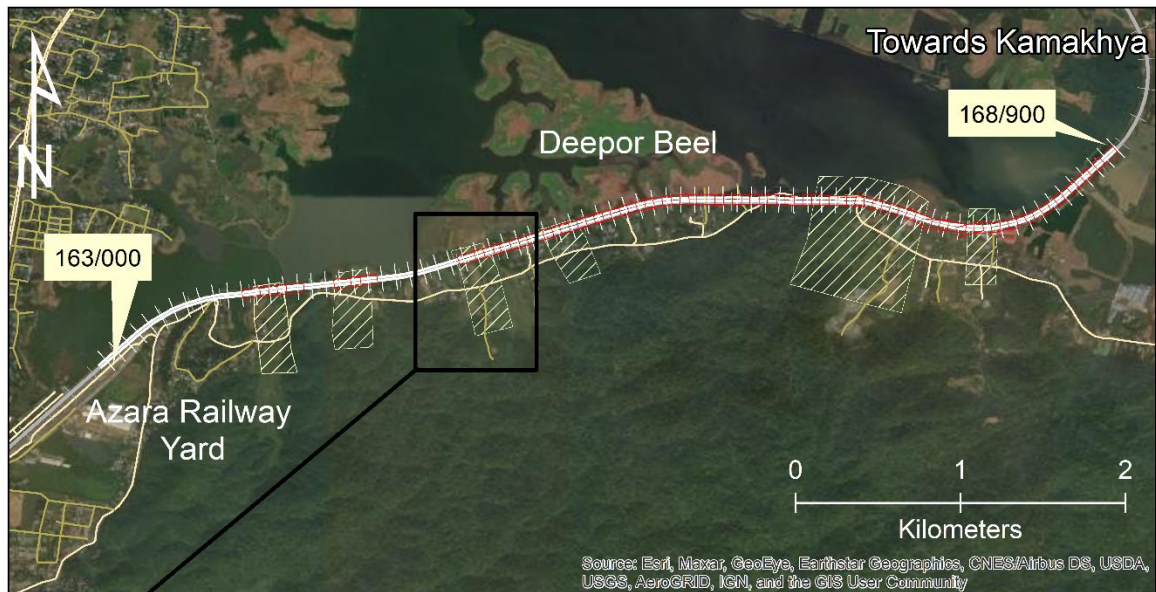
One mitigation structure (RCC box) measuring 100 m wide and 7 m high has been proposed on the third corridor (Chainage 165/100 – 165/300). Additionally, an underpass measuring 100 m wide and 7 m high on the road parallel to the railway track is recommended. It is also recommended to install guide walls to direct animal movement first towards the road underpass and then towards the railway track underpass. ***It is recommended to construct the underpasses as RCC structures with a span of 12 m and pillar-type divisions.*** The details of the proposed and recommended mitigation measures is provided in Table 4 and Figure 4.

**Table 4.** Details of mitigation measures proposed by NFR and recommended by WII on Chainage 165/200 – 165/300 of the Azara-Kamakhya section of railway line passing through Deepor Beel, Guwahati, Assam

S. No.	Mitigation measure	Chainage/GPS location	Dimensions (m) Width x height
1.	Underpass on railway track	165/200 – 165/300	100 x 7
2.	Underpass on road	Start: 26° 6'30.08"N 91°38'26.67"E End: 26° 6'29.05"N 91°38'23.64"E	100 x 7
3.	Guide walls	.kml provided (III.GW1 & III.GW2)	537 (west side) 370 (east side)







**Figure 4.** Railway track, elephant corridors and mitigation measures proposed by NFR and recommended by WII for doubling of railway track between chainage 165/200 – 165/300 of the Azara – Kamakhya railway line passing through the southern boundary of Deepor Beel, Guwahati, Assam.

#### 4. Chainage 165/400 – 168/900

One mitigation structure (viaduct) measuring 3500 m wide and 7 m high (Figure 5) has been proposed on this section. The viaduct covers three designated elephant corridors (Chainage 165/600 – 165/800, 167/100 – 167/700 and 168/000 – 168/150). The details of the proposed and recommended mitigation measures are provided in Table 5 and Figure 5.

**Table 5.** Details of mitigation measures proposed by NFR and recommended by WII on Chainage 165/400 – 168/900 of the Azara-Kamakhya section of railway line passing through Deepor Beel, Guwahati, Assam

S. No.	Mitigation measure	Chainage/GPS location	Dimensions (m) <i>Width x height</i>
1.	Viaduct on railway track	165/400 – 168/900	3500 x 7



**Figure 5.** Railway track, elephant corridors and mitigation measures proposed by NFR and recommended by WII for doubling of railway track between chainage 165/400 – 168/900 of the Azara – Kamakhya railway line passing through the southern boundary of Deepor Beel, Guwahati, Assam.



Additional recommendations have been made specifically for the three segments that fall near or within the designated elephant corridors.

#### **A. Section between chainage 165/950 – 166/050**

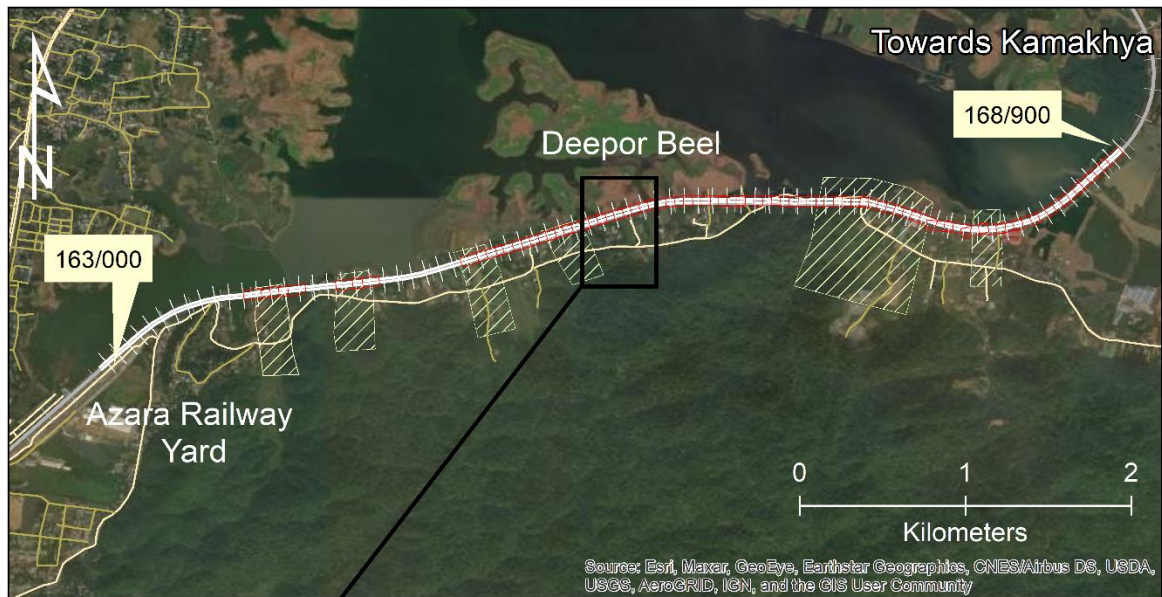
An underpass measuring 100 m wide and 7 m high on the road parallel to the railway track is recommended. It is also recommended to install guide walls to direct animal movement first towards the road underpass and then towards the viaduct on the railway track. The details of the proposed and recommended mitigation measures is provided in Table 6 and Figure 6.

**Table 6.** Details of mitigation measures proposed by NFR and recommended by WII on Chainage 165/930 – 166/050 of the Azara-Kamakhya section of railway line passing through Deepor Beel, Guwahati, Assam

<b>S. No.</b>	<b>Mitigation measure</b>	<b>GPS location</b>	<b>Dimensions (m) Width x height</b>
1.	Underpass on road	Start: 26° 6'36.21"N 91°38'50.49"E End: 26° 6'36.38"N 91°38'46.70"E	100 x 7
2.	Guide walls	.kml provided (IV.GW1 & IV.GW2)	270 (west side) 336 (east side)







**Figure 6.** Additional mitigation measures recommended in the first segment (chainage 165/950 – 166/050) of the 3500 m ling viaduct on the Azara – Kamakhya railway line passing through the southern boundary of Deepor Beel, Guwahati, Assam.



### **B. Section between chainage 166/850 and 167/380**

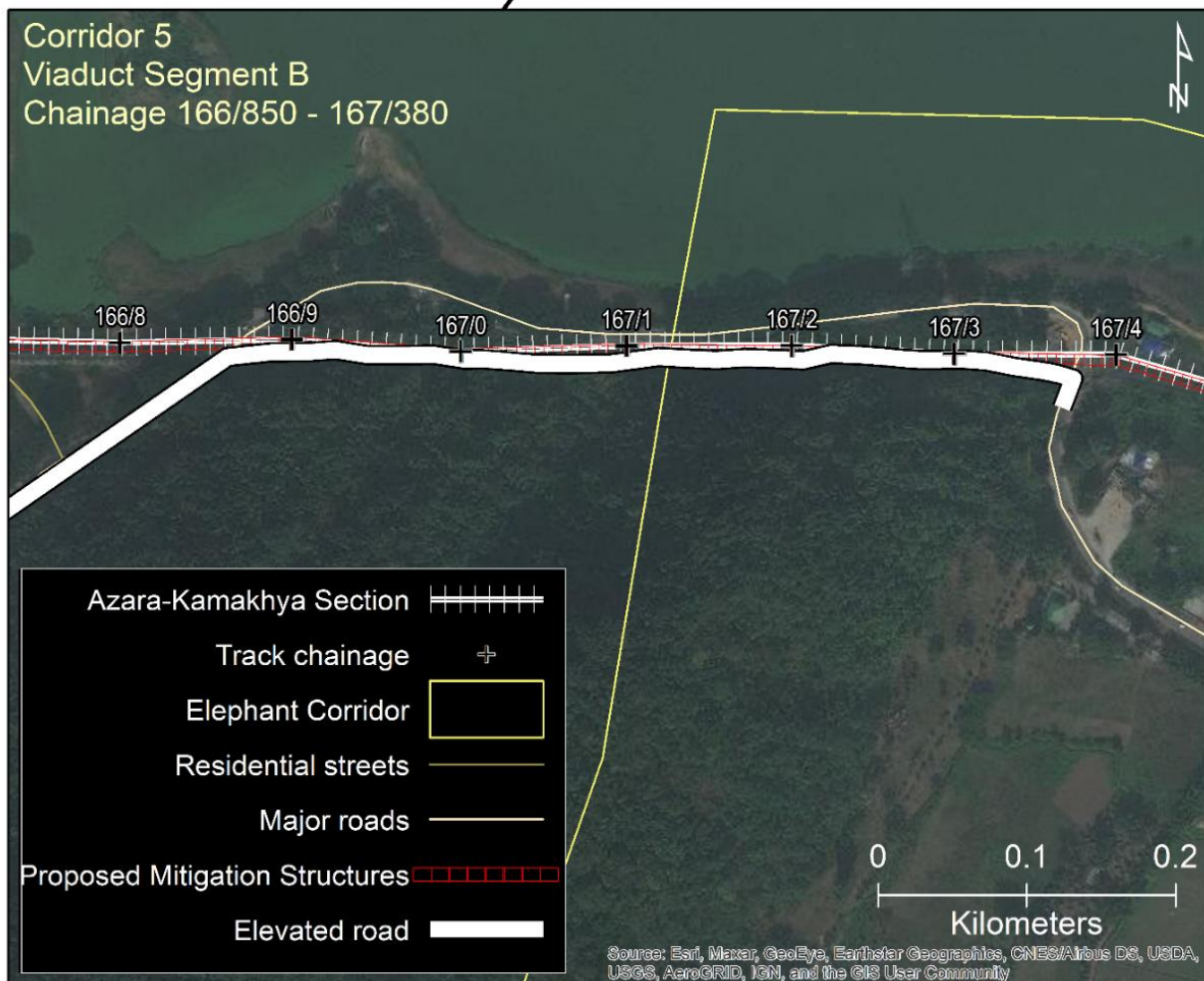
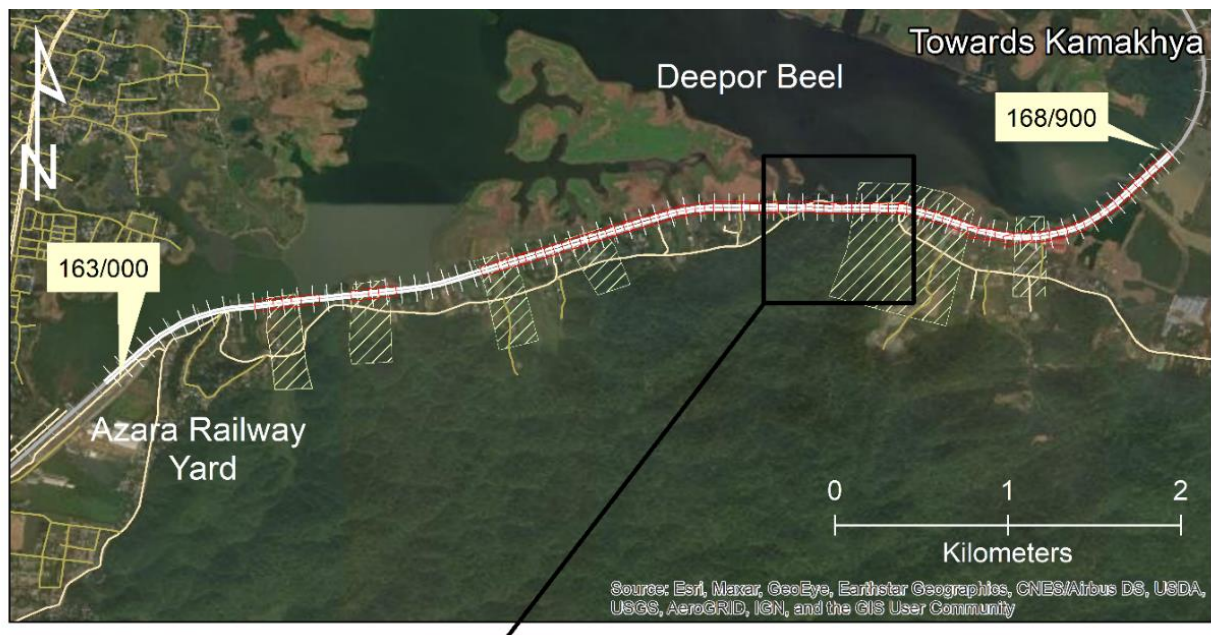
It is recommended to elevate the road section between the two level crossings (chainages 166/850 and 167/380) presently crossing over to the north of the railway track (Figure 7). The road must be elevated and brought to the south of the present alignment. The length of the road between the two level crossings is 520 m. The height of the road underpass should be the same as that of the viaduct for the entire stretch (7 m). The details of the proposed and recommended mitigation measures is provided in Table 7 and Figure 7.

**Table 7.** Details of mitigation measures proposed by NFR and recommended by WII on Chainage 166/850 – 167/380 of the Azara-Kamakhya section of railway line passing through Deepor Beel, Guwahati, Assam

S. No.	Mitigation measure	Chainage/GPS location	Dimensions (m) <i>Width x height</i>
1.	Underpass on road	166/850 – 167/380 Start: 26° 6'45.16"N 91°39'16.56"E End: 26° 6'44.74"N 91°39'35.09"E	520 x 7





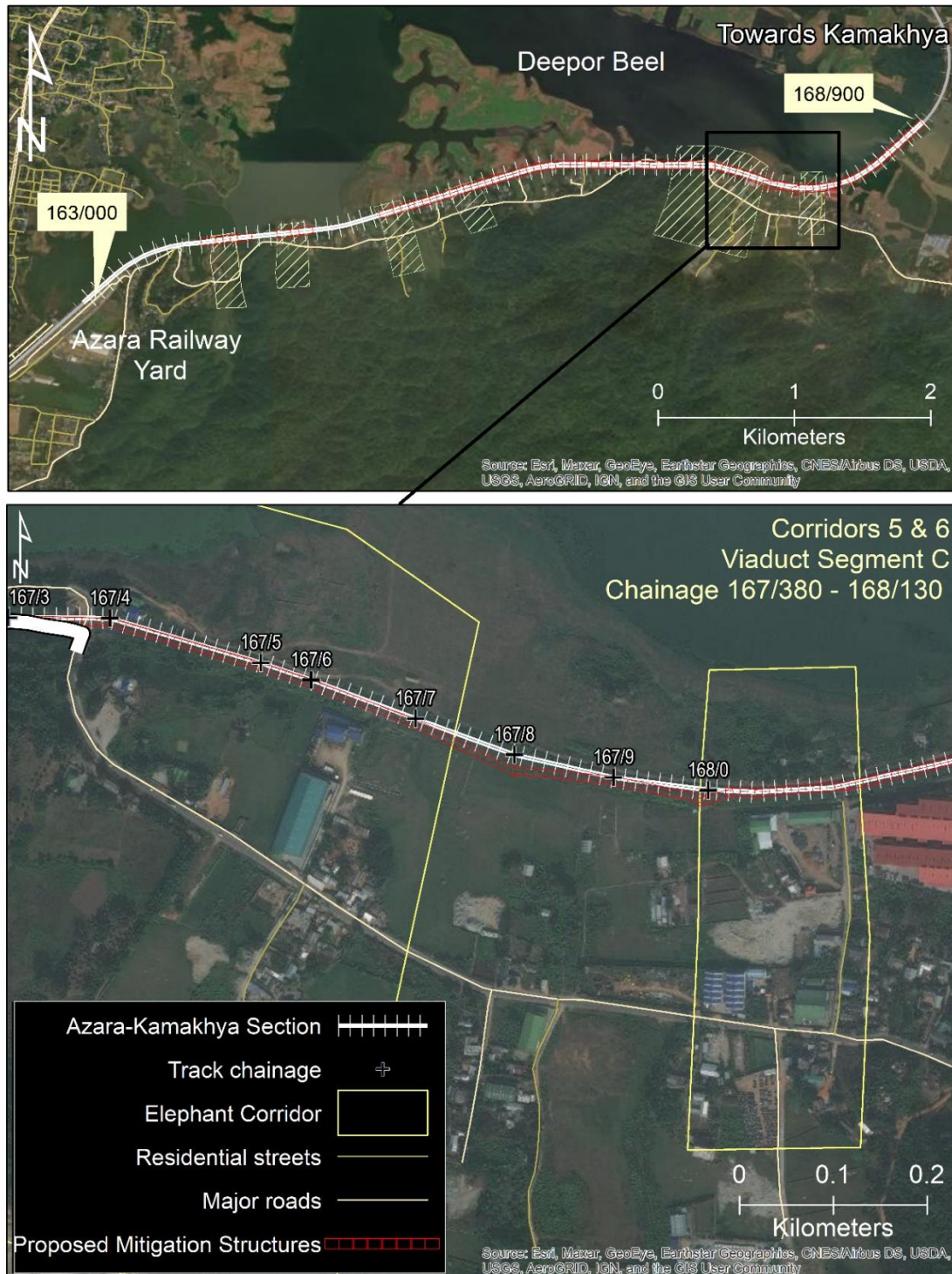


**Figure 7.** Additional mitigation measures recommended in the second segment (chainage 166/850 – 167/380) of the 3500 m ling viaduct on the Azara – Kamakhya railway line passing through the southern boundary of Deepor Beel, Guwahati, Assam.



### C. Section between chainage 167/380 and 168/130

An attempt to remove all encroachments falling in the area should be made (Figure 8). This stretch has two critical elephant corridors and if the encroachments are not removed, all mitigation measures would be futile.



**Figure 8.** Additional mitigation measures recommended in the third segment (chainage 167/380 – 168/130) of the 3500 m ling viaduct on the Azara – Kamakhya railway line passing through the southern boundary of Deepor Beel, Guwahati, Assam.

## Summary of Mitigation Measures

Overall, 4 mitigation measures are recommended on both railway tracks, and 5 on the Maghuwapara road. The details of all measures are provided in Table 8.

**Table 8.** Summary of mitigation measures recommended on Azara – Kamakhya railway line passing through the southern boundary of Deepor Beel, Guwahati, Assam.

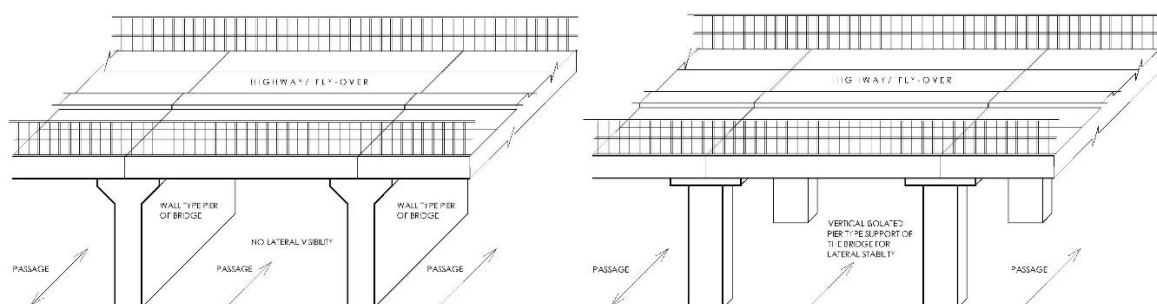
S. No.	Mitigation measure	Chainage/GPS location	Dimensions (in m) <i>Width x height</i>
1.	RCC box culvert	164/000 – 164/200	200 x 7
2.	Underpass on road	Start: 26° 6'19.29"N 91°37'43.23"E End: 26° 6'17.33"N 91°37'39.70"E	150 x 7
3.	Guide walls	.kml provided	570 (west) 220 (east)
4.	RCC box culvert	164/500 – 164/600	100 x 7
5.	Underpass on road	Start: 26° 6'25.71"N 91°37'58.73"E End: 26° 6'26.24"N 91°37'55.24"E	100 x 7
6.	Guide walls	.kml provided	246 (west) 146 (east)
7.	RCC box culvert	165/200 – 165/300	100 x 7
8.	Underpass on road	Start: 26° 6'30.08"N 91°38'26.67"E End: 26° 6'29.05"N 91°38'23.64"E	100 x 7
9.	Guide walls	.kml provided	537 (west) 370 (east)
10.	Viaduct	165/400 – 168/900	3500 x 7
10A.	Underpass on road	Start: 26° 6'36.21"N 91°38'50.49"E End: 26° 6'36.38"N 91°38'46.70"E	100 x 7
	Guide walls	.kml provided	270 (west) 336 (east)
10B.	Underpass on road	166/850 – 167/380 Start: 26° 6'45.16"N 91°39'16.56"E End: 26° 6'44.74"N 91°39'35.09"E	520
10C.	Removal of encroachments	167/380 – 168/130	

It is again highlighted that the encroachments along the railway track especially along the elephant movement corridors need to be removed to enhance the functionality of the proposed structures and to reduce the possibility of human-elephant conflict.



## General Recommendations:

- i. Guide walls are recommended to direct animal movement towards the underpasses.
- ii. The width of individual spans on all crossing structures (road and railway) should be 12 m wide (instead of 5 m wide RCC box).
- iii. The divisions of the crossing structures measuring 100 – 200 m should be of pillar type (instead of wall-type, Figure 9 a and b) with 1.5 m diameter.



**Figure 9** (a) Wall-type division of bridge and (b) pillar-type division

- iv. Attempts should be made to remove encroachments on forest land between Rani Reserve Forest and Deepor Beel for maintaining elephant movement in the area.
- v. The existing railway bed should be removed, and the height of the track should be taken from the ground level (not from the existing trackbed level).
- vi. The spacing between two railway tracks should be as open and wide as possible. The gap between tracks on crossing structure sections should be of open type (Figure 10).



**Figure 10.** Gap between two parallel bridges (Image: internet)

- vii. The height of all crossing structures (road and railway line) is to be 7 m for the passage of elephant herds.
- viii. The underpasses must be kept free of all human-related activities including foot trails and minor roads, as these have a negative influence on the use and crossing rates of animals.

**Mitigation measures on the adjoining road:**

The mitigation measures on the proposed double railway track are only going to be effective if the adjoining roads are also mitigated. We have already suggested mitigation measures on adjoining road stretches along with guide walls. All these measures will help in the effective utilization of Deepor Beel by elephants especially during water scarce situations and will also reduce human-elephant interactions. The height of all animal crossing structures on the road should be 7 m, and the divisions should be pillar-type instead of wall-type (Fig. 9a). The mitigation measures should be considered as a part of complete Mitigation Plan.

**Encroachment along Deepor Beel:**

There are a lot of encroachments along the Deepor Beel. An increase in encroachments shall not only result in enhanced human-elephant interaction but will also reduce the water-catchment area of the Beel. It is recommended to remove all the encroachments along the forest edge and along railway track to enhance use by elephants, especially along the identified elephant movement corridors.

**Speed restrictions:**

The prevalent restrictions imposed on train speed will continue as such. The restrictions would automatically be removed once the mitigation measures are in place for both the railway tracks.

**Electrifications of the existing track:**

Since the existing railway track is on an elevated bank, elephants have to cross while accessing water from the Beel. This may render electrified railway track riskier to elephant movement. Therefore, the possibility of electrification of the existing railway track should not be considered. Once the mitigation measures are in place, the railway tracks may be electrified all along the Beel. The railway tracks on either side need to be fenced (elephant proof fence) in areas where mitigation measures are not in place to avoid incidents of electrocution and rail hit.

**Use of technological options:**

It is recommended to explore the possibility of using technological options such as “Optical Fibre Sensing”, “Seismic Sensors”, etc., for detecting animals along the railway track for early warning. The system should have the capability to align with the existing signaling system of railways to avoid the hit/death of elephants or humans or damage to railways. This system should be deployed along the railway track in areas where there are no mitigation measures to avoid loss of human and animal life.



