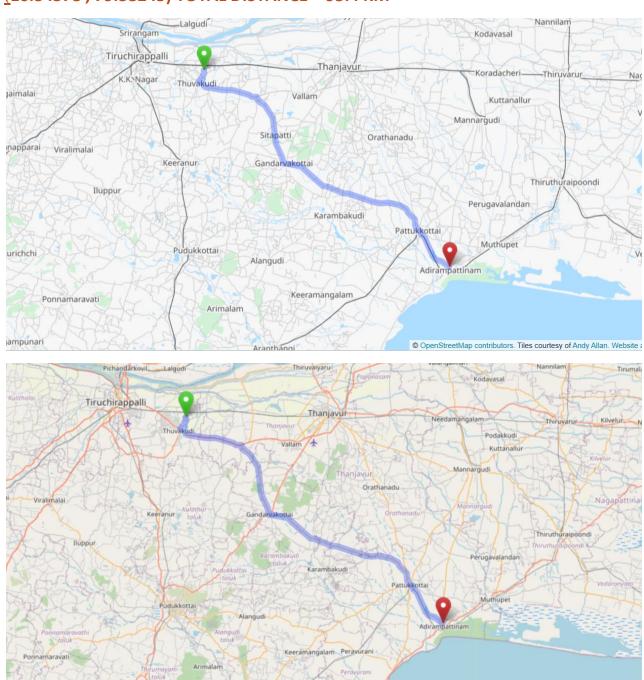


# WELCOME TO JOURNEY RISK MANAGEMENT (JRM) STUDY USING ARTIFICIAL INTELLIGENCE (AI) FOR IOCL TRICHY TERMINAL

# <u>IOCL TIRCHY TERMINAL (10.7753, 78.8368) TO CRESENT GASOLINE</u> (10.34578, 79.38245) TOTAL DISTANCE – 95.4 KM



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# Welcome to the Journey Risk Management Study for CRESENT GASOLINE

Total distance: 95.4 KM; Start with: (10.7753, 78.8368), End with: (10.34578, 79.38245)

# **Route Safety Analysis Report**

# 1. Overview of the Route Map

The route from Trichy Terminal (T.N) TO SRI SAKTHI SERVICE. The Route passes several key point including via NH 83 and Thanjavur - Kalayarkoil - Sayalkudi Rd/Thanjavur - Karaikudi - Kalaiyarkoil - Sayalkudi Rd/Thanjavur - Orathanadu - Pattukottai Rd/Thanjavur - Pattukkottai Rd.

Turn right onto Thanjavur - Kalayarkoil - Sayalkudi Rd/Thanjavur - Karaikudi - Kalaiyarkoil - Sayalkudi Rd/Thanjavur - Orathanadu - Pattukottai Rd/Thanjavur - Pattukkottai Rd, Continue on Pattukkottai Byepass Rd. Drive to MDR343 in Thuvarankurichi North, Thuvarankurichi, and Total distance from Trichy Terminal To CRESENT GASOLINE is 95.4 KM for heavy vehicles carrying hazardous materials.

# **Typical Weather Conditions and Potential Weather-Related Hazards**

**Weather Conditions:** Trichy Terminal (T.N) To CRESENT GASOLINE experiences a tropical climate with heavy monsoon rains from June to September, high humidity, and moderate temperatures throughout the year ,The summers are short and sweltering; the winters are short, cool, and dry; and it is mostly clear year-round. Over the course of the year, the temperature typically varies from 60.8°F to 110°F and is rarely below 60.8°F to 110°F.

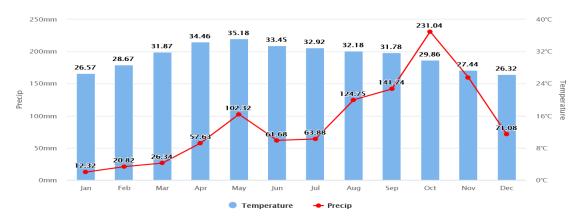
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Nov	Oct	Dec	Year
Record high °C (°F)	33.0	38.0	41.0	43.0	43.0	42.0	40.0	39.0	38.0	37.0	34.0	33.0	43.0
	(91.4)	(100.4)	(105.8)	(109.4)	(109.4)	(107.6)	(104.0)	(102.2)	(100.4)	(98.6)	(93.2)	(91.4)	(109.4)
Average high °C (°F)	30.27	32.88	36.0	38.27	38.79	36.78	36.17	35.4	35.03	32.9	30.38	29.34	34.35
	(86.49)	(91.18)	(96.8)	(100.89)	(101.82)	(98.2)	(97.11)	(95.72)	(95.05)	(91.22)	(86.68)	(84.81)	(93.83)
Daily mean °C (°F)	26.57	28.67	31.87	34.46	35.18	33.45	32.92	32.18	31.78	29.86	27.44	26.32	30.89
	(79.83)	(83.61)	(89.37)	(94.03)	(95.32)	(92.21)	(91.26)	(89.92)	(89.2)	(85.75)	(81.39)	(79.38)	(87.6)
Average low °C (°F)	19.88	20.93	24.04	27.62	28.89	27.59	27.04	26.45	25.95	24.64	22.43	20.93	24.7
	(67.78)	(69.67)	(75.27)	(81.72)	(84.0)	(81.66)	(80.67)	(79.61)	(78.71)	(76.35)	(72.37)	(69.67)	(76.46)
Record low °C (°F)	16.0	17.0	19.0	22.0	25.0	25.0	24.0	23.0	22.0	21.0	18.0	17.0	16.0
	(60.8)	(62.6)	(66.2)	(71.6)	(77.0)	(77.0)	(75.2)	(73.4)	(71.6)	(69.8)	(64.4)	(62.6)	(60.8)
Average precipitation mm (inches)	12.32 (0.49)	20.82 (0.82)	26.34 (1.04)	57.63 (2.27)	102.32 (4.03)	61.68 (2.43)	63.88 (2.51)	124.75 (4.91)	141.74 (5.58)	231.04 (9.1)	159.62 (6.28)	71.08 (2.8)	89.44 (3.52)
Average precipitation days (≥ 1.0 mm)	3.09	3.27	5.36	7.36	16.73	12.36	13.55	18.91	19.64	22.73	17.55	9.73	12.52
Average relative humidity (%)	72.01	65.19	58.27	53.97	51.56	50.59	51.14	56.11	60.33	70.18	77.39	76.61	61.95
Mean monthly sunshine hours	11.19	11.34	11.34	11.63	12.65	12.68	11.83	11.24	11.05	9.11	7.68	8.29	10.84

<u>Weather-Related Hazards:</u> Trichy Terminal (T.N) To CRESENT GASOLINE Providing a local hourly weather forecast of rain, sun, wind, humidity and temperature.

The Long-range 12 day forecast also includes detail for weather today. Live weather reports from Trichy Terminal (T.N) To CRESENT GASOLINE weather stations and weather warnings that include risk of thunder, high UV index and forecast gales.

# Climate Graph

The chart below shows the mean monthly temperature and precipitation of Tiruchirappalli in recent years.



# **Analysis of Traffic Patterns**

### **Peak Hours:**

Typically, Trichy Terminal (T.N) To CRESENT GASOLINE peak traffic hours are from 9:00 AM to 11:00 AM and 4:00 PM to 8:00 PM on weekdays.

# **Congestion-Prone Areas:**

- TIRUCHY PUBLIC SCHOOL
- Gnanam School of Business
- Ponnaiyah Ramajayam Institute of Science & Technology
- Blossom Bluebells Academy School (CBSE Syllabus)
- Dr.M.S. Swaminathan Agricultural College and Research Institute, ECK
- MMA School
- Sugalaya Varmakalai Treatment Center
- Meenakshi Chandrasekaran College of Arts and Science(women)

# \* Assessment of Road Quality and Infrastructure

**Road Quality:** Generally, the roads are well-maintained but can suffer from potholes and water logging on State Highway during the monsoon season.

**Infrastructure:** Adequate signage, street lighting, and traffic signals are present, but some areas may lack proper drainage systems, leading to water logging.

# Suggestions for Alternative Routes for Emergencies

**Alternative Route 1-** ). Via nh 83 and thanjavur - kalayarkoil - sayalkudi rd/thanjavur - karaikudi - kalaiyarkoil - sayalkudi rd/thanjavur - orathanadu - pattukottai rd/thanjavur - pattukkottai rd.

Turn right onto thanjavur - kalayarkoil - sayalkudi rd/thanjavur - karaikudi - kalaiyarkoil - sayalkudi rd/thanjavur - orathanadu - pattukottai rd/thanjavur - pattukkottai rd, continue on pattukkottai byepass rd. Drive to mdr343 in thuvarankurichi north, thuvarankurichi.

**Alternative Route 2 -)** via NH 83, Vallam Rd and Thanjavur - Kalayarkoil - Sayalkudi Rd/Thanjavur - Karaikudi - Kalaiyarkoil - Sayalkudi Rd/Thanjavur - Orathanadu - Pattukottai Rd/Thanjavur - Pattukkottai Rd,

# **Summary of Local Regulations Affecting Hazardous Material Transport**

Regulations: Transport of hazardous materials is regulated by the Petroleum and Explosives Safety Organization (PESO) and the Motor Vehicles Act. Specific routes and timings may be restricted for hazardous material transport.

Permits: Ensure all necessary permits and documentation are in place.

# Overview of Historical Incidents

Historical Incidents: There have been occasional incidents involving heavy vehicles, particularly during the monsoon season due to waterlogging and poor visibility. No major incidents involving hazardous materials have been reported recently.

### **\*** Environmental Considerations and Sensitive Areas

- Sensitive Areas: TIRUCHY PUBLIC SCHOOL, Wonder World Theme Park, Ponnaiyah Ramajayam Institute of Science & Technology ,Blossom Bluebells Academy School (CBSE Syllabus),Dr.M.S. Swaminathan Agricultural College and Research Institute, ECK MMA School.
- Educational institutions: Arasu Education Jcb Institute in Trichy, Chanakya share market training Institute, Adaikalamatha Institute of Teacher Education, National Institute of Food Technology, Entrepreneurship and.
- **Hospital:** Dr Kamali's Home Clinic, Meenakshi Hospital, Sivapreethi Hospital, Sugalaya Varmakalai Treatment Center.
- **Gas Station:** Jagdish filling station, Nayara Petrol Pump Nayara Petrol Pump,Indianoil S.Ashok kumar, BPCL Masiya Fuels,Gayatri Agency.

- **Environmental Impact:** Minimize noise and air pollution, especially in residential and sensitive areas.
- **Air pollution**: Volatile chemicals evaporate during the filling and discharge process, or from leaks.
- **Loss of habitats**: Oil and gas operations can degrade animal habitats and disrupt migratory pathways.
- **Oil spills**: Oil spills can be devastating for animals and humans.
- **Greenhouse gas emissions**: Oil and gas operations can emit greenhouse gases like methane.
- Analysis of Communication Coverage
- Communication Coverage: Generally good throughout the route, but potential dead zones may exist densely built-up areas or underpasses.
- Dead Zones: Monitor for any communication blackouts, especially in underpasses or near large buildings.
- Estimated Emergency Response Times:

TIRUCHY PUBLIC SCHOOL ,Wonder World Theme Park, Ponnaiyah Ramajayam Institute of Science & Technology, Blossom Bluebells Academy School (CBSE Syllabus),Dr.M.S. Swaminathan Agricultural College and Research Institute, ECK MMA School. areas like have quicker response times (15- 20 minutes). Congested areas may experience delays (up to 30-40 minutes).

- Overall Summary of Risk Assessment
- **Risk Level:** Moderate to High, especially during monsoon season.

- Key Risks: Waterlogging, traffic congestion, and potential communication dead zones.
- Mitigation Measures: Plan travel during non-peak hours, ensure proper vehicle maintenance, and have alternative routes and emergency contacts ready and control on the speed limit of the vehicle.
- Road Signage for TT/PT Driver

Road Traffic Signs in India

Mandatory/Regulatory Signs





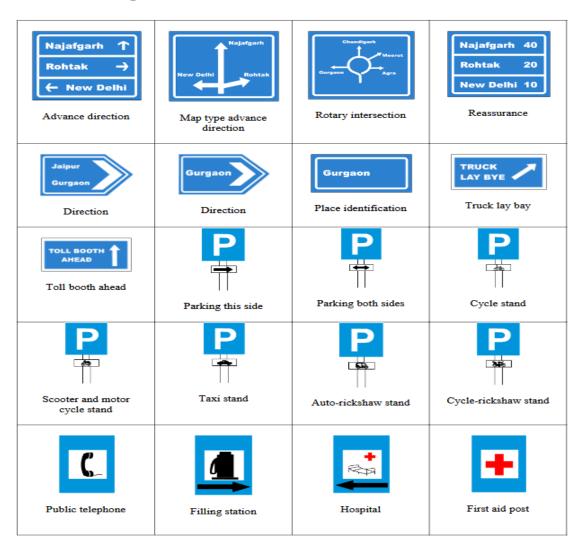


Restriction ands

# Cautionary signs



### Information signs



### **Conclusion**

The route for Trichy Terminal (T.N) To CRESENT GASOLINE is generally manageable but poses several risks, particularly during the monsoon season. Proper planning, adherence to regulations, and awareness of potential hazards can significantly mitigate these risks.

# • Risk Assessment - Sharp Turns

Risk Type	Risk Level	Coordination	Distance From Start	Recommendation Speed
Sharp turn	Medium	10.769517372474736,	650 M	20km/hr TO 30
		78.83735063199906		Km/Hr
Sharp turn	Medium	10.76584461192607,	1.1 KM	20km/hr TO 30
		78.8361700257199		Km/Hr
Sharp turn	Medium	10.764182189802032,	1.3 KM	20km/hr TO 30
		78.83459588401435		Km/Hr
Sharp turn	Medium	10.75826698538096,	2 KM	20km/hr TO 30
•		78.83349398474651		Km/Hr
Sharp turn	Medium	10.756372549032195,	2.4 KM	20km/hr TO 30
-		78.83034570133539		Km/Hr
Sharp turn	High	10.751346435623256,	3.2 KM	10km/hr TO 15
-		78.8252297405902		Km/Hr
Sharp turn	High	10.749451955814655,	3.8 KM	10km/hr TO 15
		78.83046376176118		Km/Hr
Sharp turn	Medium	10.739322086318483,	5.2 KM	20km/hr TO 30
-		78.83809834927386		Km/Hr
Sharp turn	Medium	10.73638358720799,	7.4 KM	20km/hr TO 30
		78.85765706064745		Km/Hr
Sharp turn	Medium	10.732981078965743,	9.4 KM	20km/hr TO 30
		78.87520874109956		Km/Hr
Sharp turn	Medium	10.732865083664377,	10.9 KM	20km/hr TO 30
		78.88929730997383		Km/Hr
Sharp turn	Medium	10.730622499591515,	12.9 KM	20km/hr TO 30
		78.90775412216747		Km/Hr
Sharp turn	Medium	10.720904924338443,	16.4 KM	20km/hr TO 30
		78.93805787452602		Km/Hr
Sharp turn	Medium	10.71823691532396,	17 KM	20km/hr TO 30
		78.94246547130157		Km/Hr
Sharp turn	Medium	10.71690507655357,	17.6 KM	20km/hr TO 30
_		78.94798176089265		Km/Hr
Sharp turn	Medium	10.717137481731783,	18.3 KM	20km/hr TO 30
		78.95400634061058		Km/Hr

Sharp turn	High	10.724822618517969,	20.9 KM	10km/hr TO 15
		78.9767159328364		Km/Hr
Sharp turn	Medium	10.729882461351261,	23.6 KM	20km/hr TO 30
		79.00023354091847		Km/Hr
Sharp turn	High	10.730894419758593,	25.8 KM	10km/hr TO 15
		79.01997459879757		Km/Hr
Sharp turn	High	10.730388440978299,	26.5 KM	10km/hr TO 15
		79.02701271508492		Km/Hr
Sharp turn	Medium	10.72785853437635,	27.5 KM	20km/hr TO 30
_		79.03593910647373		Km/Hr
Sharp turn	High	10.727084939556493,	30.8 KM	10km/hr TO 15
_		79.06554150725997		Km/Hr
Sharp turn	High	10.723822902909419,	31.3 KM	10km/hr TO 15
		79.06929459251997		Km/Hr
Sharp turn	High	10.72091540581739,	31.7 KM	10km/hr TO 15
		79.06756239932304		Km/Hr
Sharp turn	High	10.721908212843593,	32.1 KM	10km/hr TO 15
		79.07066591213419		Km/Hr
Sharp turn	High	10.715809489668976,	32.8 KM	10km/hr TO 15
		79.06922241780342		Km/Hr
Sharp turn	Medium	10.715242160336519,	33 KM	20km/hr TO 30
		79.07095461100035		Km/Hr
Sharp turn	Medium	10.703469836629056,	35.3 KM	20km/hr TO 30
		79.08798784468142		Km/Hr
Sharp turn	Medium	10.696448775454964,	36.7 KM	20km/hr TO 30
		79.09794795556375		Km/Hr
Sharp turn	Medium	10.695502569729664,	37.2 KM	20km/hr TO 30
		79.10318339482231		Km/Hr
Sharp turn	Medium	10.694130913553563,	37.5 KM	20km/hr TO 30
		79.10561105323868		Km/Hr
Sharp turn	High	10.681487529695021,	40.4 KM	10km/hr TO 15
		79.12824896855714		Km/Hr
Sharp turn	Medium	10.67695486776632,	41.2 KM	20km/hr TO 30
		79.1337718914544		Km/Hr
Sharp turn	Medium	10.67399171404084,	42 KM	20km/hr TO 30
		79.14020364483756		Km/Hr

Sharp turn	High	10.67005536178023,	43 KM	10km/hr TO 15
		79.14845768345319		Km/Hr
Sharp turn	High	10.654428733549738,	45.8 KM	10km/hr TO 15
		79.16836448268437		Km/Hr
Sharp turn	Medium	10.652221854896029,	46.6 KM	20km/hr TO 30
		79.17540469243615		Km/Hr
Sharp turn	Medium	10.650492128115856,	47.6 KM	20km/hr TO 30
		79.18469048587875		Km/Hr
Sharp turn	Medium	10.647688756813132,	48 KM	20km/hr TO 30
		79.1868753787529		Km/Hr
Sharp turn	Medium	10.646197591437373,	48.5 KM	20km/hr TO 30
		79.19094170660031		Km/Hr
Sharp turn	Medium	10.642678412119103,	50.2 KM	20km/hr TO 30
		79.2064180294603		Km/Hr
Sharp turn	Medium	10.644467830353127,	51.3 KM	20km/hr TO 30
		79.21588589728412		Km/Hr
Sharp turn	High	10.644987886203523,	51.6 KM	10km/hr TO 15
		79.21863195462178		Km/Hr
Sharp turn	Medium	10.644749298119521,	53.1 KM	20km/hr TO 30
		79.23222684175344		Km/Hr
Sharp turn	Medium	10.64528612104593,	53.7 KM	20km/hr TO 30
		79.23799253049232		Km/Hr
Sharp turn	Medium	10.634609131813274,	55.3 KM	20km/hr TO 30
		79.24782454730857		Km/Hr
Sharp turn	Medium	10.620710591849507,	56.9 KM	20km/hr TO 30
		79.24758178157975		Km/Hr
Sharp turn	Medium	10.614566400591388,	57.6 KM	20km/hr TO 30
		79.2504949716794		Km/Hr
Sharp turn	High	10.612955766919104,	58.1 KM	10km/hr TO 15
		79.25480406536846		Km/Hr
Sharp turn	Medium	10.613194379850361,	58.4 KM	20km/hr TO 30
		79.25765656400769		Km/Hr
Sharp turn	Medium	10.606356045215447,	59.3 KM	20km/hr TO 30
		79.26178068181336		Km/Hr
Sharp turn	Medium	10.604864678000341,	59.5 KM	20km/hr TO 30
		79.2614165330509		Km/Hr

Sharp turn	Medium	10.599674663282858,	60.2 KM	20km/hr TO 30
		79.26590770124272		Km/Hr
Sharp turn	Medium	10.587623945432698,	61.6 KM	20km/hr TO 30
		79.26687876460927		Km/Hr
Sharp turn	High	10.577564156151789,	62.8 KM	10km/hr TO 15
		79.26661048804998		Km/Hr
Sharp turn	Medium	10.564071436487005,	64.3 KM	20km/hr TO 30
		79.27114295850889		Km/Hr
Sharp turn	High	10.544242460468135,	66.8 KM	10km/hr TO 15
		79.28135681019415		Km/Hr
Sharp turn	Medium	10.544242460468135,	67.9 KM	20km/hr TO 30
		79.29105567776085		Km/Hr
Sharp turn	Medium	10.545339415945685,	68.5 KM	20km/hr TO 30
		79.29697799512458		Km/Hr
Sharp turn	High	10.550064717918724,	69.7 KM	10km/hr TO 15
1		79.30650520131842		Km/Hr
Sharp turn	High	10.491257310473884,	73. 0 KM	10km/hr TO 15
1		79.29853818515302		Km/Hr
Sharp turn	Medium	10.443654406078956,	78.4 KM	20km/hr TO 30
_		79.30643460821467		Km/Hr
Sharp turn	Medium	10.436668211144855,	79.8 KM	20km/hr TO 30
		79.31575965524249		Km/Hr
Sharp turn	Medium	10.435486459356914,	81.7 KM	20km/hr TO 30
		79.33275413115581		Km/Hr
Sharp turn	Medium	10.405772368895503,	85.9 KM	20km/hr TO 30
		79.35678672335646		Km/Hr
Sharp turn	Medium	10.400211890654985,	88.7 KM	20km/hr TO 30
		79.38070154422705		Km/Hr
Sharp turn	Medium	10.399659725764273,	88.9 KM	20km/hr TO 30
_		79.38391676381121		Km/Hr
Sharp turn	Medium	10.399699418095079,	89.4 KM	20km/hr TO 30
		79.38429476456191		Km/Hr
Sharp turn	Medium	10.379128007985434,	91.7 KM	20km/hr TO 30
		79.3812502772453		Km/Hr
Sharp turn	Medium	10.351881845292787,	94.7 KM	20km/hr TO 30
		79.38091338507228		Km/Hr

Sharp turn	Medium	10.345905447856165,	95.4 KM	20km/hr TO 30
		79.38210395036621		Km/Hr

# • Risk Assessment - Elevation Changes

Risk Type	Specific Risk	Risk Level	Coordination	Elevation Change	Gradient	Recommen dation Speed
Elevation Change	Descent	Low	10.7753, 78.8368	-3.02m	-2.96 %	40 km/hr to 50 km/hr
Elevation Change	Descent	Low	10.993921 , 78.326323	-9.28m	-6.28%	40 km/hr to 50 km/hr

<u>IOCL TIRCHY TERMINAL (10.7753, 78.8368) TO CRESENT GASOLINE</u> (10.34578, 79.38245) TOTAL DISTANCE – 95.4 KM



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.769073692604486, 78.83720120889187



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.764113439530249, 78.83446118711721



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.758209570013967, 78.83344387884853



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.751314343624747, 78.82530656733346



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.75126610223314, 78.82518044583597



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.749591316479634, 78.83018387464983



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.739318685033433, 78.8379420178455



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.735064036857814, 78.86553394452655



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.72580557887016, 79.0641504304304



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.721070762434657, 79.06770763454654



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.721721269051843, 79.07032492179873



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.715856047911897, 79.06925965827192



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.645338366462365, 79.2350894341454



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.61312680226564, 79.255443411729



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.605700689381077, 79.26145932867404



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.544054693387439, 79.28156554890528



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.435606920027084, 79.3310542197561



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.40562615771467, 79.35654026186128



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.399626375296966, 79.38421524642045



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.379554041168255, 79.38133900343172



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.365776983730507, 79.37964464828721



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.34591002745786, 79.38208861501654



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI: 10.3459581911971, 79.38239966847858