

# P09

## HAZMAT on the Way

---

**E356 – Pharmaceutical and Bio-Chem Supply Chain**

Diploma in Supply Chain Management

# E356 Topic Tree



## Pharmaceutical and Bio-chem Supply Chain

- Introduction to Pharma and Bio-chem
- Classification of Dangerous Goods
- Best Practices (GMP/GDP)
- Clinical Supply Chain
- Cold Chain Management

## Import, Packaging and Distribution

- Import and Distribution of Medical Devices
- Import of Pharmaceutical and Bio-Chem Products
- **Local Transportation of Pharmaceutical and Bio-Chem Products**
- Packaging of Pharmaceutical DG for Air Transport
- Declaration of Pharmaceutical DG for Air Transport

## Product Tracing, Recall and Disposal

- Product Tracing (anti-counterfeit technologies)
- Drug Recall
- Disposal of Bio-chem Products in Hospital Logistics

# Transporting Pharmaceuticals / Bio-chem

---



Factors to consider when shipping pharmaceuticals

- Temperature control
- Dangerous goods
- Time sensitive / critical / definite
- Security (e.g. controlled/restricted)
- High value density
- Permits / licenses for customs clearance



# Transporting Pharmaceuticals / Bio-chem



Pharmaceuticals / Bio-chem that are commonly transported by **Sea** include

- Bulk pharmaceuticals e.g. API
- Products that are relatively insensitive to time e.g. lotions and cream like Zam-buk
- Low value products that make shipping via Air unjustified e.g. Saline solution
- Highly dangerous chemical / reagents / substances, many air carriers will not carry toxic gases as a leak could result in death.



# Transporting Pharmaceuticals / Bio-chem



- Characteristics of pharmaceutical / Bio-Chem products for **Air** transportation
  - Relatively high value e.g. vaccines
  - Short expiry period
  - Time critical items e.g. organs for transplant
  - Security needed for shipment
    - Ease of control with air freight (piracy non-existent in air transport, ULDs can be sealed for added security)
    - Shorter time in transit means reduced chance of losses
    - Security is usually tighter in most airports compared to sea ports



# Transporting Pharmaceuticals / Bio-chem

---



- Transportation of hazardous substance is considered dangerous as they pose a threat to life and property in the event of fire.
- Application for the transport licensing is mandatory in order to achieve a safer working environment, and the licensing authority is the Regulatory Branch of the HAZMAT Department of **SCDF**.
- A **vehicle** to be used for transporting HAZMAT must be issued with a transport license by SCDF
- Any **bulk tank** carried on the vehicle must also be tested and certified by a Professional Engineer
- The **driver** of a licensed vehicle is required to hold a valid HAZMAT Transport Driver Permit (HTDP) at all times



# Transport Approval Control - Personnel



- Any *person* who wishes to **transport** any of the scheduled **P&FM** exceeding limits under the Fire Safety (Petroleum and Flammable Materials) Regulations 2014 must obtain the necessary approval **from SCDF**.
- Any *person* who wishes to **transport** any of the listed **15 explosive precursors** (EP) under the Arms & Explosives Act must obtain the necessary approval **from SCDF**.
- Any *person* who wishes to **transport any hazardous substance** (HS) in quantities exceeding those stipulated in the Schedule of Environmental Protection and Management (HS) Regulations (Table 2) must obtain a **Transport Approval from NEA**.
- **A Transport Approval will be issued to a person if:**
  - he holds a License to handle hazardous substances and/or explosive precursors,
  - he could show proof that the Hazardous Substances and/or explosive precursors will be transported safely in compliance with the transportation requirements.

# HAZMAT Transport Vehicle Requirement



- In addition to the licencing, HAZMAT Transport Vehicles Tracking System (**HTVTS**) was implemented since 1 Jul 2005 to enhance the safety and security of Singapore with emphasis on the road transportation of hazardous materials.
- SCDF- licensed vehicles carrying hazardous substances will have to be fitted with tracking devices, immobilizers and orange-coloured license plates
- For security violations, the vehicle's horn-hazard warning lights-immobilizer features will be activated once an alarm is detected by the system.
- **SCDF** will then dispatch enforcement officers to investigate the cause of the violation and contact the company concerned security violation





# HAZMAT Transport Vehicle Requirement

---



Vehicles carrying the followings requires **HTVTS**:

- Scheduled petroleum and flammable materials of total net quantity exceeding **3 metric tonnes (MT)**;
- Petroleum and flammable materials in tube trailers (e.g. Hydrogen) or cryogenic trailers (e.g. LNG) in **any amount/quantity**.
- All Explosive Precursors regulated by SPF exceeding net quantity of **3 metric tonnes (MT)**
- The following Hazardous Substances regulated by NEA:
  - Liquefied ammonia, chlorine, hydrogen chloride, hydrogen fluoride, methyl chloride and phosphorus trichloride of total net quantity exceeding **1 metric tonne (MT)**
  - Arsine, phosphine, phosgene gases **in any amount**

# SCDF Application requirements for vehicles transporting Hazardous Materials

---



- A test certificate on the roadworthiness of the vehicle issued by the Land Transport Authority (LTA) of Singapore
- A copy of Vehicle Registration Card
- A copy of the **Transport Emergency Response Plan (TERP)** for that vehicle, which includes
  - Name, packing and quantity of product being carried
  - SDS for the product
  - Transport Routes for the vehicle
  - Technical experts to contain emergency
  - Emergency equipment available on vehicle

# Approved Transport Timing for licensed vehicles



**Vehicles carrying various HAZMAT can only travel during the approved timings:**

S/N	TYPE OF HAZMAT	APPROVED HOURS
1	Petroleum and Flammable Materials generally, unless any other item in this table applies. (Including transportation via Tuas Checkpoint. Transportation of P&FM via Woodlands Checkpoint is not allowed)	0700hrs to 1900hrs
2	Petroleum and flammable materials in tube trailers (eg. Hydrogen) or cryogenic trailers (eg LNG).	0900hrs to 1700hrs
3	Other hazardous substances regulated by NEA i.e. corrosives, toxics	0900hrs to 1700hrs except Sundays & PHs
4	Explosives Precursors regulated by SPF	0700hrs to 1900hrs
5	LPG cylinders for domestic purposes or use at an eating place or a restaurant	0700hrs to 2100hrs
6	Petroleum and flammable materials transportation within Jurong Industrial Estate, Tuas Industrial Estate and Jurong Island	No time restriction
7	Petroleum and flammable materials for transshipment between Brani Terminal, Pasir Panjang Terminal or Keppel Terminal	No time restriction for transportation below 3 metric tonnes <sup>2</sup> .
8	Diesel and Acetylene in cylinders	No time restriction for transportation less than 3 metric tonnes to industrial premises and construction worksites

2 For transportation of 3 metric tonnes and above beyond 0700h to 1900h, SCDF's approval is required through the notification fax stated under Annex D.

# Approved Transportation Routes

---

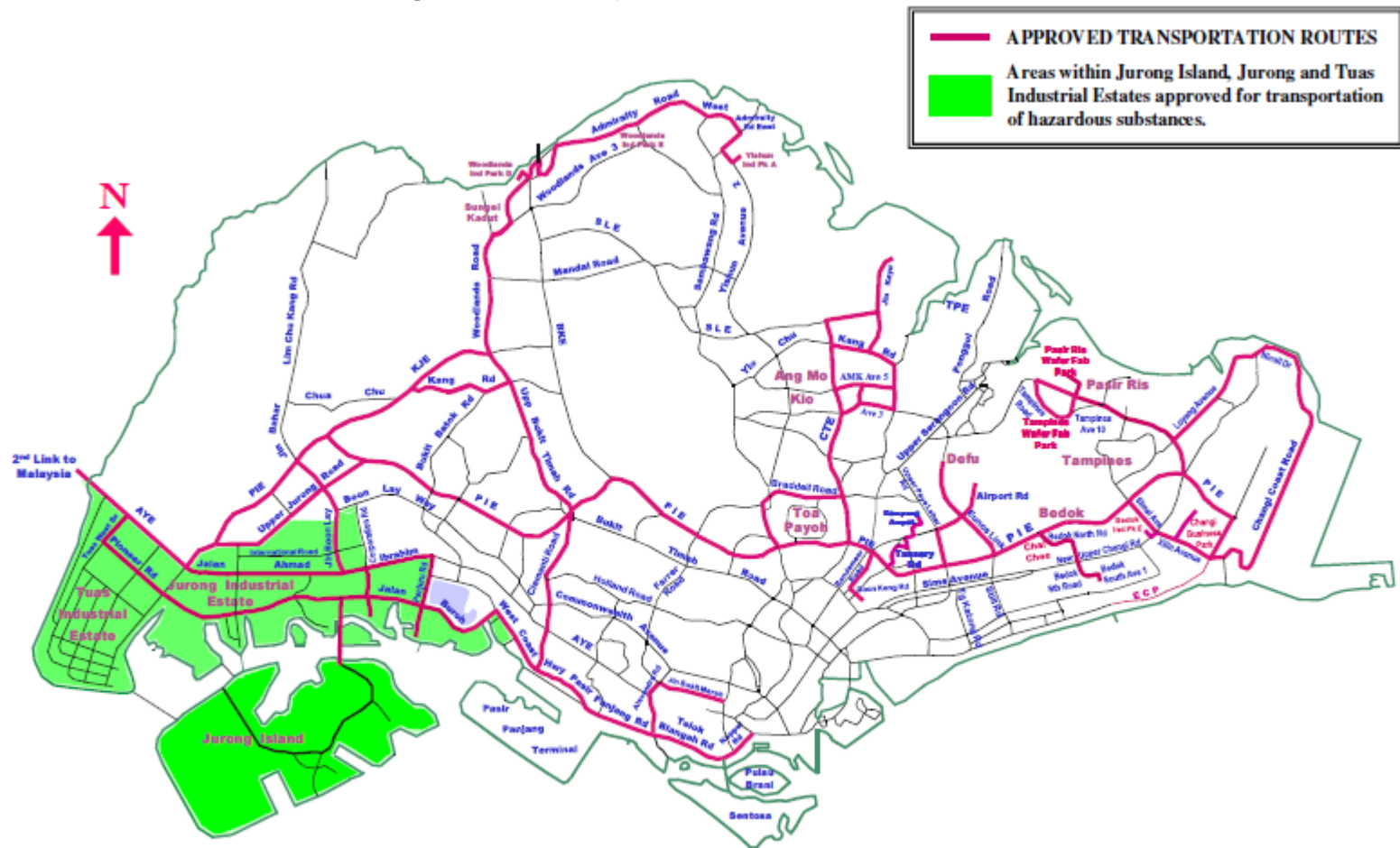


- All licensed vehicles transporting hazardous materials (petroleum and flammables) are required to adhere to approved transportation routes  
(refer to the resource file : SCDF- REQUIREMENTS ON ROAD TRANSPORTATION OF HAZARDOUS MATERIALS (HAZMAT) – Updated as at 1 Nov 2016)
- All licensed vehicles are NOT allowed to transport hazardous materials accessing Benjamin Sheares Bridge, CTE tunnels, Fort Canning tunnel, KPE tunnel, MCE Tunnel and Woodsville tunnel without prior notification. Empty licensed vehicles using the abovementioned routes are required to seek approval from SCDF 24 hours in advance with the notification fax before entry into restricted areas, in order for change to be effected in HTVTS

# Approved Transportation Routes



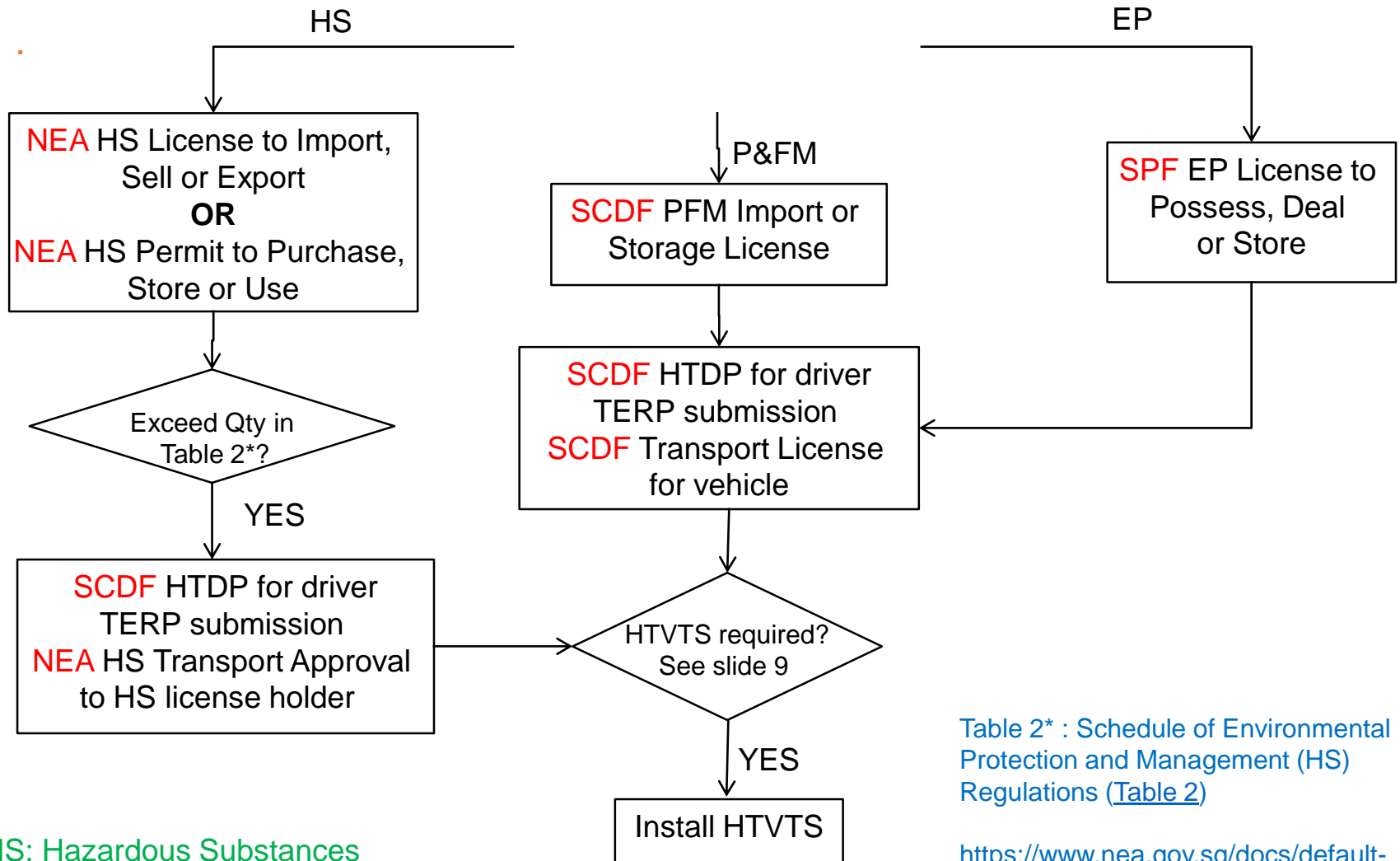
Transport route regulated by NEA



**Notes :** The Underground CTE, Fort Canning, KPE Tunnels, Benjamin Sheares Bridge, SLE, BKE & Bartley-Tampines Viaduct are prohibited routes for transport of Hazardous Substances



# Approval for import, storage and transport of chemicals in Singapore



HS: Hazardous Substances  
P&FM: Petroleum & Flammable Material  
EP: Explosive Precursor

Table 2\* : Schedule of Environmental Protection and Management (HS) Regulations ([Table 2](#))

<https://www.nea.gov.sg/docs/default-source/our-services/hs--table-2>



# Today's Problem

---

- For hazardous material transportation in Singapore, the main licensing authority is **SCDF**. SCDF approves HTDP and TERP for
  - Hazardous substances under NEA
  - Explosive precursors under SPF
  - Petroleum and Flammable Material under SCDF
- The forwarding company must pay particular attention to the requirements, especially
  - HTVTS
  - Approved Transport Timings and Routes
  - Transport Emergency Response Plan
- The driver of a licensed vehicle must hold a valid HTDP.



# Today's Problem

- The table below shows the relevant approvals necessary to transport the items

Item	Volume	Approval to transport	Approved Hours
1. Benzodiazepines / 2. Orapred	500 bottles / 1000 cartons	Pharmaceuticals not regulated. Follow GDP guidelines.	No time restriction
3. Ammonia Reagent Set which contain Ammonia, 15% weight in weight	1200 kg (Around 1.2 MT)	<b>HS</b> , exceed 1000 kg limit in NEA's Table 2* <ul style="list-style-type: none"><li>- HTDP for driver (SCDF)</li><li>- TERP approval (SCDF)</li><li>- HS Transport Approval (NEA)</li><li>- HS list in slide 10, need to install HTVTS</li></ul>	0900 – 1700 except Sun & PH
4. Ammonium Perchlorate	2.5 MT	<b>EP</b> , - HTDP for driver (SCDF) <ul style="list-style-type: none"><li>- TERP approval (SCDF)</li><li>- Transport License for vehicle (SCDF)</li><li>- Below 3MT limit, No need to install HTVTS</li></ul>	0700 – 1900
5. Acetylene	20 kg (Around 0.020MT)	<b>P&amp;FM</b> , - HTDP for driver (SCDF) <ul style="list-style-type: none"><li>- TERP approval (SCDF)</li><li>- Transport License for vehicle (SCDF)</li><li>- &lt; 3MT limit, no need to install HTVTS</li></ul>	0700 – 1900

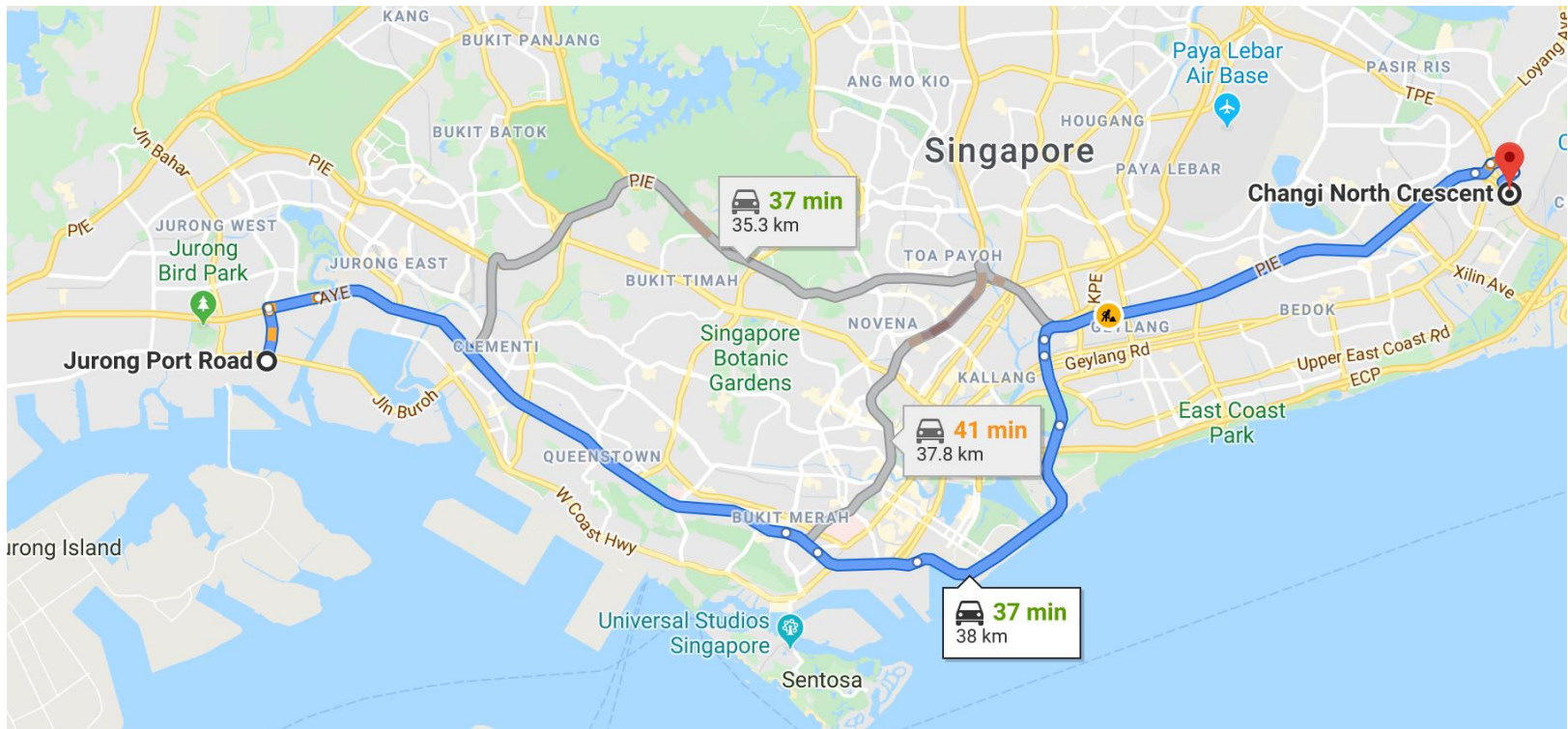
Note: \* NEA's Table 2, : Schedule of Environmental Protection and Management (HS) Regulations (Table 2) – refer to resource file.





# Today's Problem

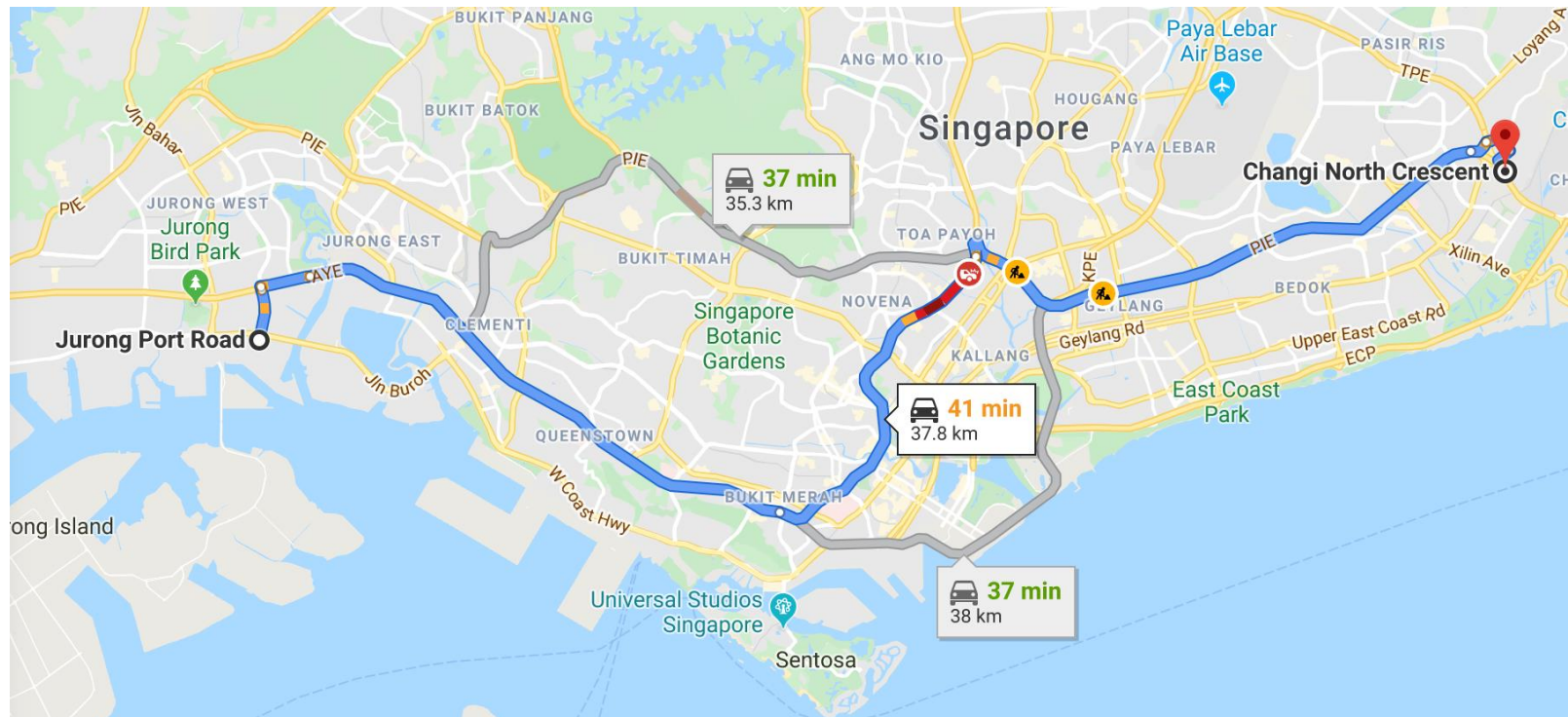
- The TERP plan has to be accompanied by a transport route.
- The most convenient route from Jurong Port to Changi North will likely be one of the following but are both restricted
  1. Via AYE-MCE-ECP
  2. Via CTE and PIE





# Today's Problem

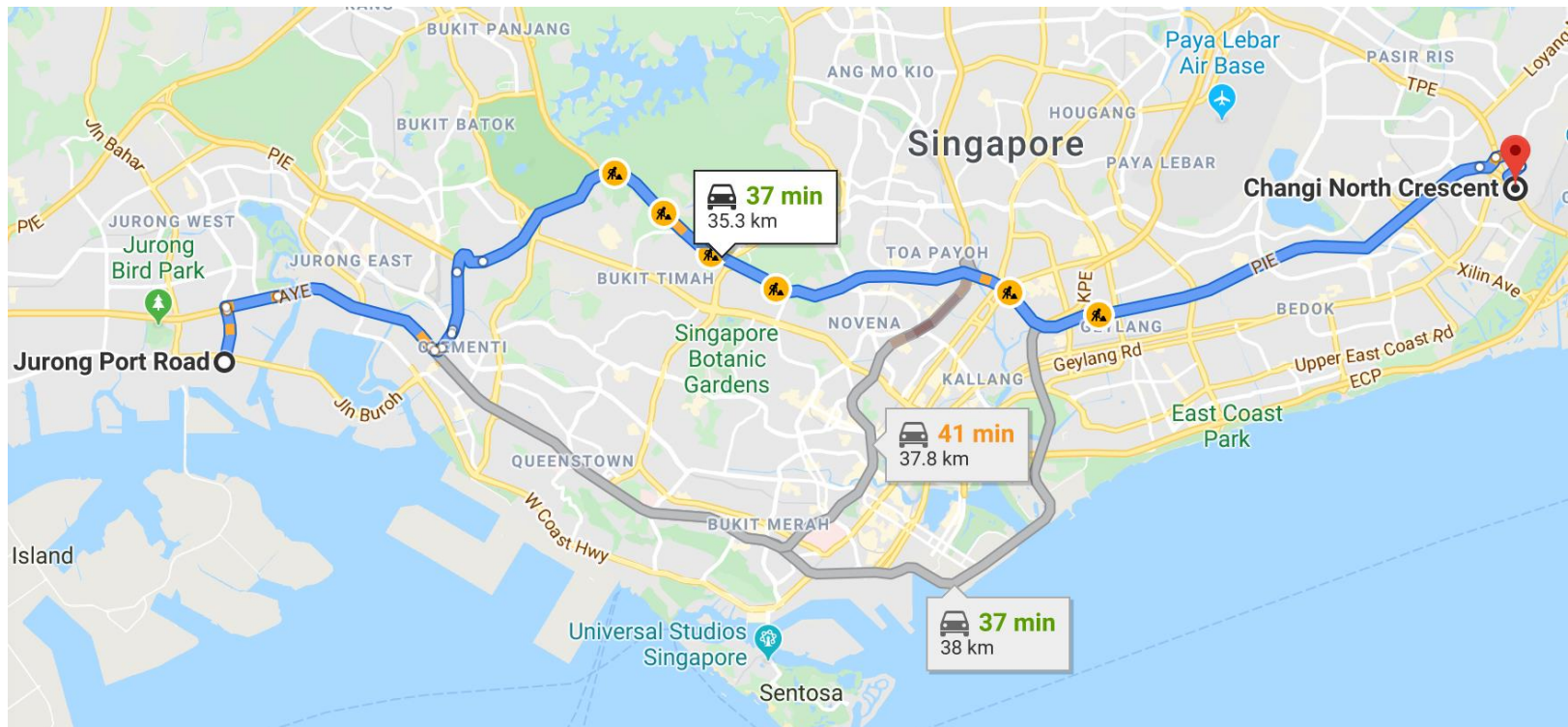
- The TERP plan has to be accompanied by a transport route.
- The most convenient route from Jurong Port to Changi North will likely be one of the following but are both restricted
  1. Via AYE-MCE-ECP
  2. Via CTE and PIE





# Today's Problem

- The transport vehicle will use the route shown below via
  - Follow AYE to Clementi Ave 6. Take exit 11 from AYE
  - Jurong Port-> PIE -> Changi North





# Learning Outcomes

---

- Describe considerations needed for distribution and transportation of bulk pharmaceutical ingredients and bio-chemicals by land, sea and air.
- Identify specific transport requirement for pharmaceutical and bio-chem product including permits and licenses application for inland transportation of DG in Singapore.
- Evaluate route considerations in bulk transportation and delivery of hazardous material.