

JOURNEY RISK MANAGEMENT (JRM) STUDY

IOCL Coimbatore Terminal to NMDC Donimalai

Objective of the JRM Report

This JRM report is designed to ensure compliance with the Central Motor Vehicle Rules, 1989 (CMVR), AIS 140 standards, and the Road Transport Safety Policy (RTSP). It provides a comprehensive risk assessment for the transportation of hazardous materials along specified routes. By integrating these legal frameworks, the report offers a broad strategy for identifying and mitigating route-specific risks.

Regulatory Compliance

The report complies with the Central Motor Vehicles (Eleventh Amendment) Rules, 2022, mandating safe transportation practices for N2 and N3 category vehicles carrying hazardous materials. These rules require detailed route assessments, especially regarding road conditions, speed limits, and risk areas, to ensure safety compliance.

Risk Management Strategy

This report categorizes transportation routes into high-risk and medium-risk areas, with a focus on factors such as sharp turns, accident-prone regions, and elevation changes. The goal is to provide actionable

recommendations to minimize these risks, including speed regulations, driver warnings for hazardous zones, and the option of alternate routes.

Compliance with the Road Transport Safety Policy (RTSP)

The report integrates RTSP provisions, including mandatory driving hours, rest periods, and nighttime driving restrictions. It ensures that drivers follow official guidelines, such as taking prescribed rest breaks and avoiding dangerous road conditions like poor visibility, heavy crowds, or high-traffic areas during peak hours.

Emergency Preparedness and Response

The report highlights the significance of predetermined emergency stops for refueling, rest, and overnight stays. It includes protocols for safe responses to road hazards, alternative routes, and rerouting processes if roads are closed or severe weather arises. This aligns with the RTSP emphasis on driver safety and rapid emergency response.

Environmental Considerations

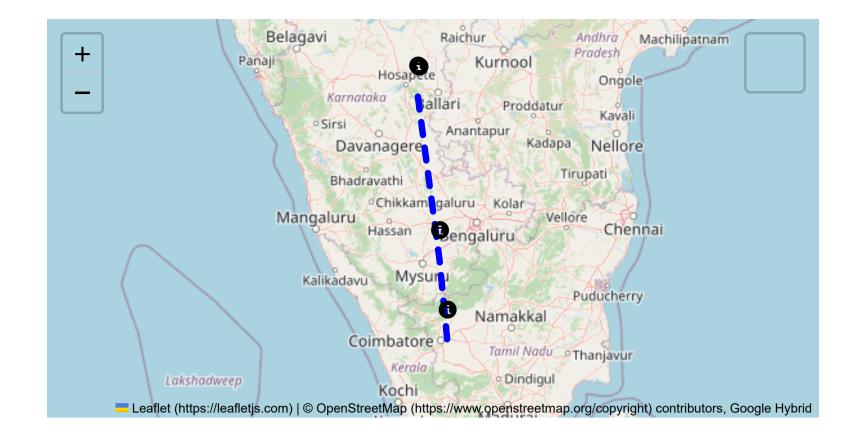
The JRM report addresses environmental risks along the route, ensuring compliance with environmental protection laws in ecologically sensitive zones. It suggests strategies such as identifying areas near water bodies, forests, or populated regions and implementing safety measures to minimize environmental impacts during transport.

Journey Risk Mitigation

The report includes route-specific risk assessments, detailed journey charts, and defensive driving guidelines for each transport route. Integration with vehicle tracking systems guarantees real-time warnings on hazardous areas, speed limits, and mandatory stops, consistent with RTSP and CMVR safety norms.

Compliance with Government Directives

This report fully adheres to governmental directives regarding hazardous material transportation, implementing mandatory speed limits, nighttime driving restrictions, and comprehensive driver briefings and real-time alerts about route-related risks.



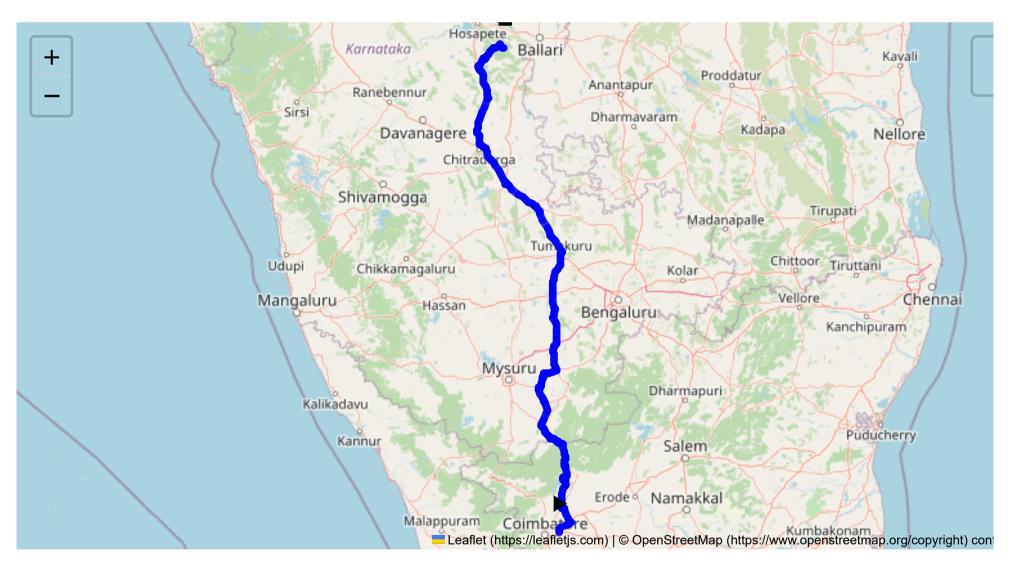
Route Summary:

Total Distance: 574.15 km

Estimated Duration: 11.2 hours

Adjusted Duration (Heavy Vehicle): 13.9 hours

Start: (11.0315, 77.0797) End: (15.06157, 76.60244)



Welcome to the Journey Risk Management Study

1. Overview of the Route Map

The route from Athappagoundenpudur, Coimbatore, Tamil Nadu to Karnataka 583118 encompasses diverse terrain, ranging from urban to semi-rural settings. The primary traversed states are Tamil Nadu and Karnataka, with notable waypoints at Kirugavalu and Bhujanganagar. The path includes major highways, rural roads, and state highways which are well-used for regional connectivity.

2. Typical Weather Conditions and Potential Weather-Related Hazards

The region experiences a tropical climate. Monsoon season, typically from June to September, can bring heavy rainfall, leading to potential flooding and landslides, particularly in hilly or poorly drained areas. During summer months (March to June), high temperatures can lead to road risks related to tire blowouts and heat-related vehicle malfunctions.

3. Analysis of Traffic Patterns

The route faces heavy traffic during peak hours in urban areas, particularly when passing through towns and cities like Coimbatore and Mysuru. Congestion is notably higher during morning (8 AM to 10 AM) and evening (5 PM to 8 PM) peak hours. Rural stretches might have lighter traffic, although local market days can significantly increase road congestion.

4. Assessment of Road Quality and Infrastructure

Road quality varies along the route. The main highways are generally well-maintained, but local roads near rural towns like Kirugavalu and Bhujanganagar might have potholes or uneven surfaces. Infrastructure such as signage and lighting may be less adequate in rural stretches and should be approached with caution.

5. Suggestions for Alternative Routes for Emergencies

Alternative routes include taking NH 44 directly for a quicker but longer bypass of major towns, which may provide a more straightforward route in emergencies. Utilizing state highway byroads could also divert traffic from highly congested urban areas if needed, though these roads may not support heavy vehicles as effectively due to size and quality constraints.

6. Summary of Local Regulations Affecting Hazardous Material Transport

Regulations typically restrict the transport of hazardous materials through populated areas during busy hours. Permit requirements will exist, and vehicles must adhere to specific routes and timing restrictions, especially near populated regions and sensitive environmental areas. Ensure compliance with local transport departments for updated regulations.

7. Overview of Historical Incidents Involving Heavy Vehicles or Hazardous Materials

While specific historical incident data might be limited, common incidents include vehicle rollovers and hazardous material spills, often related to road conditions, driver error, and vehicle maintenance issues. High-risk areas are typically urban or congestible nodes such as city entry/exit points and complex interchanges.

8. Environmental Considerations and Sensitive Areas

Sensitive areas include wildlife sanctuaries and agricultural lands, particularly around Kirugavalu. Minimizing risk in these areas involves adhering to speed regulations, using designated routes, and undergoing thorough safety checks to prevent contamination or accidents.

9. Analysis of Communication Coverage

Telecommunication coverage varies; urban areas generally have robust service, while rural areas may experience dead zones, particularly in hilly terrains or remote stretches. It's recommended to carry additional communication tools like satellite phones or radios for uninterrupted contact.

10. Estimated Emergency Response Times

Emergency response times can vary from 30 to 60 minutes in urban regions, where services are more readily available. Rural areas may exceed this range, especially during weather adversities or in communication dead zones. Familiarize yourself with local emergency numbers and nearest facilities.

12. Overall Summary of Risk Assessment

This route involves moderate risks, primarily due to varying road conditions, potential weather challenges, and traffic congestion. Heavy vehicle drivers transporting hazardous materials must be well-prepared for diverse conditions, adhere to stringent safety and regulatory standards, and remain vigilant in identifying potential hazards to ensure a safe journey. Regular driver training and updated navigation tools are highly recommended to reduce risks.

Risk Assessment - Turns

	Risk Type	Risk Level	Coordinates	Speed Limit
0	Roundabout	High	11.47271, 77.13198	15 KM/Hr
1	Roundabout	High	13.31601, 77.09101	15 KM/Hr
2	Roundabout	High	14.90384, 76.38654	15 KM/Hr
3	U-Turn	High	12.5809748, 77.0327476	10 KM/Hr
4	Turn	Medium	11.04106, 77.07756	30 KM/Hr
5	Turn	Medium	11.05288, 77.08013	30 KM/Hr
6	Turn	High	11.10925, 77.17641	15 KM/Hr
7	Turn	Medium	11.22839, 77.12024	30 KM/Hr
8	Turn	High	11.23535, 77.10304	15 KM/Hr
9	Turn	Medium	11.39782, 77.11041	30 KM/Hr

	Risk Type	Risk Level	Coordinates	Speed Limit
10	Turn	Medium	11.43147, 77.13783	30 KM/Hr
11	Turn	High	11.47295, 77.13062	15 KM/Hr
12	Turn	Medium	11.47336, 77.11565	30 KM/Hr
13	Turn	High	11.47647, 77.11144	15 KM/Hr
14	Turn	High	11.48851, 77.11186	15 KM/Hr
15	Turn	High	11.49063, 77.13337	15 KM/Hr
16	Turn	Medium	11.50426, 77.14285	30 KM/Hr
17	Turn	Medium	11.58448, 77.13234	30 KM/Hr
18	Turn	Medium	11.58973, 77.12817	30 KM/Hr
19	Turn	High	11.59285, 77.12766	15 KM/Hr
20	Turn	Medium	11.59326, 77.12652	30 KM/Hr
21	Turn	High	11.59625, 77.12483	15 KM/Hr
22	Turn	High	11.60437, 77.12929	15 KM/Hr
23	Turn	Medium	11.61029, 77.12624	30 KM/Hr
24	Turn	Medium	11.76560, 77.10980	30 KM/Hr
25	Turn	High	11.77501, 77.10325	15 KM/Hr
26	Turn	High	11.77942, 77.07290	15 KM/Hr
27	Turn	High	11.79535, 77.06371	15 KM/Hr
28	Turn	Medium	11.79563, 77.05642	30 KM/Hr
29	Blind Spot	Blind Spot	11.81384, 77.00347	10 KM/Hr
30	Turn	High	11.82868, 77.00764	15 KM/Hr
31	Turn	High	11.86665, 76.95456	15 KM/Hr
32	Turn	Medium	11.88257, 76.95613	30 KM/Hr
33	Turn	Medium	11.90247, 76.94700	30 KM/Hr
34	Turn	High	11.91747, 76.92636	15 KM/Hr
35	Turn	High	11.93574, 76.92641	15 KM/Hr
36	Turn	Medium	11.94879, 76.93971	30 KM/Hr
37	Turn	Medium	12.05035, 76.98108	30 KM/Hr
38	Turn	Medium	12.12667, 76.94994	30 KM/Hr
39	Turn	Medium	12.13558, 76.94997	30 KM/Hr
40	Turn	Medium	12.21675, 76.90657	30 KM/Hr
41	Turn	High	12.22516, 76.90797	15 KM/Hr
42	Turn	High	12.22816, 76.91306	15 KM/Hr
43	Turn	High	12.24122, 76.90975	15 KM/Hr

	Risk Type	Risk Level	Coordinates	Speed Limit
44	Turn	High	12.25426, 76.92775	15 KM/Hr
45	Turn	Medium	12.34447, 76.94748	30 KM/Hr
46	Blind Spot	Blind Spot	12.35624, 76.94462	10 KM/Hr
47	Turn	Medium	12.36102, 76.98333	30 KM/Hr
48	Turn	High	12.38883, 77.05860	15 KM/Hr
49	Blind Spot	Blind Spot	12.58201, 77.03687	10 KM/Hr
50	Blind Spot	Blind Spot	12.58162, 77.03391	10 KM/Hr
51	Turn	Medium	12.59291, 77.04936	30 KM/Hr
52	Turn	Medium	12.61121, 77.05364	30 KM/Hr
53	Turn	High	12.61435, 77.05799	15 KM/Hr
54	Turn	Medium	12.76750, 77.06107	30 KM/Hr
55	Turn	High	12.82573, 77.02742	15 KM/Hr
56	Turn	Medium	12.89246, 77.04467	30 KM/Hr
57	Turn	Medium	13.02924, 77.02631	30 KM/Hr
58	Turn	High	13.04183, 77.02145	15 KM/Hr
59	Turn	Medium	13.05200, 77.02618	30 KM/Hr
60	Turn	Medium	13.16760, 77.03319	30 KM/Hr
61	Turn	Medium	13.25008, 77.08543	30 KM/Hr
62	Turn	High	13.36189, 77.09305	15 KM/Hr
63	Turn	Medium	13.36314, 77.09981	30 KM/Hr
64	Turn	High	13.36653, 77.10312	15 KM/Hr
65	Turn	Medium	13.49326, 77.01463	30 KM/Hr
66	Turn	Medium	13.71390, 76.91370	30 KM/Hr
67	Turn	Medium	13.74947, 76.88624	30 KM/Hr
68	Turn	High	13.93736, 76.62340	15 KM/Hr
69	Turn	High	13.94542, 76.62601	15 KM/Hr
70	Turn	Medium	13.95767, 76.61880	30 KM/Hr
71	Turn	Medium	13.96138, 76.61067	30 KM/Hr
72	Turn	Medium	14.26672, 76.40389	30 KM/Hr
73	Turn	Medium	14.38577, 76.37289	30 KM/Hr
74	Turn	Medium	14.40419, 76.38602	30 KM/Hr
75	Turn	Medium	14.65020, 76.47068	30 KM/Hr
76	Turn	Medium	14.87613, 76.40363	30 KM/Hr
77	Turn	Medium	14.90035, 76.38888	30 KM/Hr

	Risk Type	Risk Level	Coordinates	Speed Limit
78	Turn	High	14.90986, 76.38861	15 KM/Hr
79	Blind Spot	Blind Spot	14.97337, 76.43488	10 KM/Hr
80	Turn	High	14.97120, 76.43855	15 KM/Hr
81	Turn	Medium	14.97891, 76.44997	30 KM/Hr
82	Turn	Medium	14.98712, 76.45171	30 KM/Hr
83	Turn	High	15.05986, 76.52106	15 KM/Hr
84	Turn	High	15.06429, 76.52163	15 KM/Hr
85	Turn	High	15.07166, 76.55879	15 KM/Hr
86	Turn	Medium	15.08607, 76.56291	30 KM/Hr
87	Blind Spot	Blind Spot	15.09294, 76.57341	10 KM/Hr
88	Turn	High	15.06185, 76.59449	15 KM/Hr

Emergency Locations

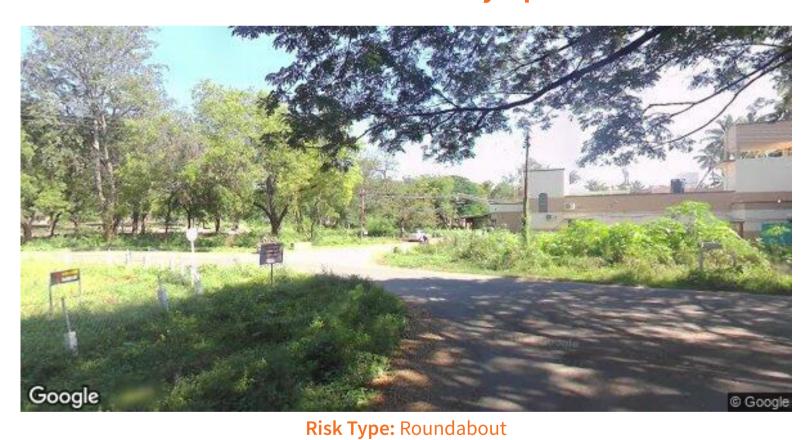
	type	name	coordinates	speed_limit	risk_level
1	hospital	NM Hospital	11.23271, 77.10187	30 km/h	Medium
5	hospital	Primary Health Centre	13.3631106, 77.100256	30 km/h	Medium
12	police	Police Station	13.9592757, 76.6109797	30 km/h	Medium
13	police	Aimangala Police Station	14.0945949, 76.5343773	30 km/h	Medium

Crowded Spots

	type	name	coordinates	speed_limit	risk_level
0	college	PSG Institute of Technology and Applied Research	11.0677118, 77.0945744	30 km/h	Medium
2	marketplace	Annur saturday market (weekly market)	11.2349165, 77.1028197	30 km/h	Medium
3	college	Bharati Education Trust	12.4820516, 77.0337572	30 km/h	Medium

	type	name	coordinates	speed_limit	risk_level
4	marketplace	TAPMCS Market	12.5802665, 77.0331636	30 km/h	Medium
6	school	HMS School Ground	13.3642008, 77.0971253	30 km/h	Medium
7	school	Arivu School	13.362788, 77.1017634	30 km/h	Medium
8	college	KSEF College	13.3688656, 77.1018044	30 km/h	Medium
9	school	Kaledasa	13.3651009, 77.1038107	30 km/h	Medium
10	college	Sridevi Nursing College	13.3720278, 77.1012553	30 km/h	Medium
11	school	Jain Pubic School	13.4104934, 77.0859529	30 km/h	Medium
14	college	Government Junior College	14.9030077, 76.3900638	30 km/h	Medium

Route Photos of Risky Spots



Risk Level: High

Speed Limit: 15 KM/Hr

Coordinates: 11.47271, 77.13198



Risk Type: Roundabout
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 13.31601, 77.09101



Risk Type: Roundabout
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 14.90384, 76.38654



Coordinates: 12.5809748, 77.0327476



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 11.04106, 77.07756



Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 11.05288, 77.08013



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 11.10925, 77.17641



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 11.22839, 77.12024



Coordinates: 11.23535, 77.10304



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 11.39782, 77.11041



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 11.43147, 77.13783



Coordinates: 11.47295, 77.13062



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 11.47336, 77.11565



Coordinates: 11.47647, 77.11144



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr

Coordinates: 11.49063, 77.13337



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr

Coordinates: 11.58448, 77.13234



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 11.58973, 77.12817



Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 11.59285, 77.12766



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr

Coordinates: 11.59326, 77.12652



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr

Coordinates: 11.59625, 77.12483



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr

Coordinates: 11.60437, 77.12929



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 11.61029, 77.12624



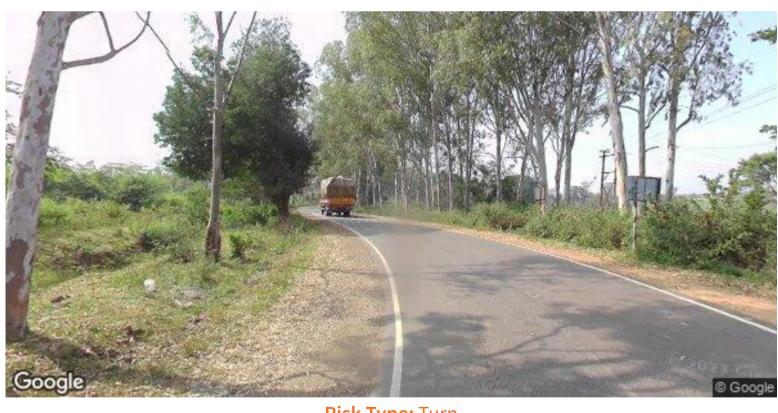
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 11.76560, 77.10980



Coordinates: 11.77501, 77.10325



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 11.77942, 77.07290



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 11.79535, 77.06371



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 11.79563, 77.05642



Risk Type: Blind Spot
Risk Level: Blind Spot
Speed Limit: 10 KM/Hr
Coordinates: 11.81384, 77.00347



Coordinates: 11.82868, 77.00764



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr

Coordinates: 11.86665, 76.95456



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 11.88257, 76.95613



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 11.91747, 76.92636



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 11.93574, 76.92641



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr

Coordinates: 11.94879, 76.93971



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 12.05035, 76.98108



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 12.12667, 76.94994



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 12.13558, 76.94997



Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 12.21675, 76.90657

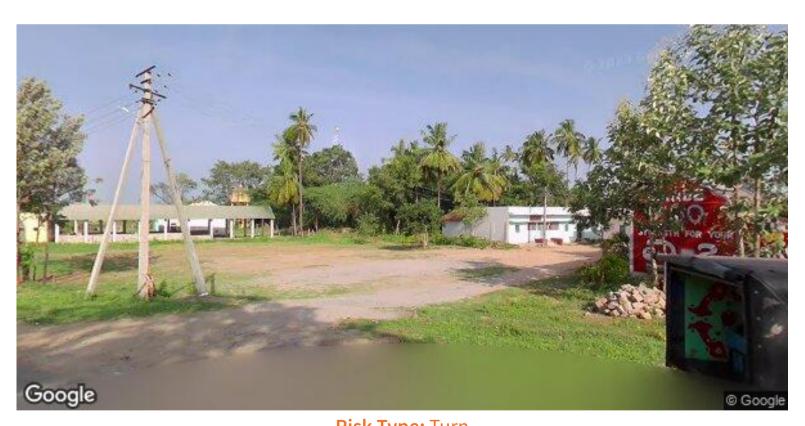


Coordinates: 12.22516, 76.90797



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr

Coordinates: 12.22816, 76.91306



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr

Coordinates: 12.24122, 76.90975



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 12.25426, 76.92775



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 12.34447, 76.94748



Risk Type: Blind Spot
Risk Level: Blind Spot
Speed Limit: 10 KM/Hr

Coordinates: 12.35624, 76.94462



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 12.36102, 76.98333



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr

Coordinates: 12.38883, 77.05860



Risk Type: Blind Spot
Risk Level: Blind Spot
Speed Limit: 10 KM/Hr
Coordinates: 12.58201, 77.03687



Risk Type: Blind Spot
Risk Level: Blind Spot
Speed Limit: 10 KM/Hr
Coordinates: 12.58162, 77.03391



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr

Coordinates: 12.59291, 77.04936



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr

Coordinates: 12.61121, 77.05364



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr

Coordinates: 12.61435, 77.05799



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 12.76750, 77.06107



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 12.89246, 77.04467

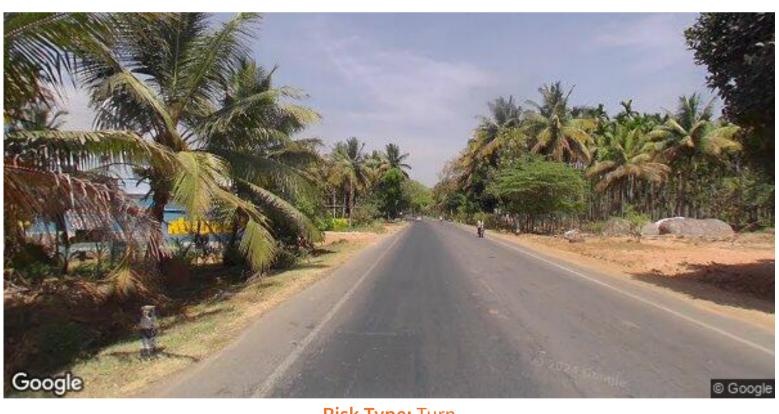


Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr

Coordinates: 13.02924, 77.02631



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 13.04183, 77.02145



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 13.05200, 77.02618



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 13.16760, 77.03319



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 13.25008, 77.08543



Coordinates: 13.36189, 77.09305



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 13.36314, 77.09981



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 13.36653, 77.10312



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 13.49326, 77.01463



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 13.71390, 76.91370



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr

Coordinates: 13.74947, 76.88624



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr

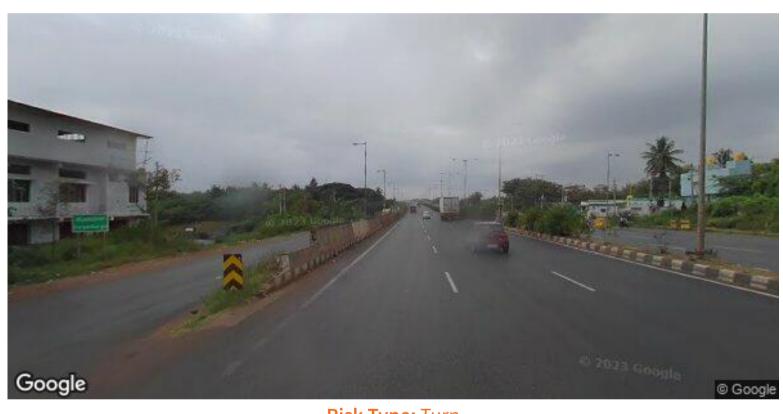
Coordinates: 13.93736, 76.62340



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 13.94542, 76.62601



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 13.95767, 76.61880



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 13.96138, 76.61067



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr

Coordinates: 14.26672, 76.40389



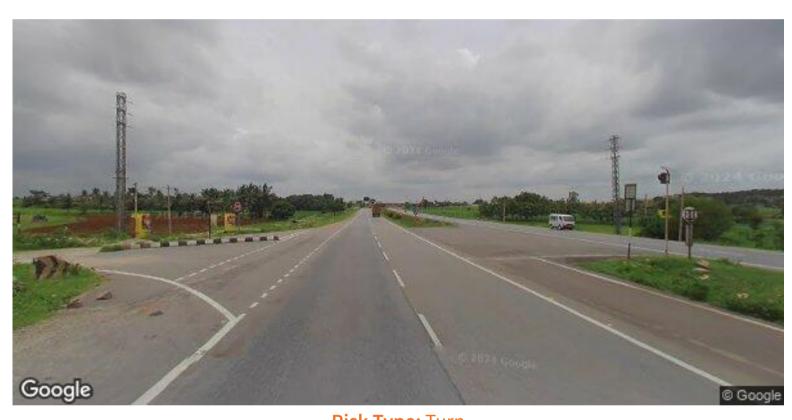
Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 14.38577, 76.37289

Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 14.40419, 76.38602

Google



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 14.65020, 76.47068



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 14.87613, 76.40363



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr

Coordinates: 14.90035, 76.38888



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr

Coordinates: 14.90986, 76.38861



Risk Type: Blind Spot
Risk Level: Blind Spot
Speed Limit: 10 KM/Hr

Coordinates: 14.97337, 76.43488



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 14.97120, 76.43855



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 14.97891, 76.44997



Coordinates: 15.05986, 76.52106



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr

Coordinates: 15.06429, 76.52163



Risk Level: High
Speed Limit: 15 KM/Hr

Coordinates: 15.07166, 76.55879



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 15.08607, 76.56291



Risk Type: Blind Spot
Risk Level: Blind Spot
Speed Limit: 10 KM/Hr
Coordinates: 15.09294, 76.57341



Coordinates: 15.06185, 76.59449