Road Report AI – Road Risk Scoring Framework Draft

1. Road Risk Score (RRS)

Road Report AI assigns each road segment a Road Risk Score (RRS) on a scale from 0 to 100, where higher values indicate greater crash likelihood.

Risk Level Categories

0–20 → Very Low Risk

21–40 → Low Risk

41–60 → Moderate Risk

61–80 → High Risk

81–100 → Severe Risk

2. Risk Score Components

The Road Risk Score is calculated using four major components:

C = Road Condition Risk

A = Historical Accident Risk

E = Environmental Risk

T = Traffic Risk

Each component contributes a weighted portion to the final score.

3. Component Definitions

A. Road Condition Risk (C)

Range: 0–30 points

Condition	Points
Construction Zone	+10
Potholes Reported	+6
Poor Road Surface	+5
Lane Closures	+5
Poor Signage	+4

Maximum Possible: 30 points

B. Environmental Risk (E)

Range: 0–25 points

Condition	Points
Ice / Snow	+12
Heavy Rain	+8
Fog / Low Visibility	+7
Night / Low Lighting	+5
High Wind	+4

Maximum Possible: 25 points

C. Traffic Risk (T)

Range: 0–20 points

Condition	Points
High Traffic Density	+8
Speed Limit > 60 mph	+6
Near Intersection	+4
School Zone	+3

Maximum Possible: 20 points

D. Historical Accident Risk (A)

Range: 0–25 points

Historical accident risk is normalized relative to the most dangerous road segment in the dataset.

A = 25 × (Accidents on segment ÷ Maximum accidents observed)

This ensures the highest-accident road receives the full 25 points.

4. Final Weighted Risk Formula

The final Road Risk Score is calculated as:

RRS = 0.35C + 0.30A + 0.20E + 0.15T

Where:

35% weight = Road Condition Risk

30% weight = Historical Accident Risk

20% weight = Environmental Risk

15% weight = Traffic Risk

The resulting score is normalized to a 0–100 scale.

5. Optional AI Enhancement (Hybrid Model)

The system may incorporate a machine learning probability score (P) ranging from 0–1.

Final Score = 70% Weighted Formula + 30% (P × 100)

This allows the model to remain interpretable while benefiting from predictive AI enhancements.

6. Example Scenario

If a road segment has:

Construction Zone (+10)

Heavy Rain (+8)

High Traffic Density (+8)

Accident rate at 80% of dataset maximum

Then:

C = 10
E = 8
T = 8
A = 25 × 0.8 = 20

RRS = 0.35(10) + 0.30(20) + 0.20(8) + 0.15(8)

RRS = 3.5 + 6 + 1.6 + 1.2 = 12.3

The score is then scaled to the 0–100 range for display in the web application.