Traffic Flow Data

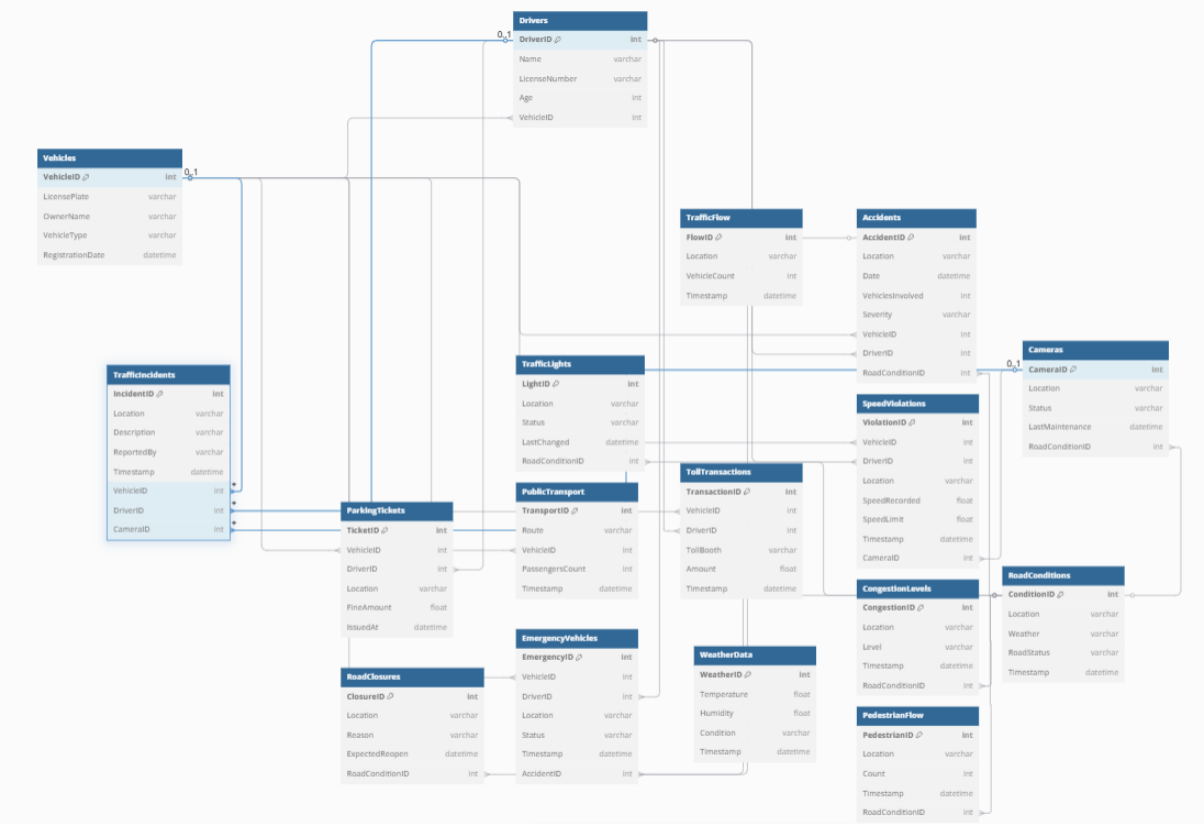

Figure: Traffic Flow ERD

Entities and Relationships

Relationship	Entities Involved	Type
A driver owns a vehicle	Drivers → Vehicles	**One-to-One**
A driver may receive multiple speeding violations	Drivers → SpeedViolations	**One-to-Many**
A vehicle can be involved in multiple accidents	Vehicles → Accidents	**One-to-Many**
Road conditions affect traffic lights	RoadConditions → TrafficLights	**One-to-One**
Cameras monitor road conditions	Cameras → RoadConditions	**One-to-One**
A camera can detect multiple speed violations	Cameras → SpeedViolations	**One-to-Many**
A vehicle may receive multiple parking tickets	Vehicles → ParkingTickets	**One-to-Many**
A vehicle passes through toll booths	Vehicles → TollTransactions	**One-to-Many**
A driver pays for toll transactions	Drivers → TollTransactions	**One-to-Many**
Public transport vehicles affect congestion	PublicTransport → CongestionLevels	**One-to-Many**
Road conditions influence pedestrian flow	RoadConditions → PedestrianFlow	**One-to-Many**

A vehicle can be involved in multiple traffic incidents	Vehicles → TrafficIncidents	**One-to-Many**
A traffic incident may be recorded by a camera	TrafficIncidents → Cameras	**One-to-One**
Emergency vehicles respond to accidents	EmergencyVehicles → Accidents	**One-to-Many**

DBML:

```
Table Vehicles {
  VehicleID int [primary key]
  LicensePlate varchar
  OwnerName varchar
  VehicleType varchar
  RegistrationDate datetime
}

Table Drivers {
  DriverID int [primary key]
  Name varchar
  LicenseNumber varchar
  Age int
  VehicleID int [ref: > Vehicles.VehicleID] // A driver is assigned to a vehicle
}

Table TrafficFlow {
  FlowID int [primary key]
  Location varchar
  VehicleCount int
  Timestamp datetime
}

Table Accidents {
  AccidentID int [primary key]
  Location varchar
  Date datetime
  VehiclesInvolved int
  Severity varchar
  VehicleID int [ref: > Vehicles.VehicleID] // Vehicles involved in accidents
  DriverID int [ref: > Drivers.DriverID] // Drivers involved in accidents
  RoadConditionID int [ref: > RoadConditions.ConditionID] // Accident affected by road
conditions
}

Table RoadConditions {
  ConditionID int [primary key]
```

```
  Location varchar
  Weather varchar
  RoadStatus varchar
  Timestamp datetime
}

Table TrafficLights {
  LightID int [primary key]
  Location varchar
  Status varchar // (Red, Yellow, Green)
  LastChanged datetime
  RoadConditionID int [ref: > RoadConditions.ConditionID] // Traffic lights may be affected by
road conditions
}

Table Cameras {
  CameraID int [primary key]
  Location varchar
  Status varchar
  LastMaintenance datetime
  RoadConditionID int [ref: > RoadConditions.ConditionID] // Cameras track road conditions
}

Table SpeedViolations {
  ViolationID int [primary key]
  VehicleID int [ref: > Vehicles.VehicleID] // Speeding violations are tied to vehicles
  DriverID int [ref: > Drivers.DriverID] // The driver who committed the violation
  Location varchar
  SpeedRecorded float
  SpeedLimit float
  Timestamp datetime
  CameraID int [ref: > Cameras.CameraID] // Speed violations may be detected by cameras
}

Table ParkingTickets {
  TicketID int [primary key]
  VehicleID int [ref: > Vehicles.VehicleID] // Parking violations are tied to vehicles
  DriverID int [ref: > Drivers.DriverID] // Driver responsible for the vehicle
  Location varchar
  FineAmount float
  IssuedAt datetime
}

Table PublicTransport {
  TransportID int [primary key]
```

```
  Route varchar
  VehicleID int [ref: > Vehicles.VehicleID] // Public transport vehicles
  PassengersCount int
  Timestamp datetime
}

Table TollTransactions {
  TransactionID int [primary key]
  VehicleID int [ref: > Vehicles.VehicleID] // Tolls are charged to vehicles
  DriverID int [ref: > Drivers.DriverID] // The driver paying the toll
  TollBooth varchar
  Amount float
  Timestamp datetime
}

Table CongestionLevels {
  CongestionID int [primary key]
  Location varchar
  Level varchar // (Low, Moderate, High)
  Timestamp datetime
  RoadConditionID int [ref: > RoadConditions.ConditionID] // Congestion affected by road
conditions
}

Table RoadClosures {
  ClosureID int [primary key]
  Location varchar
  Reason varchar
  ExpectedReopen datetime
  RoadConditionID int [ref: > RoadConditions.ConditionID] // Road closures due to road
conditions
}

Table EmergencyVehicles {
  EmergencyID int [primary key]
  VehicleID int [ref: > Vehicles.VehicleID] // Emergency vehicle tracking
  DriverID int [ref: > Drivers.DriverID] // The emergency vehicle's driver
  Location varchar
  Status varchar
  Timestamp datetime
  AccidentID int [ref: > Accidents.AccidentID] // Emergency vehicles respond to accidents
}

Table WeatherData {
  WeatherID int [primary key]
```

```
  Temperature float
  Humidity float
  Condition varchar
  Timestamp datetime
}

Table PedestrianFlow {
  PedestrianID int [primary key]
  Location varchar
  Count int
  Timestamp datetime
  RoadConditionID int [ref: > RoadConditions.ConditionID] // Pedestrian movement affected by
road conditions
}

Table TrafficIncidents {
  IncidentID int [primary key]
  Location varchar
  Description varchar
  ReportedBy varchar
  Timestamp datetime
  VehicleID int [ref: > Vehicles.VehicleID] // Involved vehicle
  DriverID int [ref: > Drivers.DriverID] // Involved driver
  CameraID int [ref: > Cameras.CameraID] // Incident may be recorded by cameras
}
```