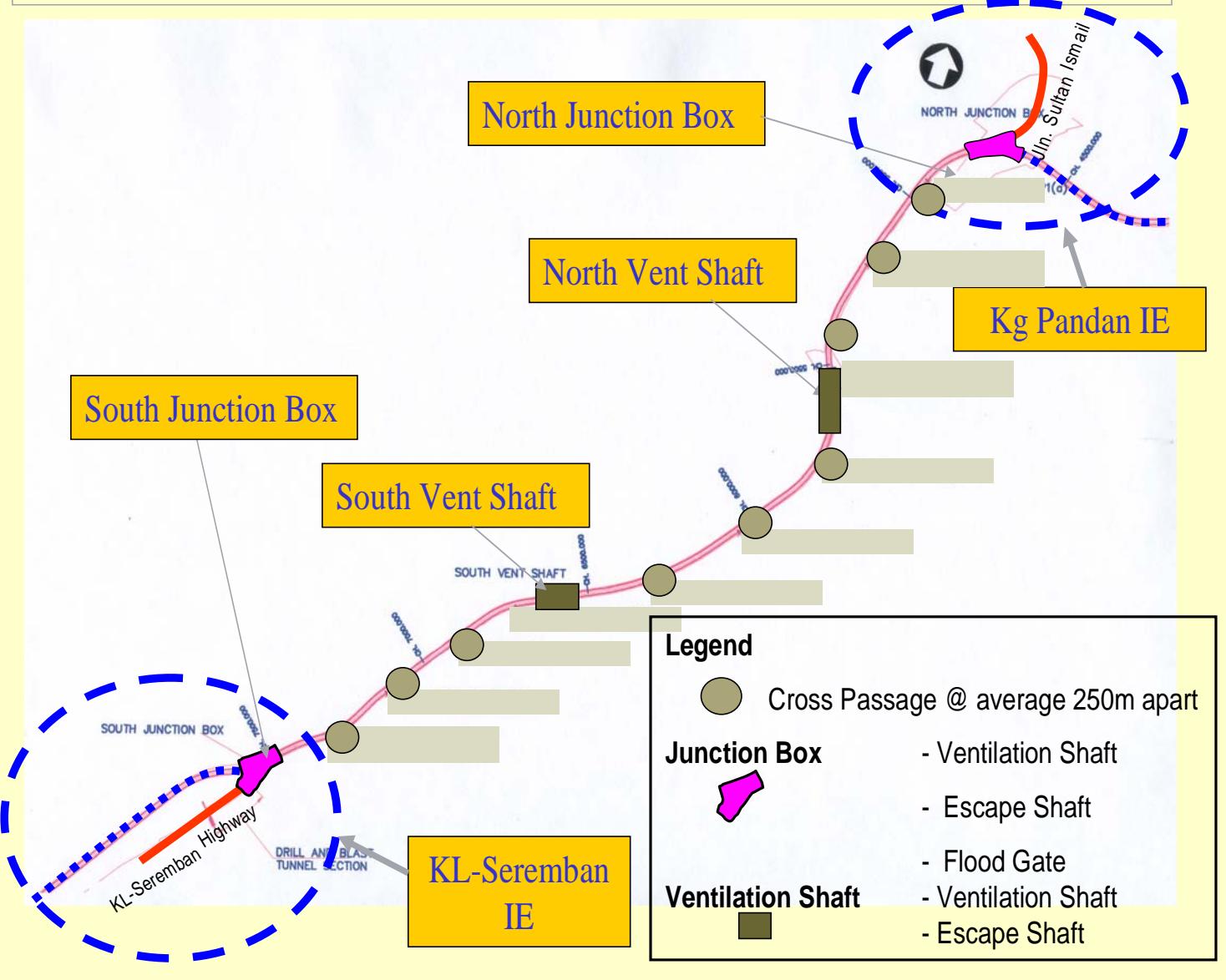


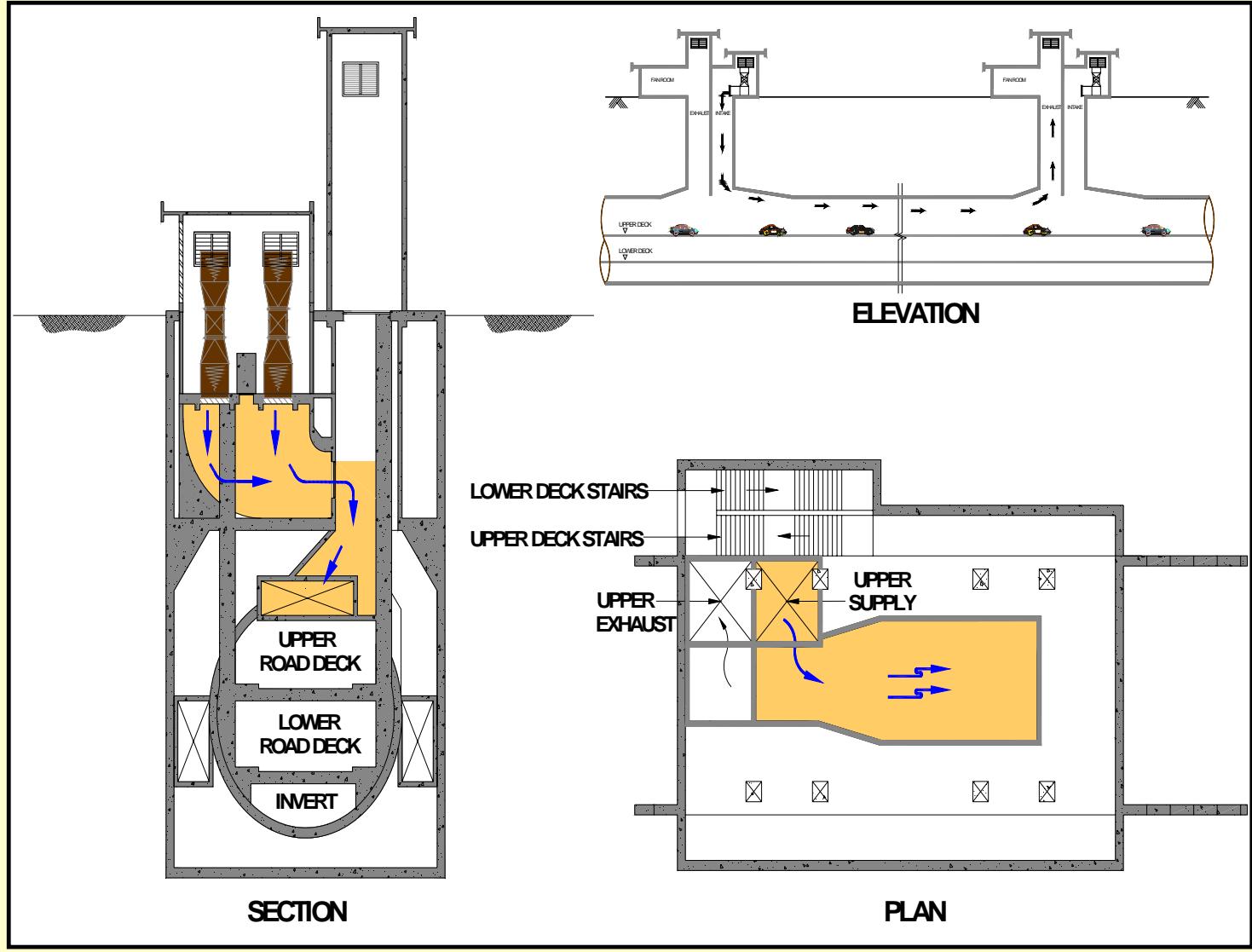
Road Deck Ventilation System

- An important feature in the motorway section of the tunnel is the efficient and effective ventilation system. The ventilation system ensures safety of tunnel users during emergencies such as fire.
- The tunnel ventilation system provided will ventilate both the upper and lower decks. The motorway consists of four ventilation buildings, each containing eight ventilation fans and pressurisation fans for the stairway and lift shaft. The ventilation system shall be supplemented by jet fans located at each of the motorway ingress/egress portal. The operation of tunnel ventilation system shall be linked to the SCVADA system. The pressurization fans' main function is to prevent smoke from entering the staircase and lifts in the cross-passage.
- The tunnel ventilation system will provide a longitudinal flow of fresh air through the use of nozzles based on the "Saccardo Principle" whereby airflows are generated along the tunnel induction from air jets. The air jets are generated by fans located in the four ventilation shaft buildings on the surface, distributed along the length of the tunnel. Balanced exhaust flows are removed through adjacent extraction ducts using separate exhaust fans.
- The main tunnel ventilation fans will operate on varied speed and is unidirectional.
- Air quality measurement equipment for Carbon Monoxide (CO) concentration and visibility will be sited at the nearest cross-passage, adjacent to the extract ductwork, within the upper and lower decks. The reason for the location to be at the cross-passages is for protection during flood conditions. The ventilation operates automatically based on the air quality monitoring system output during the normal operation (when there is no flood).
- With this state-of-the-art system in place, traveling in the motorway would be fast, efficient and most, safe.

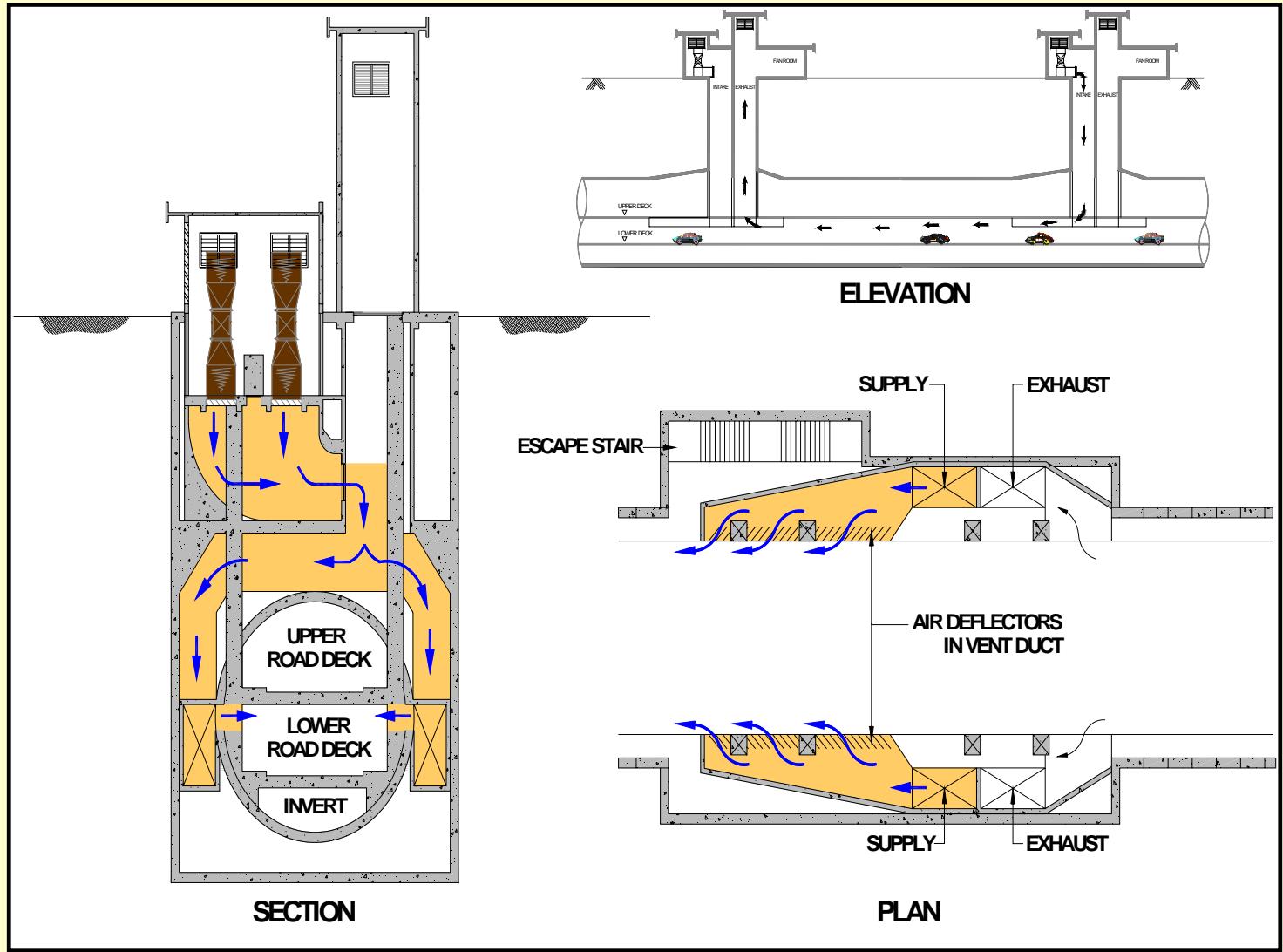
Ventilation Shaft, Cross Passage & Junction Box Location Plan



Tunnel Facilities - Ventilation For Upper Deck



Tunnel Facilities - Ventilation For Lower Deck



SECTION OF CROSS PASSAGE

