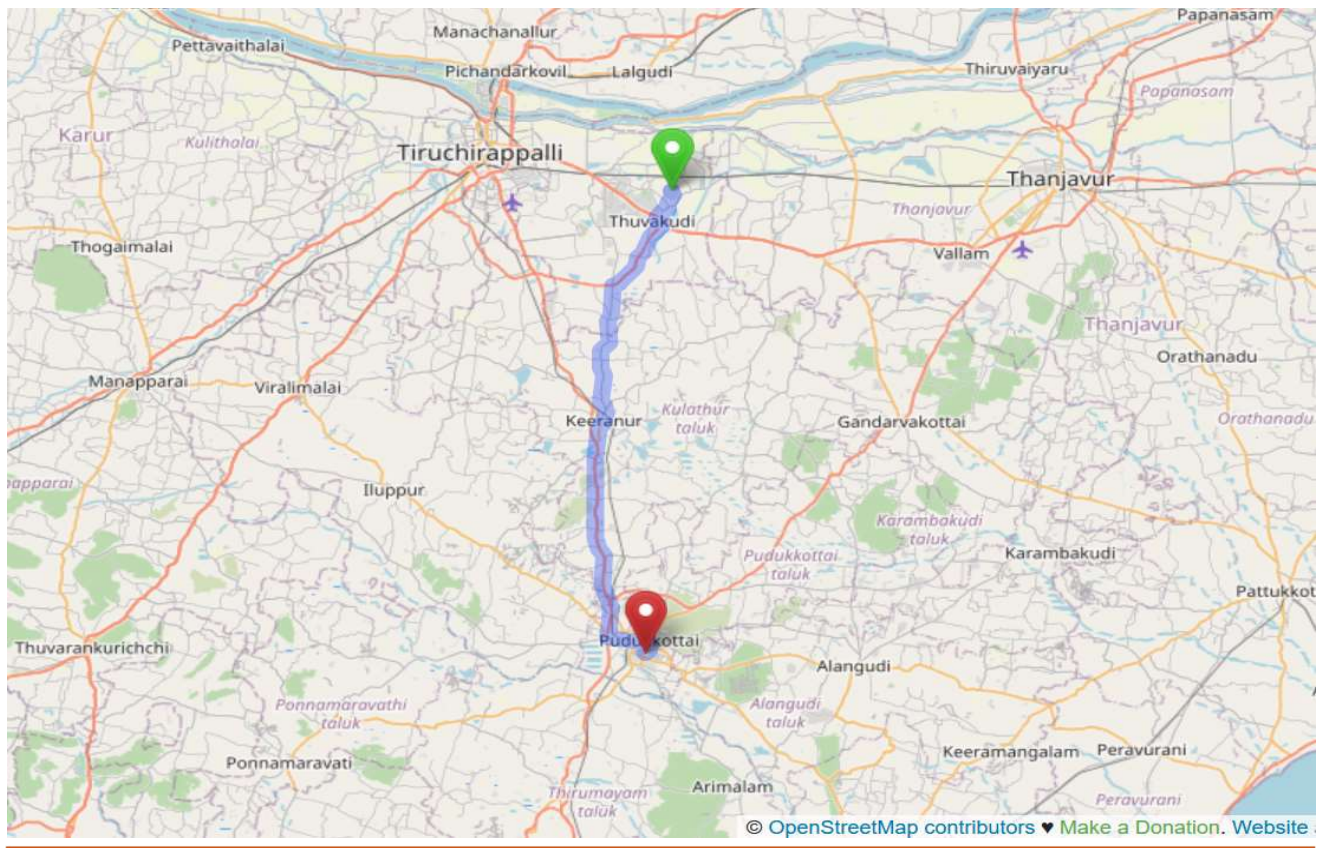
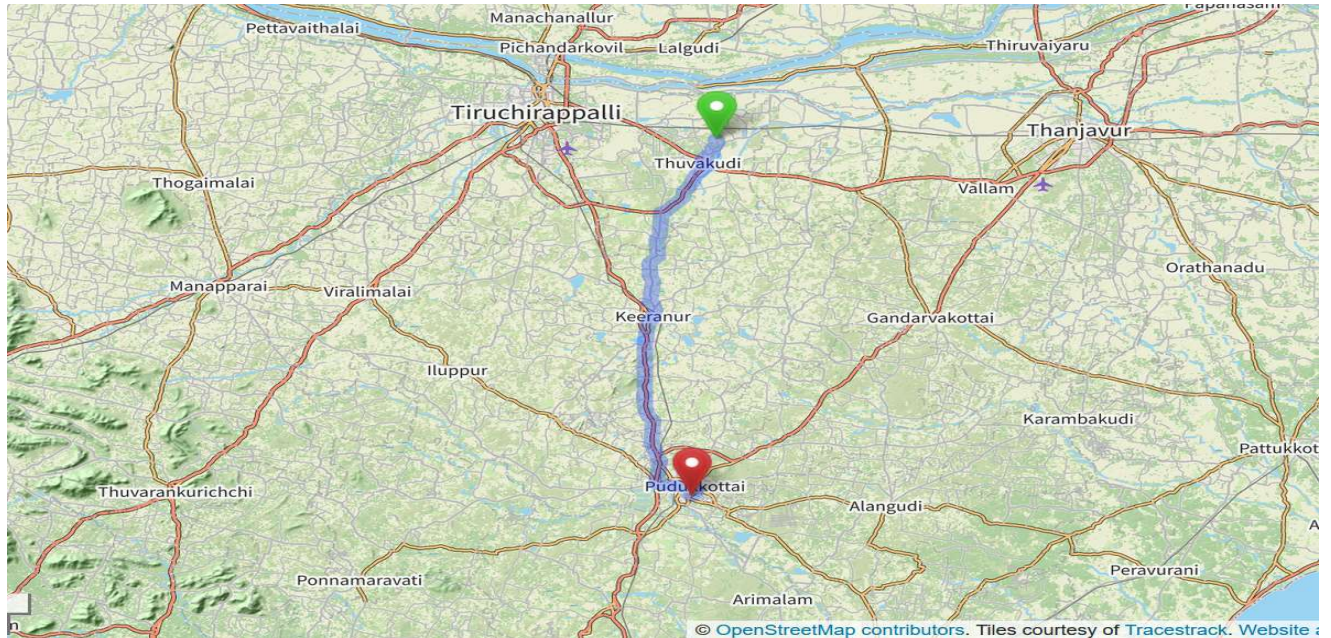




IndianOil

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

IOCL TIRCHY TERMINAL (10.7753, 78.8368) TO SENTHIL SERVICE STATION,(10.37136, 78.81651), TOTAL DISTANCE -66.2 KM



Welcome to the Journey Risk Management Study for Senthil Service Station

Total distance: 66.2 km; Start with: (10.7753, 78.8368), End with: (10.37136, 78.81651)

❖ Route Safety Analysis Report

1. Overview of the Route Map

The route from Trichy Terminal (T.N) To Senthil Service Station. The route passes through several key points including Thuakundi, Thircy – Tanjore Road, Thanjavur Road, Thircy -Thanjavur Road, Coimbatore – Nagapattan Highway, Pudukkottal – Tanjore Road, Alangudi- Pudhupati- Karambakundi Road and Total distance from Trichy Terminal To Senthil Service Station is 52 km for heavy vehicles carrying hazardous materials.

Typical Weather Conditions and Potential Weather-Related Hazards

Weather Conditions: Trichy Terminal (T.N) To Senthil Service Station 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.

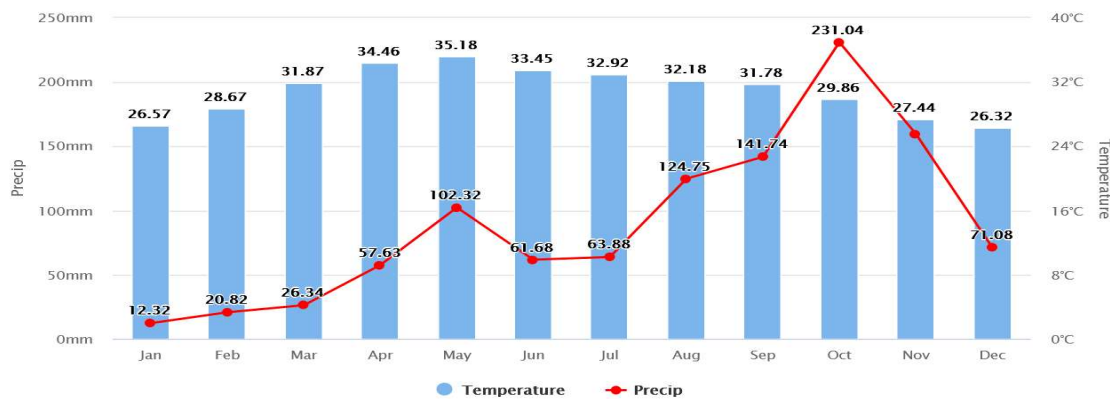
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Nov	Oct	Dec	Year
Record high °C (°F)	33.0 (91.4)	38.0 (100.4)	41.0 (105.8)	43.0 (109.4)	43.0 (109.4)	42.0 (107.6)	40.0 (104.0)	39.0 (102.2)	38.0 (100.4)	37.0 (98.6)	34.0 (93.2)	33.0 (91.4)	43.0 (109.4)
Average high °C (°F)	30.27 (86.49)	32.88 (91.18)	36.0 (96.8)	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 Senthil Service Station 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 Senthil Service Station 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 Senthil Service Station 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:

- Ganesh Wine
- Bridgestone Select - Shakthi Tyres
- Diamond Diesel Pump Service
- Government hospital kottucherry
- Servite Higher secondary School
- Kottucherry Police Station,
- Navakiraha Orphanage Care Home - Nocom Trust,
- Mary Help Of Christians Church,

- Mary St,
- Kumarpillai station

❖ **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: SIDCO Industrial Estate Valavanthankottai, NH 83, Muthandipatti Rd, SH 99, NH36, Thiruvalluvar Salai, Kummangulam - Alangudi Rd/Thiruvalluvar Salai, udukkottai - Alangudi - Avanam - Pattukkottai Rd/Vadakkadu - Alangudi Rd

Alternative Route 2: NH 83, Muthandipatti Rd, SH 99, NH36, Thiruvalluvar Salai, Kummangulam - Alangudi Rd/Thiruvalluvar Salai,

❖ **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**

- Bridgestone Select - Shakthi Tyres, Ganesh Wines, Government hospital kottucherry, Servite Higher secondary School, Kottucherry Police Station,

Navakiraha Orphanage Care Home - Nocom Trust, Mary Help Of Christians Church, Marry St, Kumarpillai st

- **Educational institutions:** - Irrigation Management Training Institute, State Institute Of Hotel Management and Catering Technology, V.O.C Govt Higher Secondary School, ENPEE International School, Don Bosco Higher Secondary
- **Hospital:** - ESI Dispensary, Trustee Medical Center Velangudi, Govt.Hospital Thenkarai Mathur
- **Gas Station:** - In there are several of fuel/Gas station some of them are G Parthasarathi Fuel Agencies , S N Ravi Kumar Agencies, Siva Fuels , Bhavani Agencies , SRI BHAGAVAN AGENCY PETROL BUNK, BPCL segipatti petrol pump, ESSAR petroleum pudukudi Thanjavur, NAYARA Energy-Sri Kandhar AGenct truchy-thanjavur Hyw , rakku sakti Kamatchupura fuel sataion.
- **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**

- ❖ Bridgestone Select - Shakthi Tyres, Ganesh Wines, Government hospital kottucherry, Servite Higher secondary School, Kottucherry Police Station, Navakiraha Orphanage Care Home - Nocom Trust, Mary Help

Of Christians Church, Marryy St, Kumarpillai st. 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

			
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

 <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

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 Senthil Service Station 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	10.769008535749057, 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	10.756122556562806, 78.83055889901199	2.0 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.751420920596344, 78.82521649200099	2.8 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.739011461069182, 78.83858885050212	4.9 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.732693078871645, 78.8744004316786	9.1 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.717181602413664, 78.95464873306916	17.9 KM	20km/hr TO 30 Km/Hr
Sharp turn	High	10.720753025938777, 78.96377618938521	19.0 KM	10km/hr TO 20 Km/Hr
Sharp turn	Medium	10.71097912745339, 78.9558694661921	20.2 KM	20km/hr TO 30 Km/Hr
Sharp turn	High	10.71089603398133, 78.95587353077819	20.8 KM	10km/hr TO 20 Km/Hr
Sharp turn	Medium	10.710510777725322, 78.95815078770025	21.1 KM	10 km/hr TO 20 Km/Hr
Sharp turn	Medium	10.707892309680394, 78.9581432313126	21.4 KM	10km/hr TO 20 Km/Hr
Sharp turn	Medium	10.71089603398133, 78.95587353077819	25.4 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.573492136690625, 79.01365840917202	32.8 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.55341892238224, 78.98920283882778	41.9 KM	20km/hr TO 30 Km/Hr

Sharp turn	Medium	10.526932823658742, 78.96621925865193	46.0 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.521018452488628, 78.95777910855021	47.1 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.500478807978283, 78.96719126485432	49.7 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.489673396392101, 78.97667721669097	51.6 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.475470878269865, 78.97744660699965	53.4 KM	20km/hr TO 30 Km/Hr
Sharp turn	High	10.461719875337447, 78.98089783911972	55.2 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.431851234791166, 78.97814636161263	58.6 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.366911225762008, 78.9863942537038	64 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.361878194809277, 78.98016952853372	67.1 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.361143177391408, 78.98166916302662	64.3 KM	20km/hr TO 30 Km/Hr
Sharp turn	Medium	10.357266261057422, 78.98084609847567	65.8 KM	20km/hr TO 30 Km/Hr

❖ **Risk Assessment - Elevation Changes**

Risk Type	Specific Risk	Risk Level	Coordinati on	Elevation Change	Gradient	Recomme ndation Speed
Elevation Change	Descent	Low	10.7753, 78.8368	0.02 m	2.6 %	30 km/hr to 40 km/hr
Elevation Change	Descent	Low	10.37136, 78.81651	0.02 m	2.6 %	30 km/hr to 40 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	Jagdish Filling station IOCL RO	10.730096699158965, 78.86385149738328
8	Bus Stand	10.737619717156392, 78.84469108474981
9	School/College	10.743654738281231, 78.85235497712233
10	Shri Rakku Sakti IOCL retail outlet	10.736854782210685, 78.85825905782572
11	School/College	10.736328228804307, 78.86222089649122
12	Moogambigai Agencies IOC RO	10.720992946251965, 78.94066066619781
13	G Parthasarathi Fuel Agencies IOCL RO	10.731949135570895, 79.01839981851398
14	Auto Parts Mall	10.73479825344728, 78.86383650381019
15	Trichy-Thanjavur Border check post	10.734414736299165, 78.8687554646539
16	Hotel	10.73449559472593, 78.87053727134324
17	Pkd railway station starting point	10.733035467327722, 78.87760665657318
18	Nayara Petrol Pump	10.733201787527669, 78.88075610377959
19	IOCL RO	10.7370281264634, 79.13691139189406
20	Smv Puncture Shop	10.733071879186443, 78.88788151537216
21	Hotel	10.732766784125532, 78.89204005296241
22	IOCL retail outlet	10.732484981220054, 78.89788773851032
23	Bank	10.730614988892885, 78.90808861916952

24	Bus Stop	10.72762381663031, 78.91707309156152
25	Tool Fab Industry	10.724738429698235, 78.92771569309396
26	Hotel	10.719730509674973, 78.96118243846999
27	Vikas Global City	10.724186034036219, 78.97449603272008
28	Gnanam Business School	10.727431325357013, 78.9783943535095
29	BPCL RO	10.725825464578664, 78.9807445894157
30	Peekay Mediequip Limited	10.729355844598135, 78.99185652717746
31	Thanjavur District Collector Office	10.734119148806737, 79.09384524937086
32	Tamil University	10.73627973338858, 79.09818351652815
33	Vembukudi Toll Plaza	10.875400860939616, 79.21069847346963
34	Temple	10.95822811647791, 79.3714838278445
35	Hotel	10.959743866452198, 79.37905624409673
36	ESI Dispensary	10.962270369182967, 79.38905619487792
37	Hotel	10.961801862688635, 79.39268285703115
38	IOCL RO	10.963122756717935, 79.80865644429767

❖ **SHARP TURN PICTURE FOR TRICHY TERMINAL TO SENTHIL SERVICE STATION**



SHARP TURN IMAGE START FROM TRICY TERMINAL



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



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



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



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



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



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



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



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



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



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



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



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



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



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



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI. 10.521018452488628, 78.9577791085502



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI.10.75826994715787, 78.83326651420096



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.75826994715787, 78.83326651420096



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.750231129775111, 78.82811473719116



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.74903839684931, 78.83067443431507



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.742539235146788, 78.82757393279459



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.73973556832621, 78.82562793774534



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.72027477903802, 78.81393634911623



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.7141676534269, 78.80978487855221



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.706304240757193, 78.8074092846165



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.69925365221937, 78.80013538152075



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.695592180759466, 78.7972570109372



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.69213724602102, 78.79365805599211



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.691122538049239, 78.79072635315475



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.642372204088872, 78.78787700005735



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.638071421487115, 78.7827642633173



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.590204846598265, 78.7826727125705



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.585809319338933, 78.77506988699538



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.496910070802862, 78.77750396021418



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.453733399854768, 78.78503126346625



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.384216880582954, 78.79694561200992



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.382956754024756, 78.80413731024227



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.382054145345363, 78.8091010149521



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.382014177553891, 78.80864078394472



IMAGE :- SHARP TURN RISK LEVEL :- MEDIUM COORDI 10.384718418891932, 78.78689610312014