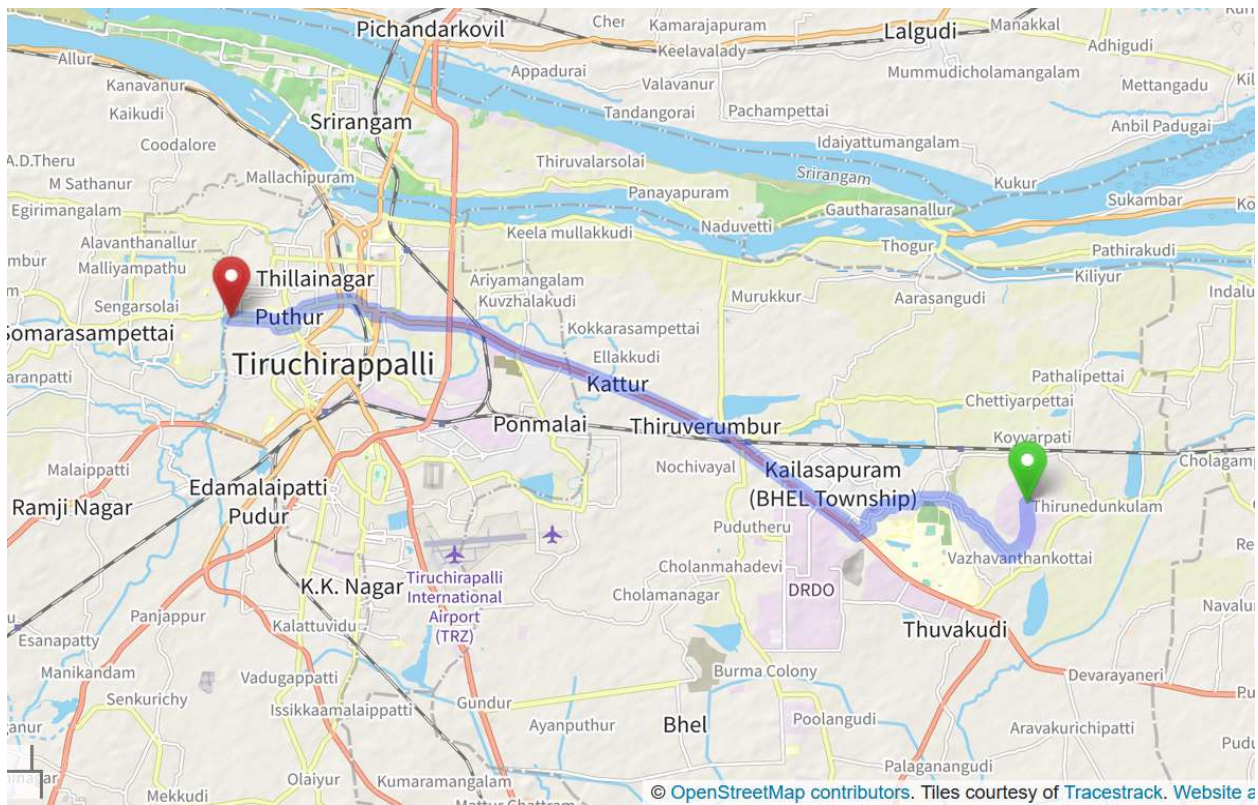
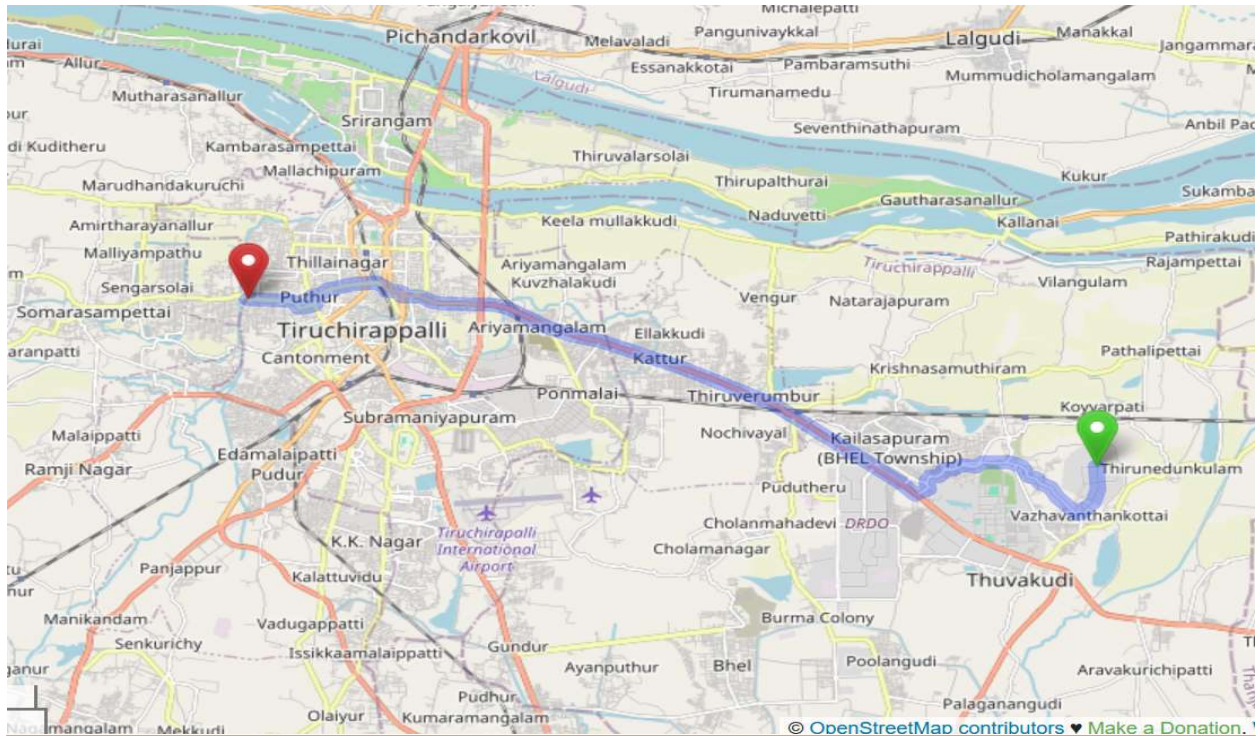




**IndianOil**

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

**IOCL TIRCHY TERMINAL (10.7753, 78.8368) TO BALAJI AGENIES (10.8144, 78.6647), TOTAL DISTANCE -66.3 KM**





## Welcome to the Journey Risk Management Study for Balaji Agency

**Total distance: 39.8 km; Start with: (10.7753, 78.8368), End with: (10.8144, 78.6647)**

### ❖ Route Safety Analysis Report

#### 1. Overview of the Route Map

The route from Trichy Terminal (T.N) To Balaji Agency. The route passes through several key points including SIDCO to Indian oil Storage, huvakudi to SIDCO& Indian oil Storage, NH 83,NSTC TRICHY RE CONDITIONING UNIT, NH38/NH83, rand Southern Trunk Rd/Nagapattinam - Coimbatore - Gundlupet Hwy/Ponmalai Service Rd/Vadakkadu - Alangudi Rdagapattinam - Coimbatore - Gundlupet Hwy/Pudukottai Main Rd, harathidasan Salai/Promenade Road, EVR Rd, Allithurai Rd/Vayalur Rd and Total distance from Trichy Terminal To Balaji Agency is 39.8 km for heavy vehicles carrying hazardous materials.

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

**Weather Conditions:** Trichy Terminal (T.N) To Balaji Agency 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 56.8°F to 108°F and is rarely below 56.8°F to 108°F.

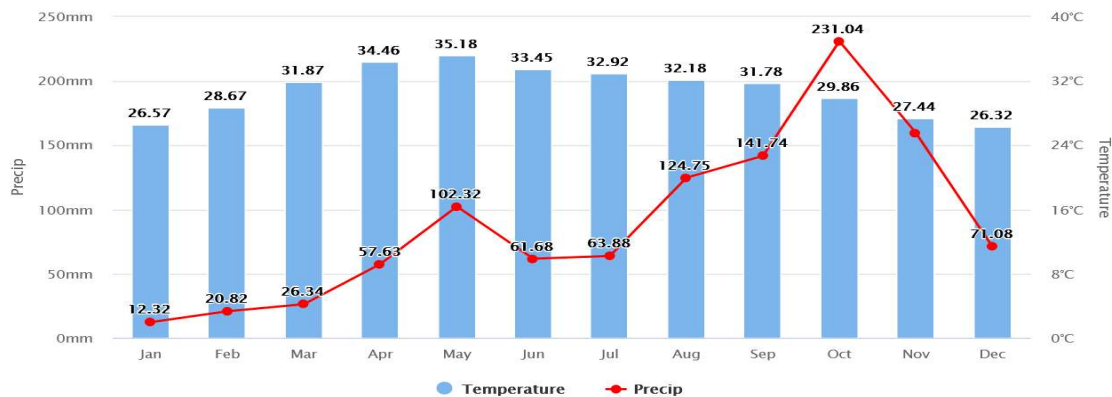
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Nov	Oct	Dec	Year
Record high °C (°F)	33.0 (91.4)	38.0 (100.4)	41.0 (105.8)	43.0 (109.4)	43.0 (109.4)	42.0 (107.6)	40.0 (104.0)	39.0 (102.2)	38.0 (100.4)	37.0 (98.6)	34.0 (93.2)	33.0 (91.4)	43.0 (109.4)
Average high °C (°F)	30.27 (86.49)	32.88 (91.18)	36.0 (96.8)	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 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 Balaji Agency 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 Balaji Agency peak traffic hours are from 8:00 AM to 12:00 AM and 5:30 PM to 9:30 PM on weekdays.

### **Congestion-Prone Areas:**

- M. J. Agencies
- Jude Digital Studios
- Reliance Smart Point
- Karur Vysya Bank
- AK Thangamaligai Manapparai
- Thirumalai Tea Stall
- RPG Garden

### ❖ **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:** NH 83, Outer Ring Rd/Trichy Bypass, NH336, Nagapattinam - Coimbatore - Gundlupet Hwy/Pudukottai Main Rd

**Alternative Route 2:** Bharathidasan Salai/EVR Rd, Allithurai Rd/Vayalur 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:** M. J. Agencies, Jude Digital Studios, Reliance Smart Point, Thirumalai Tea Stall, Karur Vysya Bank, AK Thangamaligai Manapparai
- **Educational institutions:** - Trichy School, Sacred Heart School, State Institute Of Hotel Management and Catering Technology, Sneha Girls Hostel, JRS Industrial Technology Training, Jamal Mohamad College

- **Hospital:** - Government Hospital Alangudi, Noble Hospital, MGM Healthcare, Cauvery nagar hospital quarters, Ozone Hospitals, Chirag Hospital And Institute Of Proctology
- **Gas Station:** -Bharat Petroleum, Reliance Petrol Pump, R.M Traders, M/S R.K Agencies, Ranjith Petrol Pump, GTN Indian Oil, Nayara Petrol Pump, Amuthusurabhi Agencies Indian oil petrol pump, KR Fuels IRM CNG Station.

**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**

Indian oil Storage, Sacred Heart School, Tiruchirappalli , Ram Krishna Nagar 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.








## JOURNEY RISK MANAGEMENT STUDY

- **Key Risks:** Waterlogging, traffic congestion, and potential communication dead zones and State Highway.
- **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

			
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

 <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>			

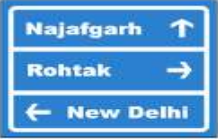


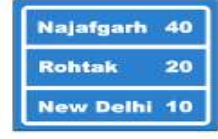


















## Cautionary signs

			
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

### 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 Balaji Agencies 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**

<b>Risk Type</b>	<b>Risk Level</b>	<b>Coordination</b>	<b>Distance From Start</b>	<b>Recommendation Speed</b>
Sharp turn	Medium	10.769008535749057, 78.83723765484662	300 M	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.765497799294907, 78.83604620042777	700 M	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.764009578128617, 78.83419636244746	950 M	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.758028485487644, 78.8334001457567	1.6 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.74954217373084, 78.83173987930641	3.8 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.707703218673851, 78.80907089120686	9. 2 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.691366660881561, 78.79250244301613	11.7 KM	20km/hr TO 30 Km/Hr
Sharp turn	High	10.701660390963093, 78.73110013816326	18.6 KM	10km/hr TO 20 Km/Hr
Sharp turn	Medium	10.731958248248086, 78.71747005611415	22.2 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.74150326450818, 78.71552902133438	23.4 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.787930307505306, 78.69628872536427	29.4 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.801095135803841, 78.68989682727627	30.8 KM	10km/hr TO 20 Km/Hr
Sharp turn	Medium	10.809015513957517, 78.68076157538997	32.2 KM	10 km/hr TO 20 Km/Hr
Sharp turn	Medium	10.813978570101114, 78.67443319534608	33.3 KM	10km/hr TO 20 Km/Hr



## JOURNEY RISK MANAGEMENT STUDY

### ❖ Risk Assessment - Elevation Changes

Risk Type	Specific Risk	Risk Level	Coordination	Elevation Change	Gradient	Recommendation Speed
Elevation Change	Descent	Low	<u>10.7753, 78.8368</u>	-3.02m	-2.96 %	40 km/hr to 50 km/hr
Elevation Change	Descent	Low	<u>10.8144, 78.6647</u>	-9.28m	-6.28%	40 km/hr to 50 km/hr

### ❖ Risk Assessment – Key Location:

Sr No	Location	Lat, Lon.
1	Hall/Hotel	10.757627679523425, 78.83287045929539
2	OLD Burma Colony	10.75810448259808, 78.83342945889828
3	School/College	10.751940259658717, 78.824855152166
4	School/College	10.751244043943656, 78.82964545444308
5	Bank	10.749935829138195, 78.8268757083185
6	Toll Plaza	10.739223590189045, 78.82491390378034
7	Hotel/Restaurant	10.701444574062581, 78.73129207330703
8	School/College	10.703678000471413, 78.73189375630369
9	Hostel	10.72417231487581, 78.68718618406425
10	BPC Retail Outlet	10.758181036689974, 78.65598357301882
11	School/College	10.74008121723329, 78.6379129330532
12	IOCL Retail Outlet	10.733112284745776, 78.63240994992489

## JOURNEY RISK MANAGEMENT STUDY

13	School/College	10.751575145484235, 78.614060731372
14	School/College	10.75066744861209, 78.59905450362704
15	Temple	10.746887750005037, 78.59479570906672
16	School/College	10.720295382587906, 78.55149351755783
17	IOCL Retail Outlet	10.710207607228426, 78.53753206431443
18	IOCL LPG Bottling Plant	10.707624098893909, 78.53612845795988
19	ESSAR Petrol Pump	10.676876960685677, 78.5083325274308
20	Dairy	10.655209313280023, 78.47786068494291
21	Bank	10.638480473093344, 78.44810155282683
22	IOCL Retail Outlet	10.635808318189218, 78.4456274984975
23	BPCL Retail Outlet	10.607172101131809, 78.41180072584812
24	Residency	10.605861306601657, 78.41756933692223
25	Hospital	10.604756406613477, 78.41842529840494

## JOURNEY RISK MANAGEMENT STUDY

### SHARP TURN IMAGE

Total distance: 39.8 km; Start with: (10.7753, 78.8368), End with: (10.8144, 78.6647)



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.769008535749057, 78.83723765484662



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.764009578128617,  
78.83419636244746



## JOURNEY RISK MANAGEMENT STUDY



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.765497799294907, 78.83604620042777**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.701660390963093, 78.73110013816326**

## JOURNEY RISK MANAGEMENT STUDY



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.809015513957517, 78.68076157538997**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI**



## JOURNEY RISK MANAGEMENT STUDY



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.813978570101114, 78.67443319534608**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.813978570101114, 78.67443319534608**



## JOURNEY RISK MANAGEMENT STUDY



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.765497799294907,  
78.83604620042777**

## JOURNEY RISK MANAGEMENT STUDY



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.756122556562806,  
78.83055889901199**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.739011461069182,  
78.83858885050212**

## JOURNEY RISK MANAGEMENT STUDY



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.720753025938777,  
78.96377618938521**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.573492136690625,  
79.01365840917202**



## JOURNEY RISK MANAGEMENT STUDY



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.489673396392101,  
78.97667721669097**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.461719875337447,  
78.98089783911972**

## JOURNEY RISK MANAGEMENT STUDY



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.366911225762008,  
78.9863942537038**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.494374169846944,  
78.97771872041729**

## JOURNEY RISK MANAGEMENT STUDY



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.361143177391408,  
78.98166916302662**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.357266261057422,  
78.98084609847567**



## JOURNEY RISK MANAGEMENT STUDY



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI.23.423073831779945,  
70.68656297849758**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.494374169846944, 78.97771872041729**



## JOURNEY RISK MANAGEMENT STUDY



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.366911225762008, 78.9863942537038**



**IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.521018452488628, 78.95777910855021**

## JOURNEY RISK MANAGEMENT STUDY



**IMAGE :- Blind Spot RISK LEVEL :- MEDIUM COORD 10.728096799775422, 78.63174082151609**