

# JOURNEY RISK MANAGEMENT (JRM) STUDY

## IOCL Coimbatore Terminal to Yadadri Thermal Power Station

#### **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**

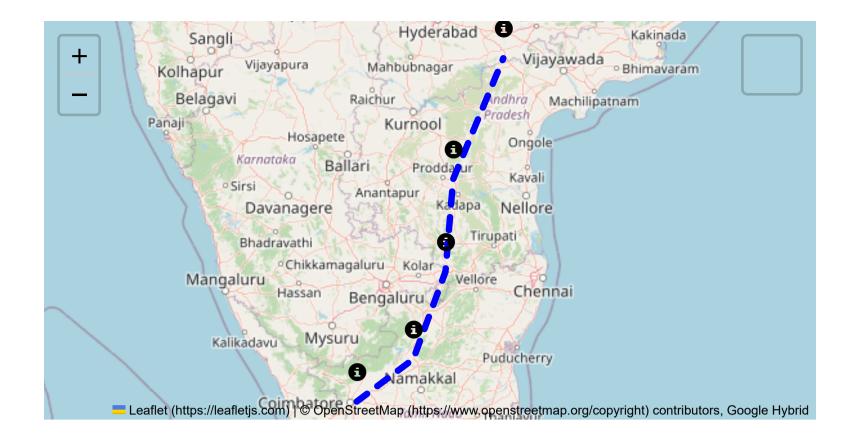
The JRM report addresses environmental risks along the route, ensuring compliance with environmental protection laws in ecologically sensitive zones. It suggests strategies such as identifying areas near water bodies, forests, or populated regions and implementing safety measures to minimize environmental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



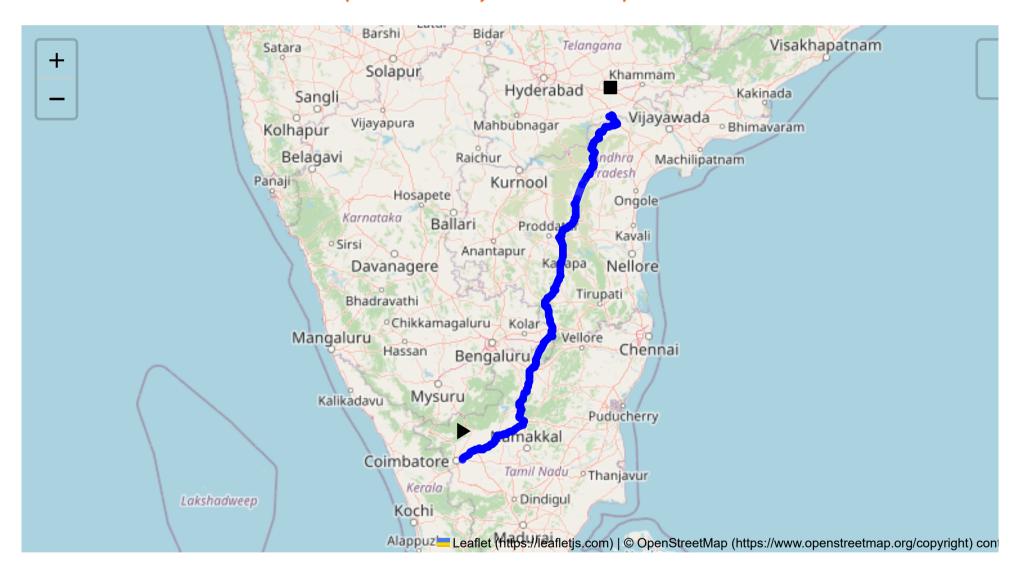
**Route Summary:** 

Total Distance: 868.13 km

**Estimated Duration: 16.8 hours** 

Adjusted Duration (Heavy Vehicle): 21.0 hours

Start: (11.0315, 77.0797) End: (16.712534, 79.580495)



#### Welcome to the Journey Risk Management Study

#### 1. Overview of the Route Map

The route from Athappagoundenpudur, Coimbatore in Tamil Nadu to Kallepalli, Telangana covers approximately 868.13 kilometers, passing through major waypoints like Bengaluru, Omalur in Tamil Nadu, Gandrajupalle in Andhra Pradesh, and Mydukur. It includes a mix of state highways and national highways, including NH544, NH44, and several SH roads.

#### 2. Typical Weather Conditions and Potential Hazards

The route traverses through regions with predominantly tropical climates. Typical weather conditions can include:

- Coimbatore & Omalur: Moderate climate, possible heavy rains during monsoon (June to September).
- Bengaluru: Pleasant climate, occasional heavy rainfall, potential fog in the early morning.
- Gandrajupalle & Mydukur: Hot and dry especially in summer months; risks include heat fatigue.
- **Telangana region:** Potential for hot weather and summer dust storms.

#### 3. Analysis of Traffic Patterns

- Peak Hours:
  - Coimbatore and Bengaluru: Heavy traffic from 8-10 AM and 5-8 PM.
  - o Omalur and smaller towns: Light to moderate traffic.
- Congestion-Prone Areas:
  - Bengaluru city centers and major junctions.
  - Entry and exits of NH44 and NH544.

#### 4. Assessment of Road Quality and Infrastructure

- National Highways: Generally well-maintained with good signage.
- State Highways: Varying conditions; some sections may have potholes and narrow lanes, especially near rural areas.
- Bridges & Tunnel Safety: Regular maintenance, but crowded during peak traffic.

#### **5. Suggestions for Alternative Routes**

- For emergencies:
  - Alternate to NH44 via NH48: Could be used between Bengaluru and Gandrajupalle.
  - Local bypasses and ring roads around Bengaluru for congestion avoidance.

#### 6. Summary of Local Regulations

- Transport of hazardous materials is regulated by guidelines that require proper labeling and documentation.
- Restricted movement in densely populated areas and during night hours in certain zones.
- Specific permits required for hazardous materials, especially near urban centers.

#### 7. Historical Incidents Involving Heavy Vehicles

- Bengaluru: Known for several trucking accidents mainly due to congestion.
- Coimbatore Region: Few incidents with overturned trucks on NH544 during rainy seasons.
- Focus on poor visibility and mechanical failure as common causes.

#### 8. Environmental Considerations and Sensitive Areas

- Forested areas in Karnataka: Sensitive zones around Bengaluru require cautious driving.
- Water bodies: Avoid spillage and contamination risks near rivers and lakes during transit.

#### 9. Communication Coverage

- Good coverage on major highways, but potential signal dead zones in rural Andhra regions.
- Ensure two-way radios and alternative communication tools like satellite phones for backup.

#### **10. Estimated Emergency Response Times**

- Bengaluru & Coimbatore: Roughly 30-45 minutes with dedicated emergency services.
- Rural Andhra and Telangana areas: Could extend to 1-2 hours.

#### 12. Overall Summary of Risk Assessment

The route poses moderate risks typical to long-distance highway travel involving heavy vehicles:

- **High Risk**: Traffic congestion in urban areas such as Bengaluru.
- Moderate Risks: Weather factors like monsoons impacting road conditions, some sections of poorquality roads, especially in Andhra Pradesh.
- Operational Risks: Communication issues and emergency response delays in rural sectors.

Mitigation strategies include adhering strictly to safety protocols, planning rest stops around weather conditions, ensuring GPS and communication devices are functional, and preparing contingency plans for emergencies. Regular checks and driver training are critical for minimizing risks.

#### **Risk Assessment - Turns**

	Risk Type	Risk Level	Coordinates	Speed Limit
0	Roundabout	High	14.44423, 78.80587	15 KM/Hr
1	Roundabout	High	14.50832, 78.79202	15 KM/Hr
2	Roundabout	High	14.72743, 78.72222	15 KM/Hr
3	Turn	High	11.05288, 77.08013	15 KM/Hr
4	Turn	Medium	11.15332, 77.21111	30 KM/Hr
5	Turn	Medium	11.17633, 77.25357	30 KM/Hr
6	Turn	High	11.17552, 77.28070	15 KM/Hr
7	Turn	Medium	11.19154, 77.29068	30 KM/Hr

	Risk Type	Risk Level	Coordinates	Speed Limit
8	Turn	Medium	11.21621, 77.35657	30 KM/Hr
9	Turn	Medium	11.19878, 77.41414	30 KM/Hr
10	Turn	High	11.25950, 77.55055	15 KM/Hr
11	Turn	Medium	11.27802, 77.55638	30 KM/Hr
12	Turn	Medium	11.29108, 77.57201	30 KM/Hr
13	Turn	Medium	11.29241, 77.58804	30 KM/Hr
14	Turn	Medium	11.39320, 77.65138	30 KM/Hr
15	Turn	Medium	11.41212, 77.67226	30 KM/Hr
16	Turn	High	11.43091, 77.67598	15 KM/Hr
17	Turn	High	11.45521, 77.81219	15 KM/Hr
18	Turn	Medium	11.49066, 77.85203	30 KM/Hr
19	Turn	Medium	11.49794, 77.90753	30 KM/Hr
20	Turn	Medium	11.61529, 78.10510	30 KM/Hr
21	Turn	High	11.67829, 78.12807	15 KM/Hr
22	Turn	High	11.73649, 78.05462	15 KM/Hr
23	Turn	High	11.87437, 78.08256	15 KM/Hr
24	Turn	Medium	11.91502, 78.05935	30 KM/Hr
25	Turn	High	11.93494, 78.06232	15 KM/Hr
26	Turn	High	11.94134, 78.05028	15 KM/Hr
27	Turn	Medium	12.28898, 78.19868	30 KM/Hr
28	Turn	Medium	12.42306, 78.22647	30 KM/Hr
29	Turn	Medium	12.62226, 78.32580	30 KM/Hr
30	Turn	Medium	12.68203, 78.33867	30 KM/Hr
31	Turn	Medium	12.90467, 78.42972	30 KM/Hr
32	Turn	Medium	12.91331, 78.44495	30 KM/Hr
33	Turn	Medium	12.98356, 78.46787	30 KM/Hr
34	Turn	High	13.07520, 78.54382	15 KM/Hr
35	Turn	High	13.09477, 78.60745	15 KM/Hr
36	Turn	Medium	13.11725, 78.60215	30 KM/Hr
37	Turn	Medium	13.16650, 78.60857	30 KM/Hr
38	Turn	Medium	13.18084, 78.60345	30 KM/Hr
39	Turn	Medium	13.35638, 78.56407	30 KM/Hr
40	Turn	Medium	13.37513, 78.56757	30 KM/Hr
41	Turn	High	13.58066, 78.52137	15 KM/Hr

	Risk Type	Risk Level	Coordinates	Speed Limit
42	Turn	High	13.57962, 78.49860	15 KM/Hr
43	Turn	High	13.63276, 78.49411	15 KM/Hr
44	Turn	High	13.63944, 78.48730	15 KM/Hr
45	Turn	Medium	13.66976, 78.49040	30 KM/Hr
46	Turn	Medium	13.84957, 78.65683	30 KM/Hr
47	Turn	High	13.88519, 78.64655	15 KM/Hr
48	Turn	High	14.03758, 78.73730	15 KM/Hr
49	Turn	Medium	14.05495, 78.73269	30 KM/Hr
50	Turn	Medium	14.08974, 78.74772	30 KM/Hr
51	Turn	High	14.09597, 78.75634	15 KM/Hr
52	Turn	Medium	14.28238, 78.74725	30 KM/Hr
53	Turn	Medium	14.43608, 78.80347	30 KM/Hr
54	Turn	Medium	14.49291, 78.78507	30 KM/Hr
55	Blind Spot	Blind Spot	14.72744, 78.72335	10 KM/Hr
56	Turn	High	14.72626, 78.73357	15 KM/Hr
57	Turn	Medium	14.84032, 78.78684	30 KM/Hr
58	Turn	Medium	14.85735, 78.80056	30 KM/Hr
59	Turn	Medium	14.97684, 78.97987	30 KM/Hr
60	Turn	Medium	15.06237, 79.01174	30 KM/Hr
61	Turn	High	15.89352, 79.29348	15 KM/Hr
62	Turn	High	15.90534, 79.32024	15 KM/Hr
63	Turn	Medium	16.05166, 79.30313	30 KM/Hr
64	Turn	High	16.12758, 79.33511	15 KM/Hr
65	Turn	Medium	16.15488, 79.31958	30 KM/Hr
66	Turn	High	16.16306, 79.29544	15 KM/Hr
67	Turn	Medium	16.18847, 79.28763	30 KM/Hr
68	Turn	High	16.22647, 79.30034	15 KM/Hr
69	Turn	High	16.23645, 79.29370	15 KM/Hr
70	Turn	Medium	16.30529, 79.32881	30 KM/Hr
71	Turn	Medium	16.34740, 79.36982	30 KM/Hr
72	Turn	High	16.35780, 79.40018	15 KM/Hr
73	Turn	Medium	16.36884, 79.40421	30 KM/Hr
74	Turn	Medium	16.42493, 79.39905	30 KM/Hr
75	Turn	Medium	16.47388, 79.44196	30 KM/Hr

	Risk Type	Risk Level	Coordinates	Speed Limit
76	Turn	High	16.46902, 79.47218	15 KM/Hr
77	Turn	Medium	16.54504, 79.52010	30 KM/Hr
78	Turn	Medium	16.55873, 79.54787	30 KM/Hr
79	Turn	Medium	16.55300, 79.57611	30 KM/Hr
80	Turn	High	16.59531, 79.72009	15 KM/Hr
81	Turn	High	16.68868, 79.65172	15 KM/Hr
82	Turn	Medium	16.71481, 79.64922	30 KM/Hr
83	Blind Spot	Blind Spot	16.73580, 79.62559	10 KM/Hr
84	Turn	High	16.73181, 79.62280	15 KM/Hr
85	Turn	Medium	16.71903, 79.58345	30 KM/Hr

## **Emergency Locations**

	type	name	coordinates	speed_limit	risk_level
4	clinic	Erode Cancer Centre	11.3732, 77.649152	30 km/h	Medium
5	hospital	Thanish Siddha Hospital	11.430003, 77.674964	30 km/h	Medium
6	clinic	Harshitha Clinic	11.4313207, 77.674718	30 km/h	Medium
7	hospital	Sri Kaalangi Siddhar Mooligai Vaithiya Nilayam	11.432369, 77.674894	30 km/h	Medium
8	clinic	G.K Clinic	11.4297244, 77.6749715	30 km/h	Medium
13	hospital	Sri Gokulam Speciality Hospital	11.6788724, 78.1274258	30 km/h	Medium
14	pharmacy	Healthy Pharmacy	11.6762714, 78.127744	30 km/h	Medium
15	pharmacy	Thulasi Pharmacy	11.6761991, 78.1277377	30 km/h	Medium
16	pharmacy	Salem Medicals	11.7343192, 78.0566844	30 km/h	Medium
19	hospital	Government Hospital	12.3048002, 78.2060881	30 km/h	Medium

	type	name	coordinates	speed_limit	risk_level
24	hospital	Government Hospital,V.Kota	13.000841, 78.489338	30 km/h	Medium
25	hospital	Moksha Surgical and Diabetic Care Hospital	13.0018791, 78.4858114	30 km/h	Medium
26	hospital	Kaamakshi Hospital	14.7250981, 78.7319562	30 km/h	Medium
27	hospital	Rangashimha Hospital	14.7265972, 78.7325262	30 km/h	Medium
30	hospital	Shaina Praja Vaidhyashala	16.0430097, 79.3062801	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
1	marketplace	Thekkalur Weekly market	11.1537037, 77.2126685	30 km/h	Medium
2	marketplace	Thekalur weekly market	11.1547211, 77.2140187	30 km/h	Medium
3	college	Government polytechnic college	11.2907053, 77.5698726	30 km/h	Medium
9	college	Vivekanandha Engineering College	11.4589312, 77.7899284	30 km/h	Medium
10	school	KRP Matric. Hr. Sec School	11.4546193, 77.8142445	30 km/h	Medium
11	school	DIET - Salem	11.6144158, 78.1025078	30 km/h	Medium
12	college	Sona College	11.6768, 78.1257052	30 km/h	Medium
17	school	John Britto Matriculation Higher Secondary School	11.7676907, 78.0513092	30 km/h	Medium
18	college	Laxminarayana Polytechnic College	12.0421277, 78.103203	30 km/h	Medium
20	school	Government Boys Higher secondary school	12.3047059, 78.2065495	30 km/h	Medium

	type	name	coordinates	speed_limit	risk_level
21	school	AP Model School (Govt)	12.6805954, 78.3390671	30 km/h	Medium
22	school	APMS Nadimur	12.6806744, 78.3394771	30 km/h	Medium
23	school	APMS Nadimur	12.6807313, 78.339014	30 km/h	Medium
28	school	Z P HS ONIPENTA	14.7976968, 78.7778189	30 km/h	Medium
29	school	Balikala Gurukula Patashala & Z P HS ONIPENTA, Vonipenta	14.7979458, 78.7772695	30 km/h	Medium
31	school	Gurukula Patasala Girls	16.0526843, 79.3037807	30 km/h	Medium

## **Route Photos of Risky Spots**



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

**Coordinates:** 14.44423, 78.80587



**Coordinates:** 14.50832, 78.79202



Risk Type: Roundabout
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 14.72743, 78.72222



**Coordinates:** 11.05288, 77.08013



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 11.15332, 77.21111



Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 11.17633, 77.25357



**Coordinates:** 11.17552, 77.28070



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 11.19154, 77.29068



**Coordinates:** 11.21621, 77.35657



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 11.19878, 77.41414



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

**Coordinates:** 11.25950, 77.55055



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

**Coordinates:** 11.27802, 77.55638



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 11.29108, 77.57201



**Coordinates:** 11.29241, 77.58804



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

**Coordinates:** 11.39320, 77.65138



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

**Coordinates:** 11.41212, 77.67226



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 11.43091, 77.67598



Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 11.45521, 77.81219



**Coordinates:** 11.49066, 77.85203



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 11.49794, 77.90753



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 11.61529, 78.10510



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 11.67829, 78.12807



Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 11.73649, 78.05462



**Coordinates:** 11.87437, 78.08256



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 11.91502, 78.05935



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

**Coordinates:** 11.93494, 78.06232



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 11.94134, 78.05028



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 12.28898, 78.19868



**Coordinates:** 12.42306, 78.22647



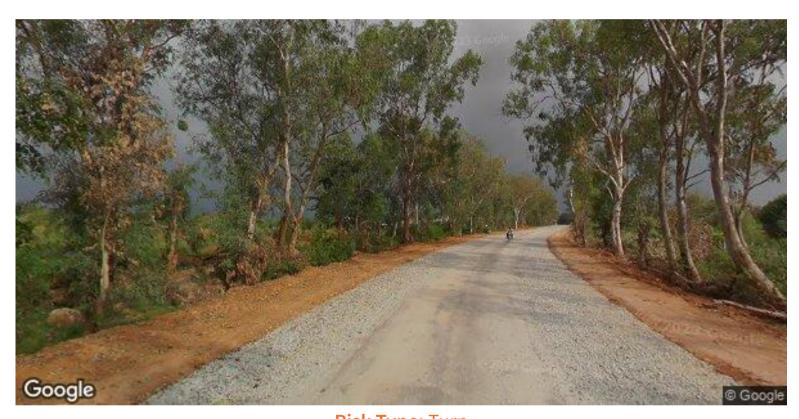
Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 12.62226, 78.32580



Risk Type. Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 13.09477, 78.60745



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 13.11725, 78.60215



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 13.16650, 78.60857



**Coordinates:** 13.18084, 78.60345



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 13.35638, 78.56407



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 13.37513, 78.56757



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 13.58066, 78.52137



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 13.57962, 78.49860



**Coordinates:** 13.63944, 78.48730



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 13.66976, 78.49040



Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 13.84957, 78.65683



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 13.88519, 78.64655



Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 14.03758, 78.73730



**Coordinates:** 14.05495, 78.73269



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 14.08974, 78.74772



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

**Coordinates:** 14.09597, 78.75634



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

**Coordinates:** 14.28238, 78.74725



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 14.43608, 78.80347



**Coordinates:** 14.49291, 78.78507



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

**Coordinates:** 14.72744, 78.72335



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

**Coordinates:** 14.72626, 78.73357



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 14.84032, 78.78684



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 14.85735, 78.80056



**Coordinates:** 14.97684, 78.97987



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 15.06237, 79.01174



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

**Coordinates:** 15.89352, 79.29348



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 15.90534, 79.32024



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 16.05166, 79.30313



**Coordinates:** 16.12758, 79.33511



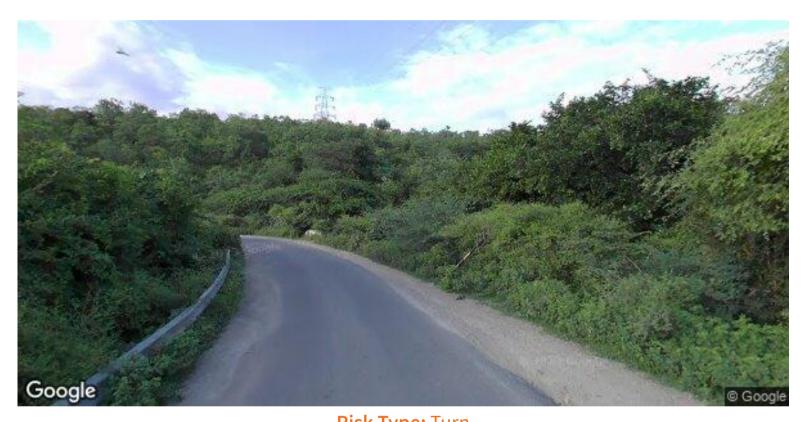
Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 16.15488, 79.31958



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 16.16306, 79.29544



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 16.18847, 79.28763



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 16.22647, 79.30034



**Coordinates:** 16.23645, 79.29370



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 16.30529, 79.32881



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

**Coordinates:** 16.34740, 79.36982



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 16.35780, 79.40018



Risk Type: Turn
Risk Level: Medium
Speed Limit: 30 KM/Hr
Coordinates: 16.42493, 79.39905



**Coordinates:** 16.47388, 79.44196



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

**Coordinates:** 16.46902, 79.47218



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

**Coordinates:** 16.59531, 79.72009



Risk Type: Turn
Risk Level: High
Speed Limit: 15 KM/Hr
Coordinates: 16.68868, 79.65172



Speed Limit: 30 KM/Hr Coordinates: 16.71481, 79.64922

Risk Level: Medium



**Coordinates:** 16.73181, 79.62280