

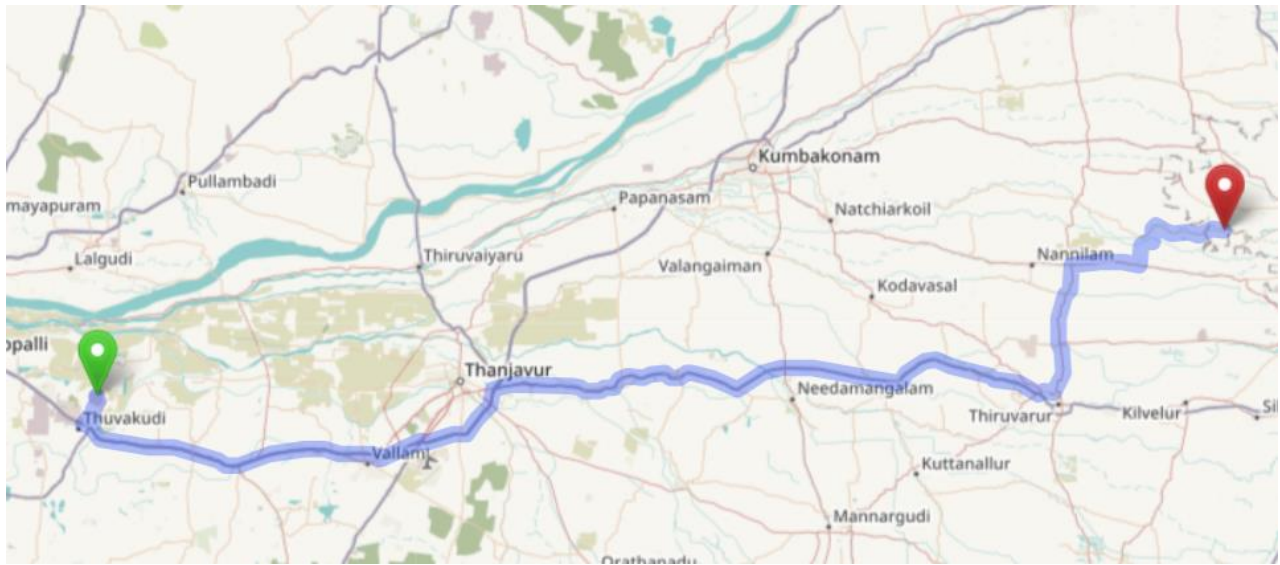
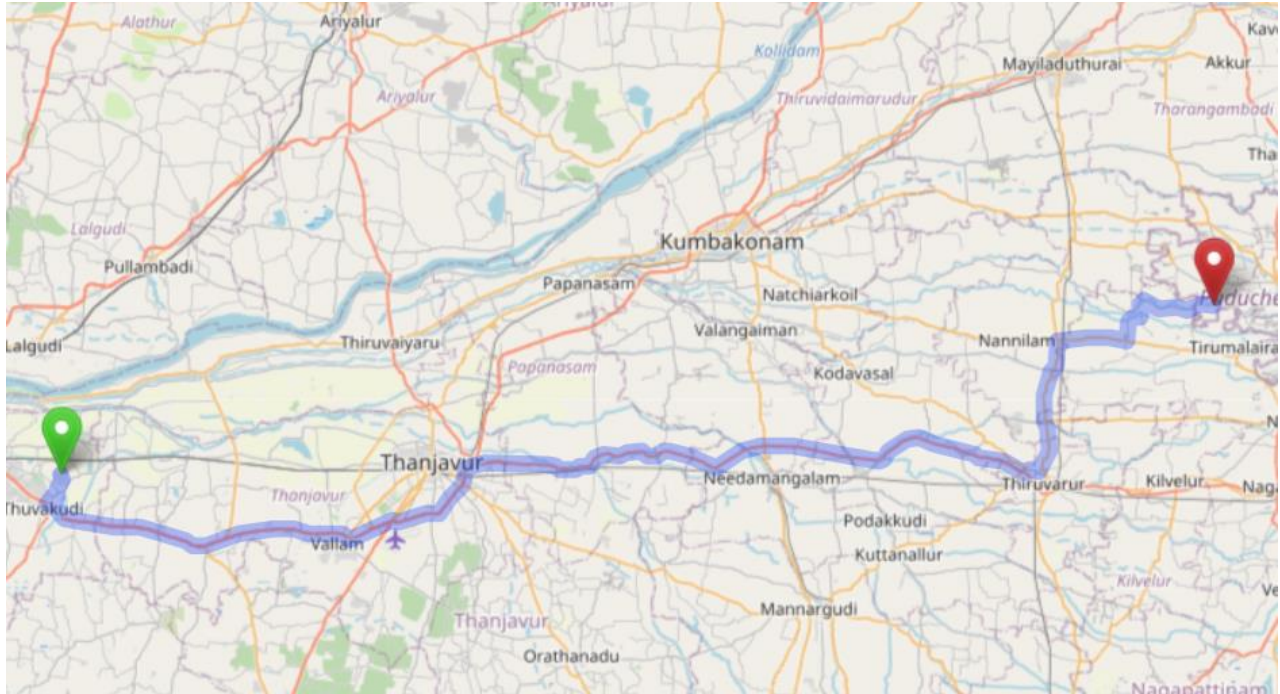


**IndianOil**

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

## JOURNEY RISK MANAGEMENT STUDY REPORT

**IOCL TIRCHY TERMINAL (10.7753, 78.8368) TO  
BHUVANESWARIPETROLEUM(10.908316 , 79.772667), TOTAL  
DISTANCE -129KM**



**Welcome to the Journey Risk Management Study  
for BHUVANESWARI PETROLEUM**

**Total distance: 68.2 km; Start with: (10.7753, 78.8368), End with: (10.908316 , 79.772667)**

## ❖ Route Safety Analysis Report

### 1. Overview of the Route Map

The route from Trichy Terminal (T.N) To BHUVANESWARI PETROLEUM. The route passes through several key points including **Thuakudi, Thircy – Tanjore Road, Thanjavur Road, Thircy - Thanjavur Road, Coimbatore – Nagapattinam Highway, Pudukkottai – Tanjore Road, and Alangudi – Pudhupati – Karambakudi Road**.and Total distance from Trichy Terminal To BHUVANESWARI PETROLEUMis 129km for heavy vehicles carrying hazardous materials.

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

**Weather Conditions:** Trichy Terminal (T.N) To BHUVANESWARIPETROLEUMexperiences 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 (91.4)	38.0 (100.4)	41.0 (105.8)	43.0 (109.4)	43.0 (109.4)	42.0 (107.6)	40.0 (104.0)	39.0 (102.2)	38.0 (100.4)	37.0 (98.6)	34.0 (93.2)	33.0 (91.4)	43.0 (109.4)
Average high °C (°F)	30.27 (86.49)	32.88 (91.18)	36.0 (96.8)	38.27 (100.89)	38.79 (101.82)	36.78 (98.2)	36.17 (97.11)	35.4 (95.72)	35.03 (95.05)	32.9 (91.22)	30.38 (86.68)	29.34 (84.81)	34.35 (93.83)
Daily mean °C (°F)	26.57 (79.83)	28.67 (83.61)	31.87 (89.37)	34.46 (94.03)	35.18 (95.32)	33.45 (92.21)	32.92 (91.26)	32.18 (89.92)	31.78 (89.2)	29.86 (85.75)	27.44 (81.39)	26.32 (79.38)	30.89 (87.6)
Average low °C (°F)	19.88 (67.78)	20.93 (69.67)	24.04 (75.27)	27.62 (81.72)	28.89 (84.0)	27.59 (81.66)	27.04 (80.67)	26.45 (79.61)	25.95 (78.71)	24.64 (76.35)	22.43 (72.37)	20.93 (69.67)	24.7 (76.46)
Record low °C (°F)	16.0 (60.8)	17.0 (62.6)	19.0 (66.2)	22.0 (71.6)	25.0 (77.0)	25.0 (77.0)	24.0 (75.2)	23.0 (73.4)	22.0 (71.6)	21.0 (69.8)	18.0 (64.4)	17.0 (62.6)	16.0 (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

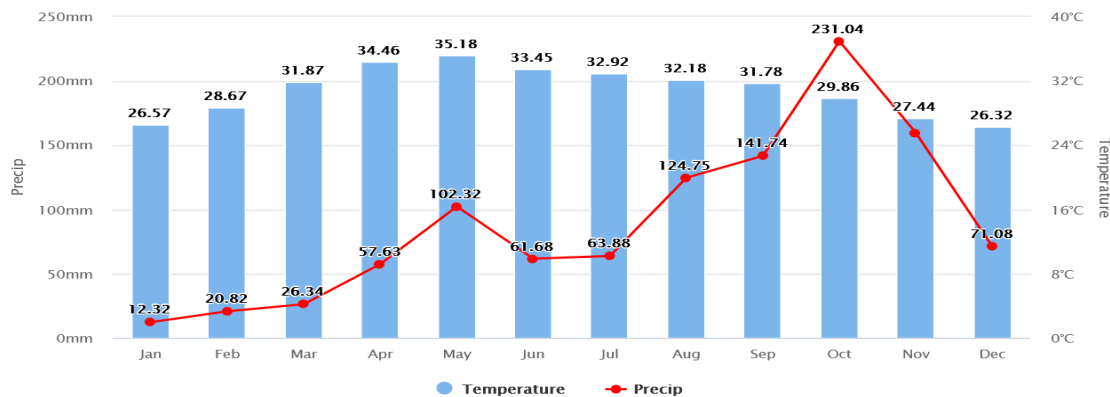
**Weather-Related Hazards:** Trichy Terminal (T.N) To BHUVANESWARIPETROLEUMProviding a local hourly weather forecast of rain, sun, wind, humidity and temperature.

## JOURNEY RISK MANAGEMENT STUDY REPORT

The Long-range 12 day forecast also includes detail for weather today. Live weather reports from Trichy Terminal (T.N) To BHUVANESWARIPETROLEUM 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 BHUVANESWARIPETROLEUM peak traffic hours are from 8:00 AM to 11:00 AM and 5:00 PM to 8:00 PM on weekdays.

### Congestion-Prone Areas:

- **Palpannai to Thuvakudi Section on Trichy-Thanjavur NH (NH83):** This stretch often experiences traffic congestion due to inadequate service
- **Thuvakudi Town:** Located along NH83, Thuvakudi can have slow-moving traffic, especially during peak hours, due to local crossings and market areas.
- **Thanjavur City Entrances:** Approaching Thanjavur, especially near key junctions, can be congested due to urban traffic and local activities.
- **Thanjavur Bypass Intersections:** Intersections on the bypass can experience delays due to merging traffic and signal controls.
- **Pudukkottai Road Junctions:** Areas where Pudukkottai Road intersects with other major roads can have traffic build-ups, particularly during school and office hours.



## JOURNEY RISK MANAGEMENT STUDY REPORT

- **Alangudi Town Center:** Narrow roads and local traffic in Alangudi can cause slowdowns, especially during market days.
- **Pudhupatti Village Areas:** Local vehicular and pedestrian traffic can lead to minor delays in this region.
- **Karambakudi Bus Stand Area:** The bus stand in Karambakudi has been reported to be in a dilapidated state, leading to congestion and potential safety hazards for vehicles passing through this area.
- **Rural Marketplaces:** Occasional roadside markets in villages along the route can cause temporary traffic slowdowns.
- **Agricultural Crossings:** Farm vehicles entering or exiting fields adjacent to the road may lead to brief traffic interruptions.

Thiru Muthiah Physio Clinic

### ❖ Assessment of Road Quality and Infrastructure

**Road Quality:** Generally, the roads are well-maintained but can suffer from potholes and waterlogging 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 waterlogging.

### ❖ Suggestions for Alternative Routes for Emergencies

#### **Alternative Route 1:**

From Trichy, take **National Highway 38 (NH38)** towards **Pudukkottai**. From Pudukkottai, proceed on **State Highway 71 (SH71)** towards **Alangudi**, and then continue to **Karambakudi**, leading to your destination.

#### **Alternative Route 2 :**

Start on **NH83** from Trichy towards **Thanjavur**. From Thanjavur, take **State Highway 99 (SH99)** towards **Pudukkottai**, then proceed on **SH71** to **Alangudi** and **Karambakudi**.

## JOURNEY RISK MANAGEMENT STUDY REPORT

### 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:** The route from **Trichy Terminal (T.N)** to **Bhuvaneswari Petroleum** passes through several sensitive areas, including **residential zones** like **Thuvakudi Town** and **Alangudi Town Center**, and **educational institutions** in **Thuvakudi**. It also includes **healthcare facilities** in **Thanjavur**, **market areas** such as **Thanjavur Market** and **Alangudi Market**, and **religious sites** like **temples in Thanjavur**.
- **Educational institutions:** - several educational institutions, including **National Institute of Technology (NIT), Tiruchirappalli, M.A.M. Polytechnic College, Government Arts College, Thuvakudi, Periyar Maniammai Institute of Science & Technology**, and **SASTRA Deemed University** in Thanjavur. Special care should be taken while passing these areas to ensure the safety of students and staff..
- **Hospital:** - several notable hospitals are situated, including **Annal Gandhi Memorial Government Hospital** in Trichy, **GVN Hospital** in Trichy, **Kauvery Hospital** in Trichy, and **Apollo Speciality Hospitals** in Trichy.
- **Gas Station:** - notable gas stations include the **IndianOil-Adani Gas Pvt Ltd CNG Station** located at Ms Asgl Sons No 2, Dindigul Road, Trichy, Tiruchirappalli, Tamil Nadu, 620001, and the **Adani Gas CNG Station** situated on NH-38, Chennai Trichy Highway, Alathur, Perambalur District, Tamil Nadu, 621109 These stations provide refueling options for vehicles traveling along this route..

## JOURNEY RISK MANAGEMENT STUDY REPORT

**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**

Vizhithiyur, Ervadi, Kailasanadhar Temple, Bus stop, Vacation rentals are also available for your dates, Geetan Residence A/C, Chandrodayam Residency - Hotels in Thirunallar, RUKMANI HOSPITAL, TMC Hospital TIRUVARUR MEDICAL CENTRE (P) LTD, 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**

# JOURNEY RISK MANAGEMENT STUDY REPORT














## Road Traffic Signs in India

### Mandatory/Regulatory Signs

 Stop	 Give way	 No entry	 Straight prohibited
 One way	 One way	 Vehicles prohibited in both directions	 Horn prohibited
 Pedestrians prohibited	 Cycles prohibited	 Right turn prohibited	 Left turn prohibited
 U-turn prohibited	 Overtaking prohibited	 Trucks prohibited	 Tonga prohibited



## JOURNEY RISK MANAGEMENT STUDY REPORT

 <p>All motor vehicles prohibited</p>	 <p>Hand cart prohibited</p>	 <p>Bullock cart prohibited</p>	 <p>Bullock and hand carts prohibited</p>
 <p>No parking</p>	 <p>No parking or stopping</p>	 <p>Speed limit</p>	 <p>Axle load limit</p>
 <p>Width limit</p>	 <p>Weight limit</p>	 <p>Length limit</p>	 <p>Load limit</p>
 <p>Restriction and</p>			





















## JOURNEY RISK MANAGEMENT STUDY REPORT

### Cautionary signs

			
Right hand curve	Left hand curve	Right hand pin bend	Left hand pin bend
			
Right reverse bend	Narrow bridge	Gap in median	Cycle crossing
			
Pedestrian crossing	School	Men at work	Roundabout
			
Narrow road	Road widens	Side road left	Side road right

## JOURNEY RISK MANAGEMENT STUDY REPORT

### Information signs

			
Advance direction	Map type advance direction	Rotary intersection	Reassurance
			
Direction	Direction	Place identification	Truck lay bay
			
Toll booth ahead	Parking this side	Parking both sides	Cycle stand
			
Scooter and motor cycle stand	Taxi stand	Auto-rickshaw stand	Cycle-rickshaw stand
			
Public telephone	Filling station	Hospital	First aid post

### Conclusion

The route for Trichy Terminal (T.N) To BHUVANESWARIPETROLEUM 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.

## JOURNEY RISK MANAGEMENT STUDY REPORT

### ❖ Risk Assessment - Sharp Turns

<b>Risk Type</b>	<b>Risk Level</b>	<b>Coordination</b>	<b>Distance From Start</b>	<b>Recommendation Speed</b>
Sharp turn	Medium	10.767642136666634, 78.83656246650979	800 M	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.766104870899234, 78.83837435596118	1.2 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.760926654829381, 78.83788020429262	1.8 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.762383037090828, 78.84026860402399	2.2 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.76359668360023, 78.84166870041824	2.4 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.769341210757451, 78.84306879681247	3.1 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.772243516599755, 78.84851713757425	3.7 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.771806352815046, 78.84985215372419	3.9 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.774575046066431, 78.85893768030019	5 KM	20km/hr TO 30 Km/Hr
Sharp turn	High	10.775303645322287, 78.86501942053881	5.6 KM	10km/hr TO 20 Km/Hr
Sharp turn	Medium	10.750639580707837, 78.85771391563857	8.6 KM	20km/hr TO 30 Km/Hr
Sharp turn	High	10.749182260982312, 78.85949393727076	8.8 KM	10km/hr TO 20 Km/Hr
Sharp turn	Medium	10.736685457214278, 78.85534055382843	10.3 KM	10 km/hr TO 20 Km/Hr
Sharp turn	Medium	10.726305780740544, 79.06592867791738	34 KM	10km/hr TO 20 Km/Hr
Sharp turn	Medium	10.73782802147338, 79.10574308998895	38.8 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.772507313235941, 79.13248148867956	43.8 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.782875761512738, 79.19856520362217	51.2 KM	20km/hr TO 30 Km/Hr

## JOURNEY RISK MANAGEMENT STUDY REPORT

Sharp turn	Medium	10.77982286650421, 79.25890250910265	58 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.788232653159202, 79.28751728550245	61.6 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.78909665903812, 79.31314158358069	64.6 KM	20km/hr TO 30 Km/Hr
Sharp turn	High	10.788290253669349, 79.34656458078109	68.5 KM	20km/hr TO 30 Km/Hr
Sharp turn	High	10.802056448537193, 79.35823331092269	71.3 KM	20km/hr TO 30 Km/Hr
Sharp turn	High	10.787541446746475, 79.35665011638086	72.9 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.78731104424123, 79.35999241596916	73.3 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.780744498560757, 79.36667701589302	74.7 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.786043827134852, 79.50306629973606	90.1 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.361143177391408, 78.98166916302662	94.8 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.813287814049456, 79.54288071198695	96.2 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.81443972517275, 79.55636718400989	98 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.824691539435612, 79.55748128421752	99.2 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.815879608022687, 79.5744273299561	101 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.81547644149445, 79.63628919286766	109 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.88089749205389, 79.64907202348363	117 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.880839909679409, 79.70266609301248	123 KM	20km/hr TO 30 Km/Hr

### ❖ Risk Assessment - Elevation Changes



## JOURNEY RISK MANAGEMENT STUDY REPORT

Risk Type	Specific Risk	Risk Level	Coordination	Elevation Change	Gradient	Recommendation Speed
Elevation Change	Descent	Low	10.7753, 78.8368	-3.02m	-2.96 %	40 km/hr to 50 km/hr
Elevation Change	Descent	Low	10.908316 , 79.772667	-9.28m	-6.28%	40 km/hr to 50 km/hr

❖ **SHARP TURN PICTURE FOR TRICHY TERMINAL TO BHUVANESWARI PETROLEUM**

## JOURNEY RISK MANAGEMENT STUDY REPORT



**SHARP TURN IMAGE START FROM TRICY TERMINAL**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.77449127868486, 78.86474760654163**

## JOURNEY RISK MANAGEMENT STUDY REPORT



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.738967181449123, 78.83848389752976**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.758284345025109, 78.83341546678423**



## JOURNEY RISK MANAGEMENT STUDY REPORT



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.726433136936237, 79.06611613176774**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.780145134251104, 79.16752742804024**

## JOURNEY RISK MANAGEMENT STUDY REPORT



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.780741041420981, 79.25899562106135**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.792236353319069, 79.3099673841393**



## JOURNEY RISK MANAGEMENT STUDY REPORT



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.779723228989928, 79.36749148756599**

## JOURNEY RISK MANAGEMENT STUDY REPORT



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.785829243209065, 79.50313703978875**

## JOURNEY RISK MANAGEMENT STUDY REPORT



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.801548739564168, 79.53931504980483**



## JOURNEY RISK MANAGEMENT STUDY REPORT



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.81291295352307, 79.54300963860157**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.8129906953137, 79.54480077932249**

## JOURNEY RISK MANAGEMENT STUDY REPORT



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.815296043226946, 79.54533570675646



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.814683837212568, 79.5561476002278



## JOURNEY RISK MANAGEMENT STUDY REPORT



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.822932552328032, 79.55649974825202**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.821755643904002, 79.56547473869614**

## JOURNEY RISK MANAGEMENT STUDY REPORT



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.81586786901618, 79.5745610464662**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.815179989345905, 79.63634730583023**



## JOURNEY RISK MANAGEMENT STUDY REPORT



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.88025499794623, 79.70695292317274**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.907788357736262, 79.72780423383308**