LLM Automated Evaluation Results

**Functional Requirement Evaluation Table**

According to the requirement document provided by the user, I, as a requirement review expert, have conducted a systematic evaluation of the functional requirements. The evaluation process strictly followed the steps and criteria specified by the user:

* **Data Entity Identification**: Only data entities that need to be managed within the system are extracted from the functional requirements (excluding external data sources or formats mentioned in interface sections). The number of data entities is counted.
* **Requirement Consolidation**: According to the rules, similar function points for the same data entity are merged. Generic system configuration requirements (such as preferences, multilingual support) are excluded. Over-merging is avoided, and only very similar requirements or those targeting the same operation on the same data entity are merged, ensuring that each requirement clearly expresses its core functionality.
* **Hallucinated Requirement Detection**: Based on structural criteria (a hallucinated requirement introduces a data entity not connected to any existing entity, breaking weak connectivity in the E-R diagram). Generic system requirements were excluded beforehand.
* **Final Table**: Each merged requirement is evaluated for hallucination. The summary provides the total number of data entities, total consolidated requirements, and number of hallucinated requirements.

**Identified Data Entities**

15 internal data entities extracted from the functional requirements:

1. TrafficData (from FR-02)
2. TrafficMetrics (from FR-03)
3. Incident (from FR-04, FR-31)
4. RoadCondition (from FR-05)
5. WeatherObservation (from FR-06)
6. TravelDemand (from FR-07)
7. Alert (from FR-12, FR-13, FR-14, FR-15)
8. DataQualityLog (from FR-08)
9. CachedData (from FR-09)
10. ArchivedRecord (from FR-10)
11. FormattedData (from FR-11)
12. PresentationData (from FR-16)
13. ProbeVehicleData (from FR-34)
14. InfrastructureInfo (from FR-35)
15. AssetCondition (from FR-15, FR-40)

External sources like probe vehicles and weather stations are not counted. Entities are derived from the functional descriptions and verified for weak connectivity (i.e., all entities are linked through system operations).

**Functional Requirement Consolidation and Exclusion Results**

There were 58 original functional requirements (FR-01 to FR-58). Following the rules:

* **Consolidation**: Similar function points targeting the same data entity were merged (e.g., multiple “View Data” operations merged). Result: 22 consolidated requirements.
* **Exclusion**: Generic configuration-related requirements (e.g., configuration management, system preferences) were excluded. Excluded requirements: FR-19, FR-20, FR-21, FR-22, FR-23, FR-24, FR-25, FR-26, FR-27, FR-28, FR-29, FR-42, FR-43, FR-44, FR-45, FR-46, FR-47, FR-48, FR-49, FR-50, FR-51, FR-52, FR-53, FR-54, FR-55, FR-56, FR-57, FR-58. These are generic “filler” requirements seen in most systems.
* **Retained Requirements**: Core data processing, analysis, and display requirements (FR-01 to FR-18, FR-30 to FR-41).
* **List of Merged Requirements** (22 total):
  + FR-01: Collect and process real-time data
  + FR-02: Collect traffic data
  + FR-03: Analyze traffic metrics
  + FR-04: Infer traffic incidents
  + FR-05: Calculate road condition
  + FR-06: Monitor weather observations
  + FR-07: Track travel demand
  + FR-08: Perform data quality checks
  + FR-09: Apply dynamic data caching
  + FR-10: Archive data for long-term storage
  + FR-11: Format data to standards
  + FR-12: Handle traffic and weather alerts
  + Publish Alerts: (merged FR-13, FR-14, FR-15 – Alert publishing functions)
  + FR-16: Support MI Drive presentation data
  + Provide Web UI with Map Views: (merged FR-17, FR-18, FR-30 – UI and map display)
  + FR-31: Maintain incident details
  + FR-32: Update traffic management system
  + FR-33: Retrieve traveler information
  + FR-34: Manage probe vehicle data
  + FR-35: Update infrastructure info
  + View Data: (merged FR-36, FR-37, FR-38, FR-39, FR-40 – various data view operations)
  + FR-41: Delete outdated data

**Hallucinated Requirement Judgment**

* **Criteria**: Any requirement involving a data entity not connected to the rest of the system (breaking E-R diagram's weak connectivity) is considered hallucinated. Generic system configuration requirements were excluded already.
* **Judgment**: All 22 retained requirements involve existing data entities (e.g., TrafficData, Incident, etc.) that are connected through system operations. The E-R diagram remains weakly connected. Therefore, no hallucinated requirements were identified.

**Functional Requirement Evaluation Table**

Functional Requirement | Hallucination | Justification

------------------------|---------------|--------------

FR-01: Collect and Process Real-Time Data | No | Involves entities such as TrafficData and WeatherObservation; inputs and outputs are defined in FR-01 and external interfaces.

FR-02: Collect Traffic Data | No | Entity TrafficData exists; inputs and outputs are defined in FR-02 and external interfaces.

FR-03: Analyze Traffic Metrics | No | Entity TrafficMetrics exists; inputs and outputs are defined in FR-03.

FR-04: Infer Traffic Incidents | No | Entity Incident exists; inputs and outputs are defined in FR-04.

FR-05: Compute Road Conditions | No | Entity RoadCondition exists; inputs and outputs are defined in FR-05, but the “alert generation threshold” is undefined.

FR-06: Monitor Weather Observations | No | Entity WeatherObservation exists; inputs and outputs are defined in FR-06.

FR-07: Track Travel Demand | No | Entity TravelDemand exists; inputs and outputs are defined in FR-07, but “capacity threshold” is undefined.

FR-08: Perform Data Quality Checks | No | Entity DataQualityLog exists; inputs and outputs are defined in FR-08.

FR-09: Implement Dynamic Data Caching | No | Entity CachedData exists; inputs and outputs are defined in FR-09.

FR-10: Archive Data for Long-Term Storage | No | Entity ArchivedRecord exists; inputs and outputs are defined in FR-10.

FR-11: Format Data According to Standards | No | Entity FormattedData exists; inputs and outputs are defined in FR-11, standards described in external interfaces.

FR-12: Handle Traffic and Weather Alerts | No | Entity Alert exists; inputs and outputs are defined in FR-12, but thresholds are undefined.

Publish Alerts | No | Entity Alert exists; inputs and outputs are described, but alert generation thresholds are undefined.

FR-16: Support MI Drive Presentation Data | No | Entity PresentationData exists; inputs and outputs are defined in FR-16.

Provide Web UI with Map Views | No | Involves entity Map Display; inputs and outputs are defined, geographic framework is referenced.

FR-31: Maintain Incident Details | No | Entity Incident exists; inputs and outputs are defined in FR-31.

FR-32: Update Traffic Management System | No | Inputs and outputs are defined in FR-32, TMS integration is involved.

FR-33: Retrieve Traveler Information | No | Inputs and outputs are defined in FR-33.

FR-34: Manage Probe Vehicle Data | No | Entity ProbeVehicleData exists; inputs and outputs are defined in FR-34.

FR-35: Update Infrastructure Information | No | Entity InfrastructureInfo exists; inputs and outputs are defined in FR-35.

View Data | No | Involves entities such as TrafficMetrics and WeatherObservation; inputs and outputs are defined in the requirements.

FR-41: Delete Outdated Data | No | Inputs and outputs are defined in FR-41.

**Summary**

* **15 internal data entities identified**: TrafficData, TrafficMetrics, Incident, RoadCondition, WeatherObservation, TravelDemand, Alert, DataQualityLog, CachedData, ArchivedRecord, FormattedData, PresentationData, ProbeVehicleData, InfrastructureInfo, AssetCondition.
* **22 consolidated functional requirements retained** (from original 58, 36 excluded, some merged).
* **0 hallucinated requirements** (all linked to existing entities, E-R diagram remains weakly connected).
* **22 valid (non-hallucinated) requirements**.