



# Road Plus

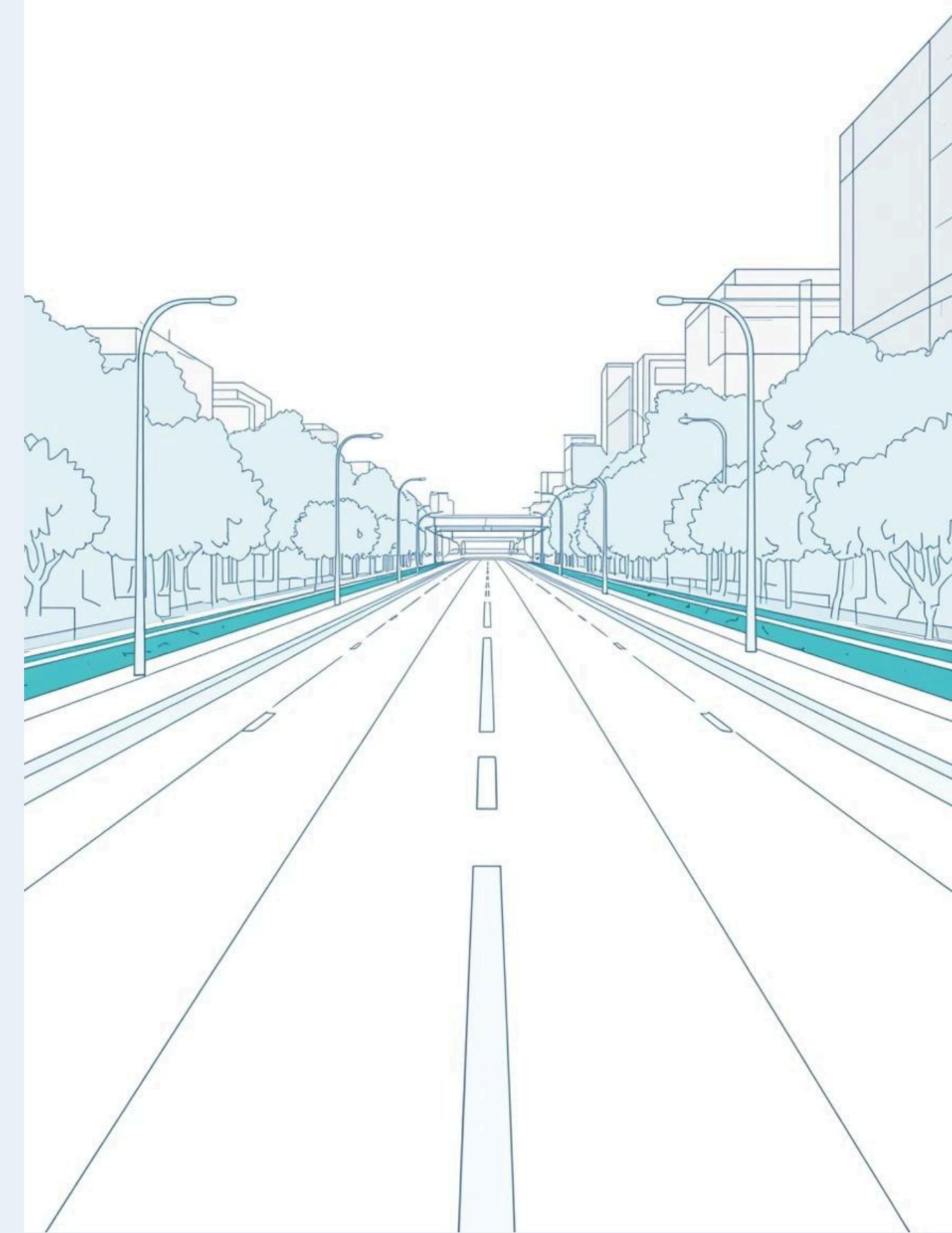
Smart, Transparent & Rapid Road  
Maintenance Service

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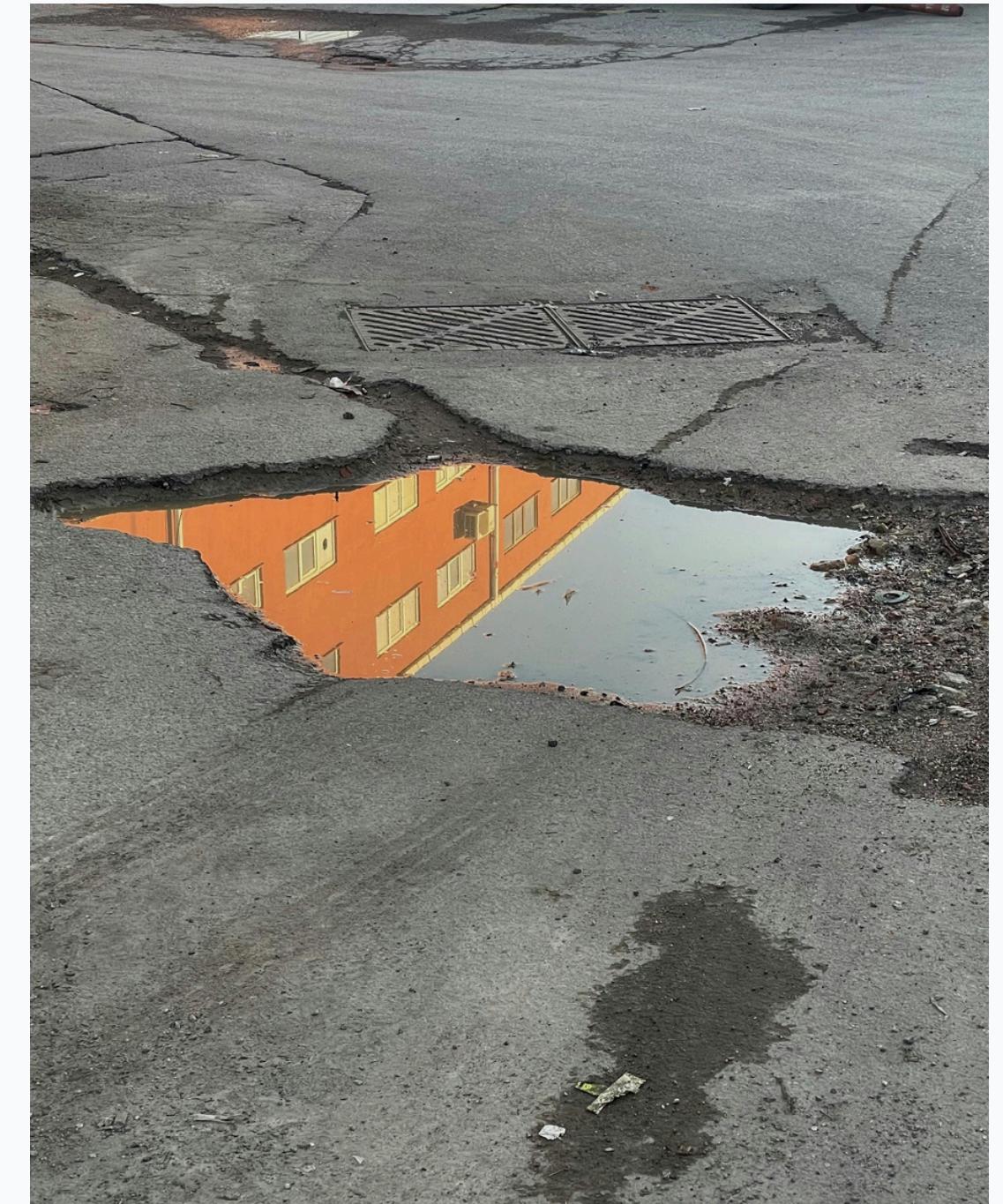
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# The Urban Road Problem

Ahmedabad roads face repetitive pothole formation, especially post-monsoon → causing:

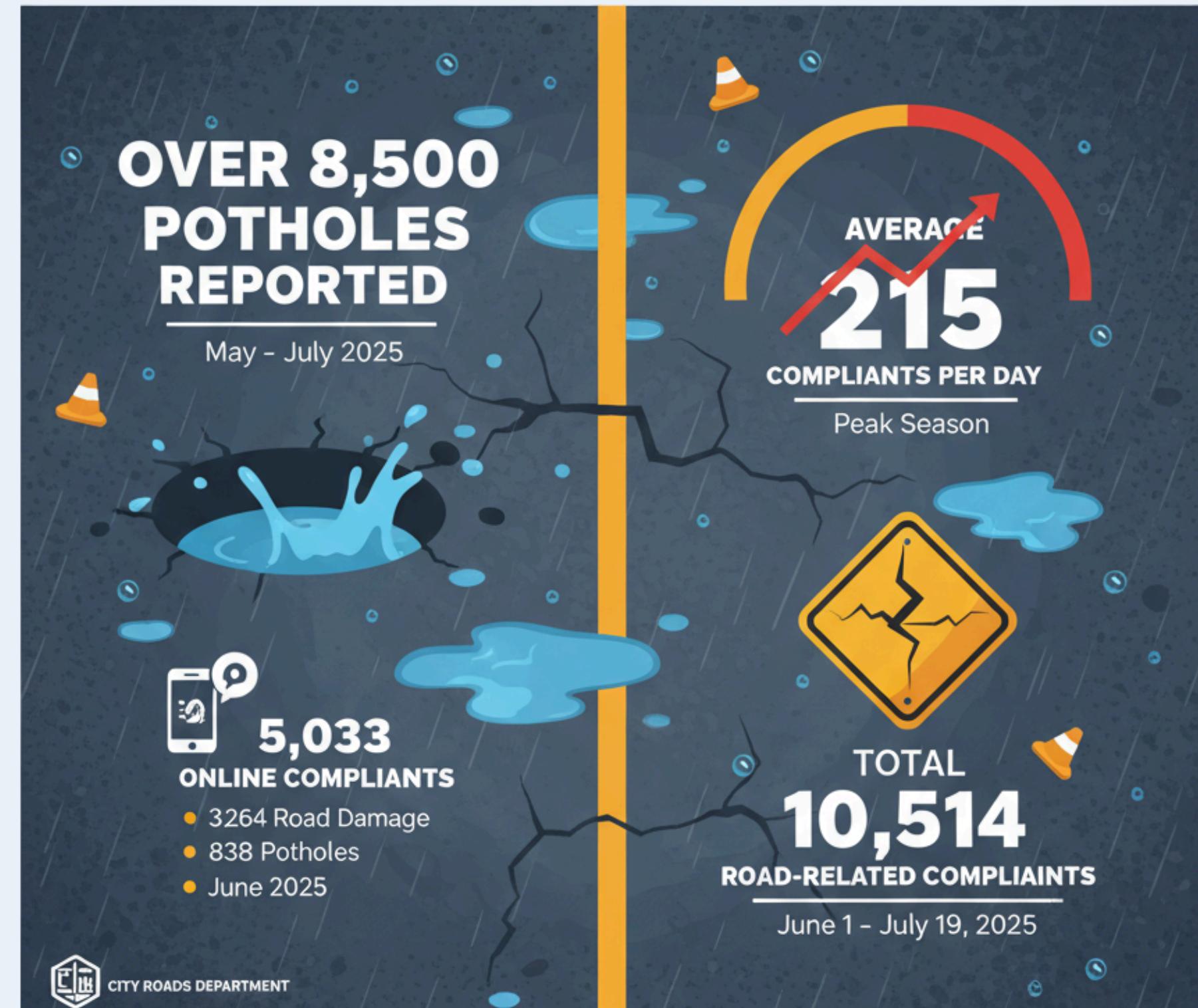
- Safety risks (skidding, accidents)
- Commuter discomfort and back pain
- Higher vehicle maintenance costs
- Delays in bus and goods movement



The issue is not that roads break — the issue is major percentage of potholes recur within 3 months due to incentive + verification gaps.

# Why Does This Happen? (Root Causes)

- Repair system is reactive, not preventive
- Verification delays due to limited field staff
- Contractors are paid per patch, not for durability
- Little public transparency → trust gap
- Monsoon + heavy vehicles re-damage weak repairs



# Current Attempts



## Gov Apps Helplines

AMC app WhatsApp reporting  
Low adoption still reactive



## Tech Detection Tools

AI Drones Road-scanners  
Detection not repair execution



## Citizen Pressure Groups

Social media local activism  
No structural authority

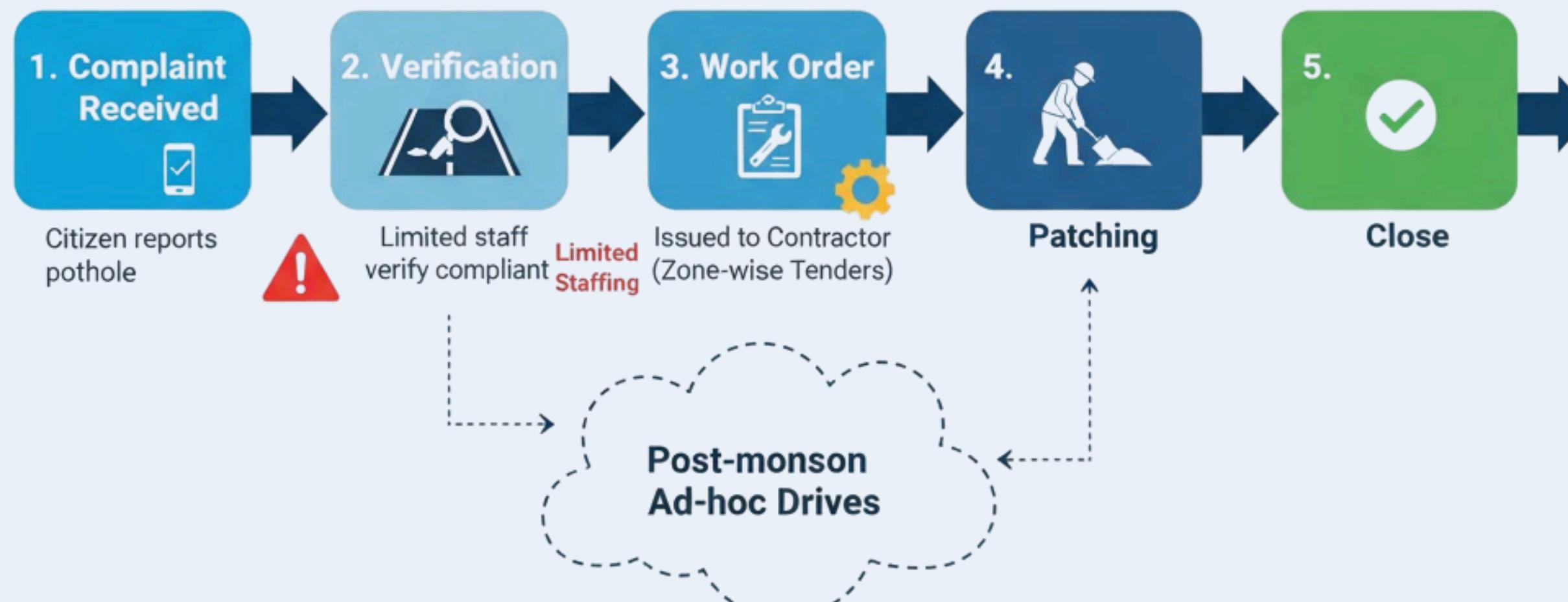


## Private Contractors

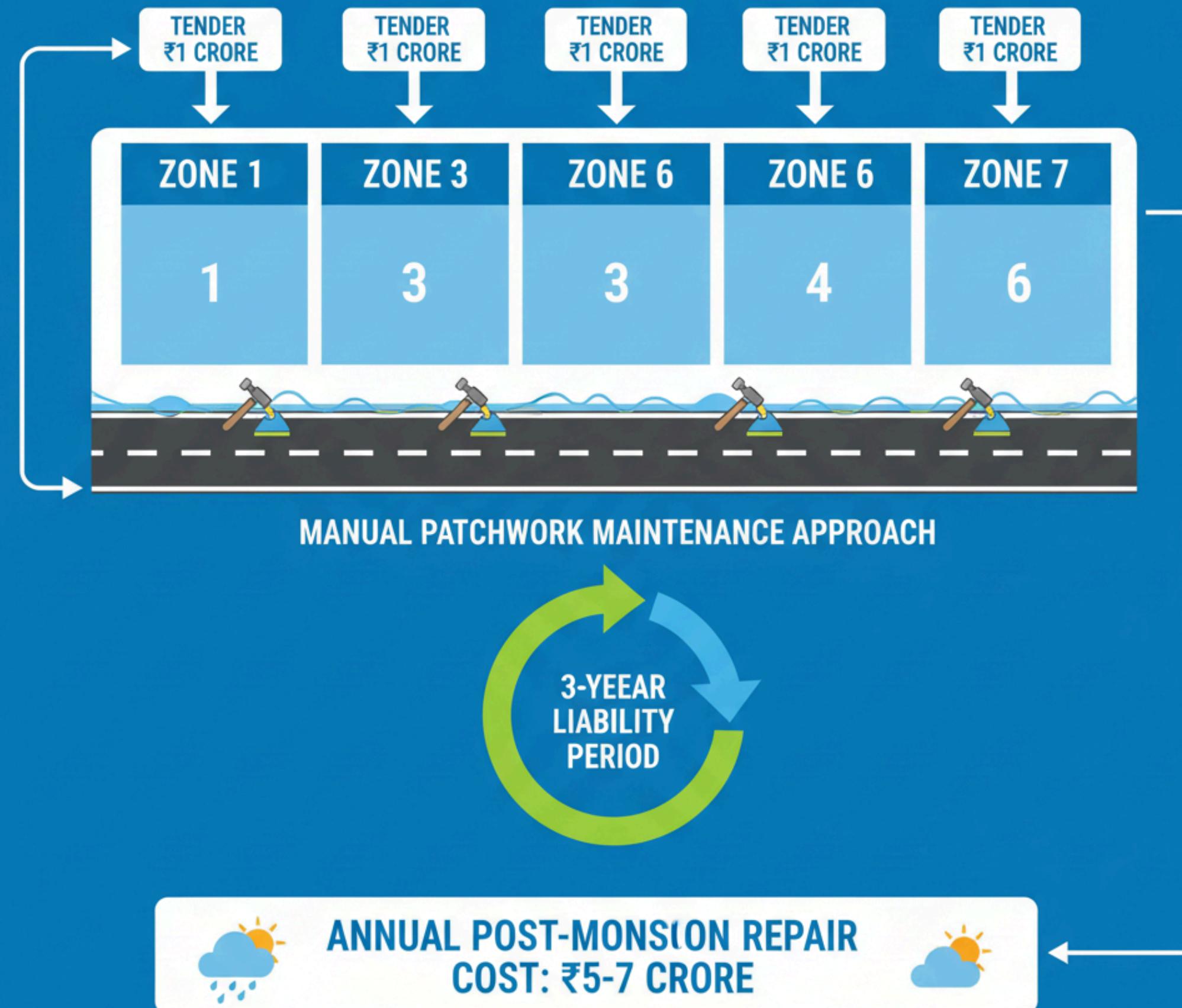
Tender-based patchwork Incentives  
es favor repeat repairs not quality

# History & Current Maintenance Model (How It Works Today)

## AMC Pothole Compliant Process (Traditional Reactive Maintenance Model)



## ROAD MAINTENANCE OPERATIONAL MODEL - ZONAL STRUCTURE



# New SOP Framework (July 2025)

## Gujarat Road Maintenance: New Standard Operating Procedures (SOP)



### DAILY SURVEYS & DOCUMENTATION

Engineers to conduct daily road inspections all defots location.



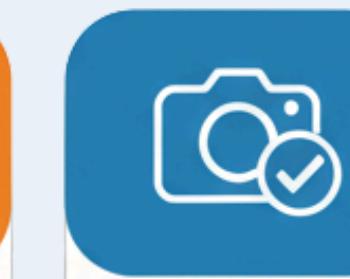
Document all defects with photos & location.



### RAPID REPAIR TIMELINE

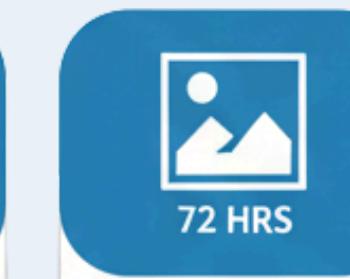


### SERIOUS DAMAGE: repair completion



### WORK COMPLETION & VERIFICATION

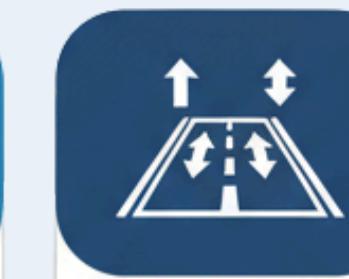
Completed work to be photo-documented within 72 hours



### STANDARDIZED METHODOLOGY



Uniform repair requirements mix.  
(e.g), bitumen mix, aggregates.



### TECHNOLOGY ADOPTION

1. Cold Emulsion Injection Pothole Pothole Patching



2. Infrared Recycling Technology

# ROAD MAINTENANCE HISTORICAL PERFORMANCE (2020-2025)

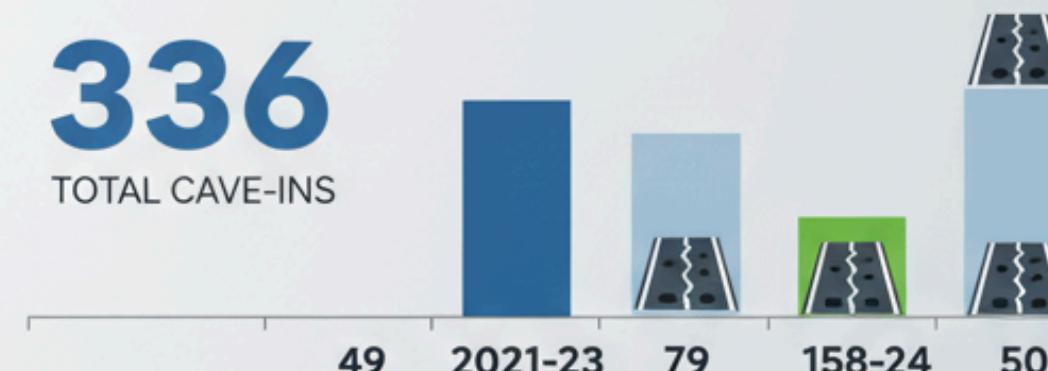
## 5-YEAR OVERVIEW



### CAVE-INS

**336**

TOTAL CAVE-INS



**1.53 LAKH**  
TOTAL ROAD-RELATED  
COMPLIANTS  
OVER 5 YEARS

### POTHOLEs

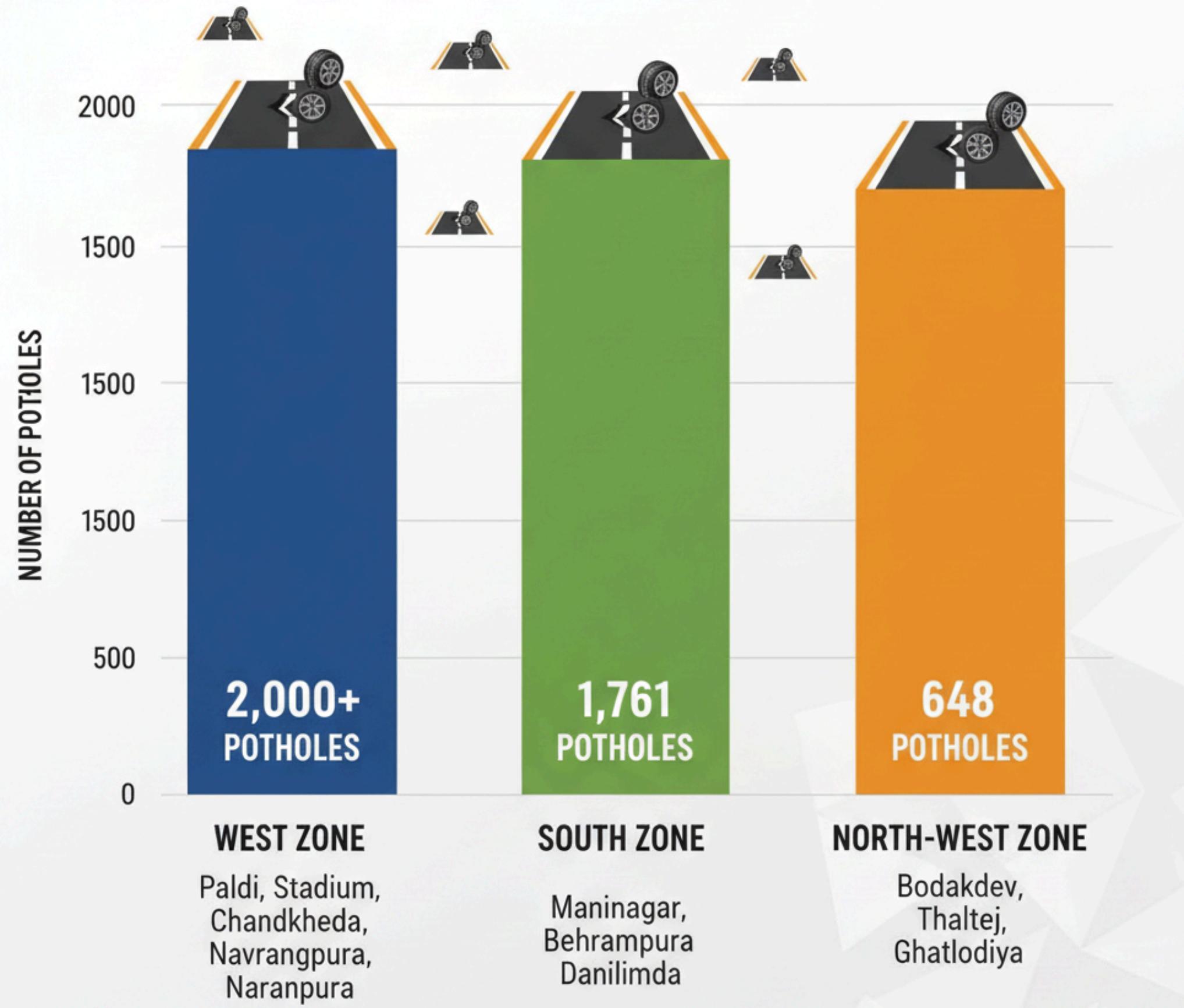
**19,000**

RECORDED IN 2024-25



**OVER 15,000**  
POTHOLEs ANNUALLY  
DURING MONSOON SEASONS

## ZONE-WISE POTHOLE PROBLEM DISTRIBUTION



# Where the System Breaks

- Reactive: work starts only after complaints
- Understaffed verification → slow SLA
- Misaligned incentives: paid per patch, not durability
- Weak monitoring: limited proof, low transparency
- Monsoon failure: temporary fixes re-fail

Job to Be Done	Assigned Today	What Actually Happens	Job to Be Done
<b>SLA Enforcement</b>	Municipal engineers	Manual checks → delayed penalties → SLA meaningless	<b>SLA Enforcement</b>
<b>Proof-of-Work</b>	Contractors	Self-reported photos → unverifiable → low trust	<b>Proof-of-Work</b>
<b>Recurrence Reduction</b>	Nobody explicitly	Paid per patch → repeat failures rewarded	<b>Recurrence Reduction</b>

# Competitor Landscape

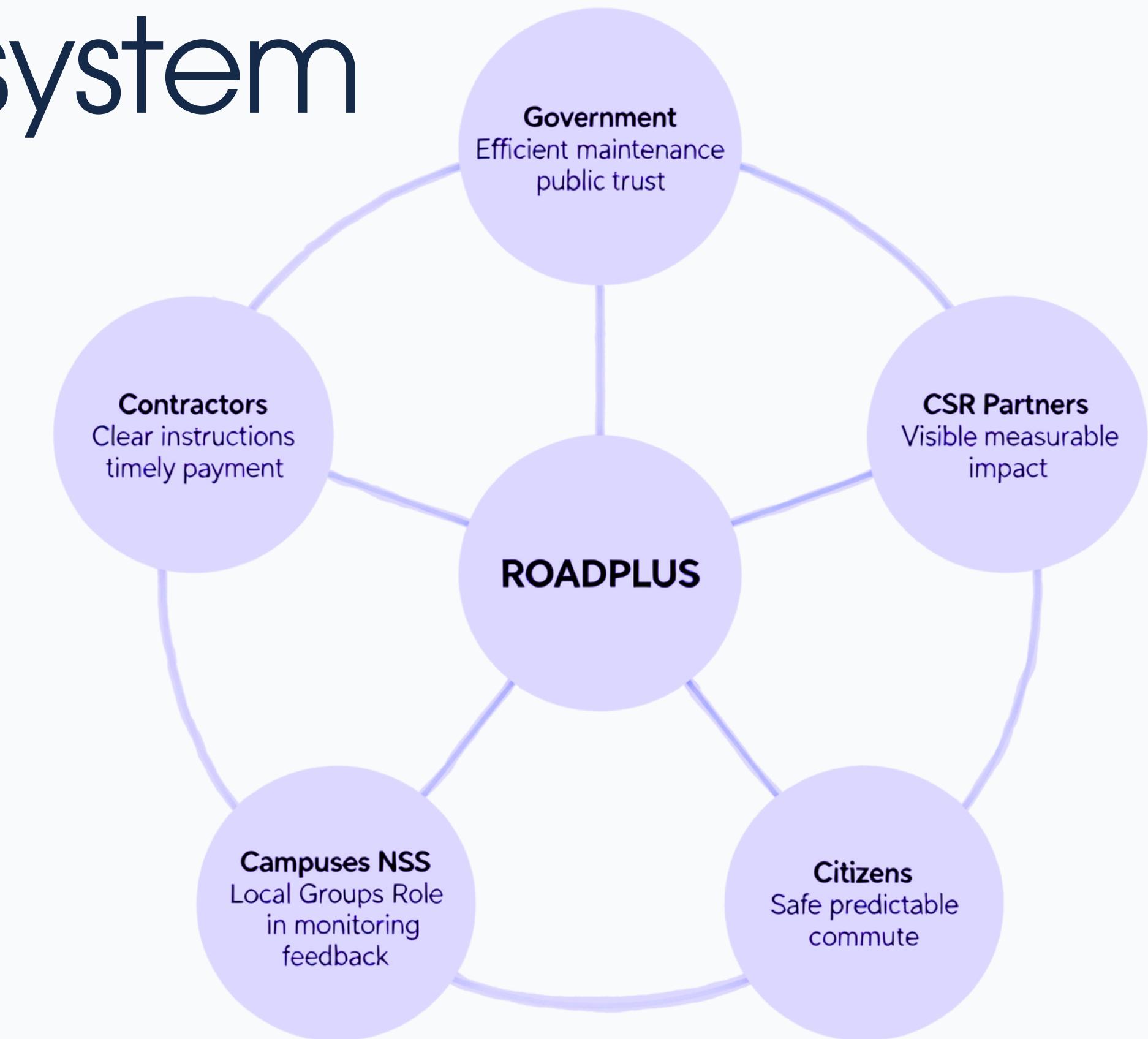
<b>Player</b>	<b>Focus</b>	<b>Gap</b>
PotHoleRaja®	Materials + CSR execution	Limited monitoring & SLA
Ecofix+ CRRI	Rapid cold mix repair	Does not solve transparency
Pothole Brigade	AI-based condition scanning	No execution governance
JCB/CRRI Patch Machine	Mechanized repair	Requires coordinated ops layer

Nobody is solving the problem of Accountability + Coordination + Durability.

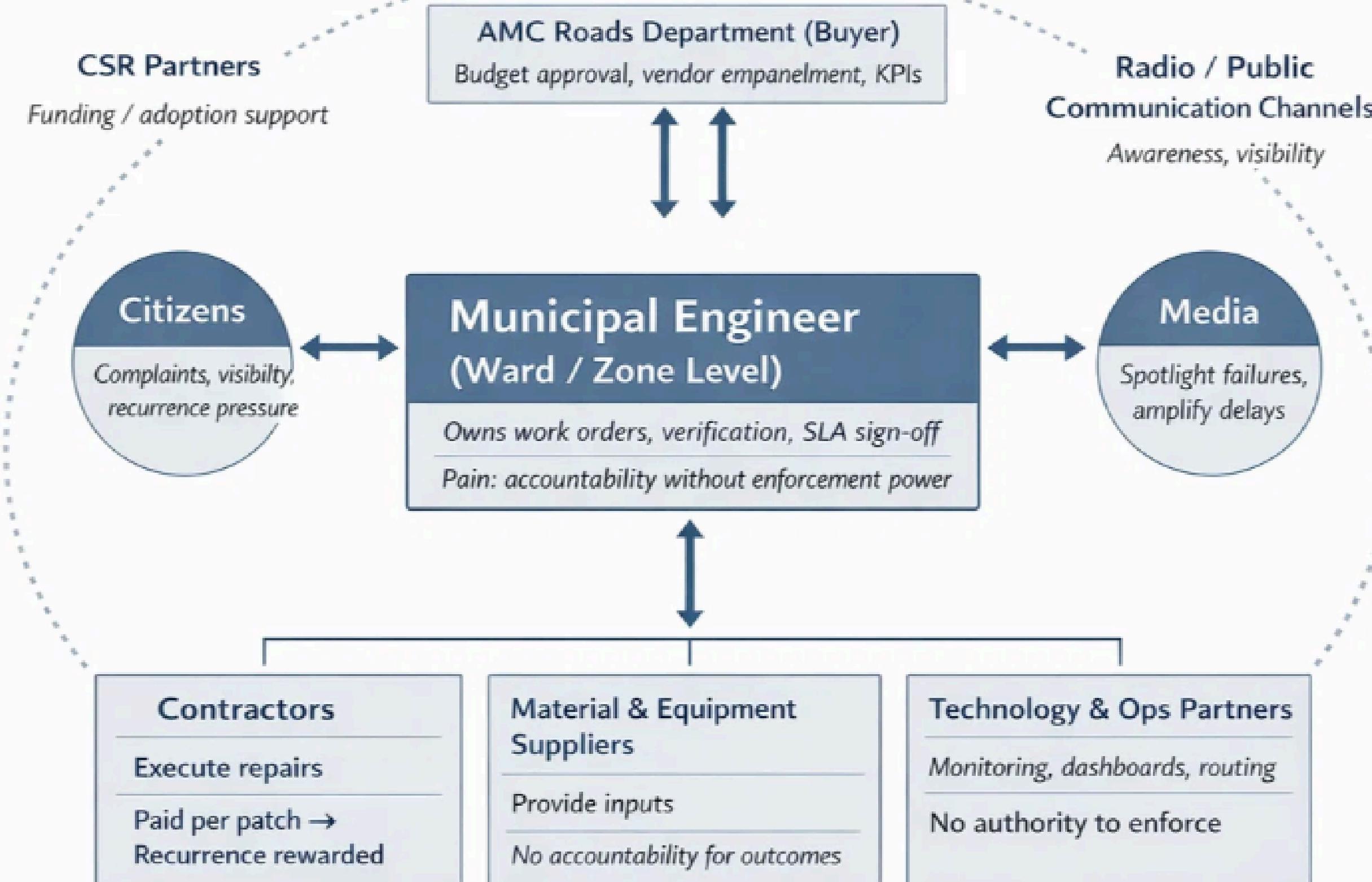
# Stakeholder Ecosystem

Engaging all parties for successful governance

The **ROADPLUS** initiative thrives on cooperation among key stakeholders, including government entities, contractors, citizens, and CSR partners, ensuring a comprehensive approach to urban road improvement and sustainable development.



# Decision-Centric Stakeholder Map



# Contextual Inquiry (User Research Insights)

Interviewed: Faculty commuters, workshop staff, rickshaw drivers, Nirma transport team

Common patterns:

- Back pain & spine stress due to continuous jolts
- Rickshaws risk tipping when weight shifts over potholes
- Bus drivers report fatigue + slower routes
- Water-filled potholes cause uncertain depth → fear + risk



**Ahmedabad man thought it was just a pothole. Then a sinkhole nearly swallowed his vehicle**

The sinkhole was formed on a busy six-lane road in Ahmedabad.

 Hindustan Times / May 6

# Contextual Inquiry

## Two-Wheeler Riders

- Broken patches → jerks; bike ergonomics help but still strain
- Wants predictable safe corridor near campus entrances
- Slow speeds → delay; frequent tyre/suspension cost
- Water-filled potholes risky on new routes
- Passengers feel more discomfort than riders

## Three-Wheeler Riders

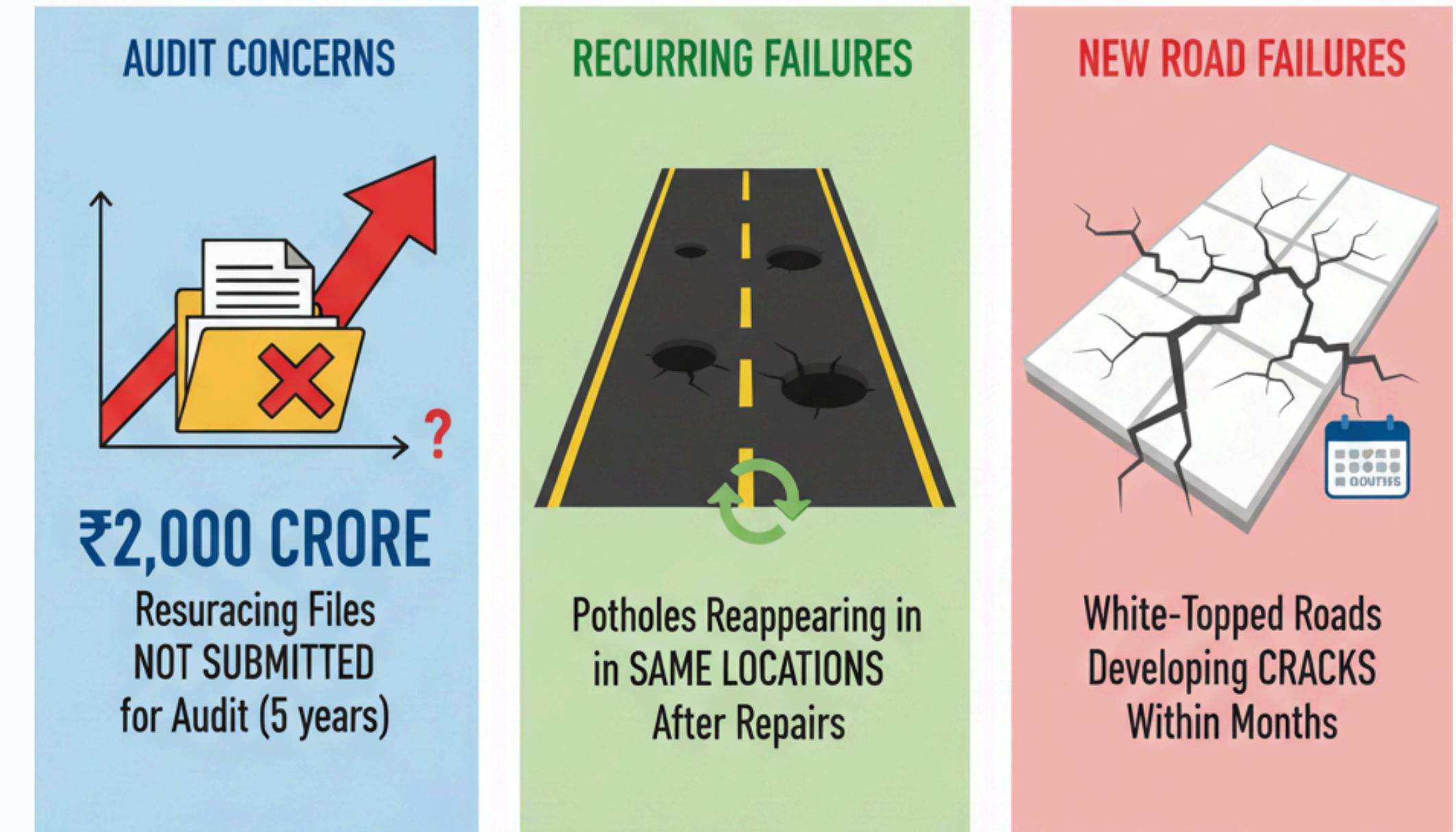
- Weight shift can cause tilt on potholes
- Slow speeds → delay; frequent tyre/suspension cost

## Four-Wheeler Riders

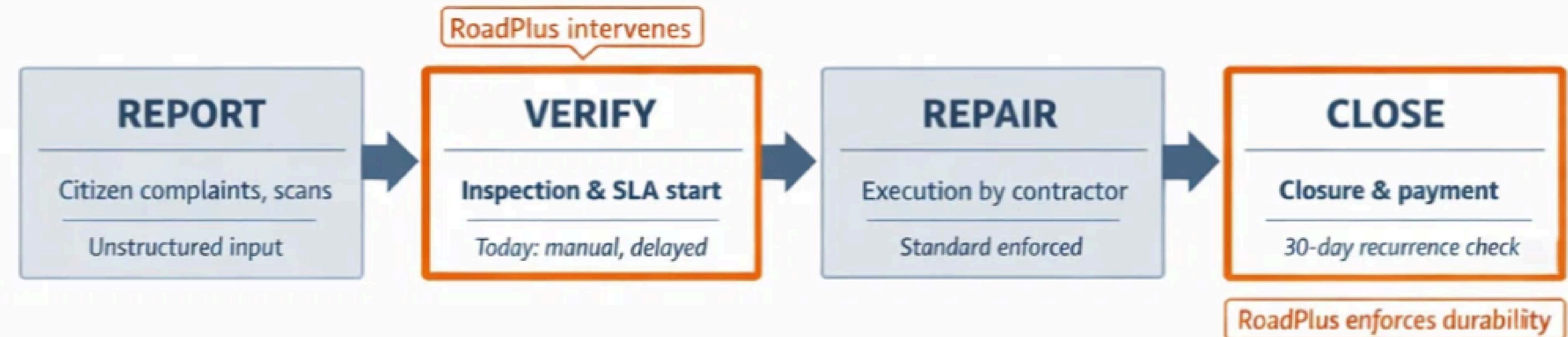
- 6–35 km commutes; early hours
- Accidental hits → back/wrist/leg pain
- Vehicle repairs rise; tyres/suspension changes are required sooner than usual
- Going slow to avoid damage → late arrivals

# Core Insight

- The unsolved problem is not detection or repair — it is verifiable closure within SLA
- Durability, speed, and proof must be built-in
- Public visibility (progress + SLA) drives trust & compliance



# End-to-End Road Maintenance Workflow (Ownership Shift)



RoadPlus Owns Across All Steps

- SLA enforcement
- Proof-of-work
- Recurrence accountability

# Service Blueprint (Frontstage/Backstage)

PHASE	FRONTSTAGE (User Sees)	BACKSTAGE
REPORT	WhatsApp/IVR submission	Log & severity score
SCHEDULE	ETA & slot shown	Assign contractor, plan materials
EXECUTE	Repair signage on site	Supervisor oversight
VERIFY	Before/After proof visible	QC checklist & acceptance
CLOSE	Dashboard update & feedback	Archive

# Technology Platform



**WhatsApp Bot  
+ IVR (inclusive  
access)**



**Geo-tagged  
work orders;  
SLA countdowns**



**Image/video QC  
tamper-evident logs**



**Public dashboards  
for AMC/CSR/citizens**



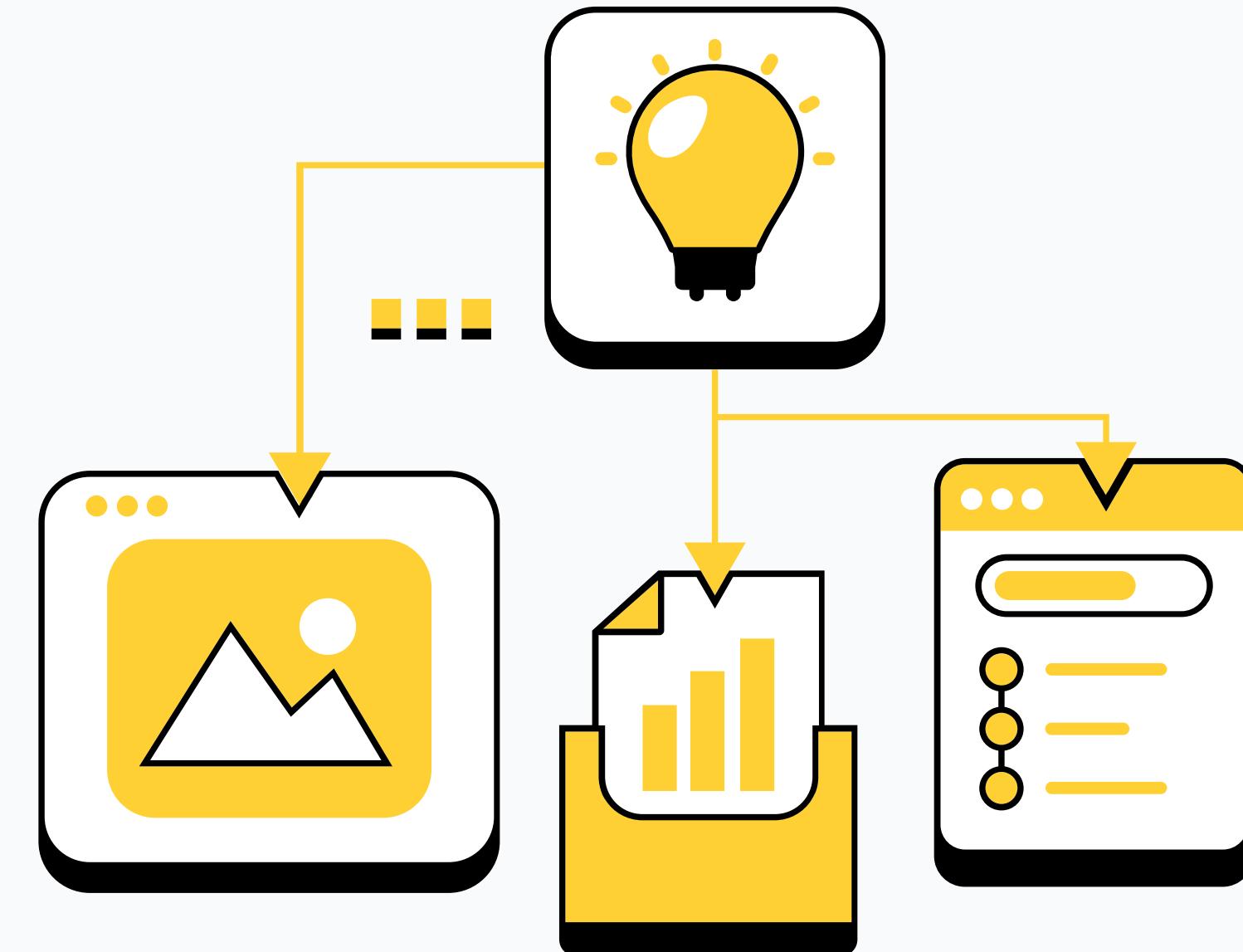
**(Roadmap)  
AI condition scoring  
for preventive  
maintenance**

# Public Communication & Citizen Awareness Layer

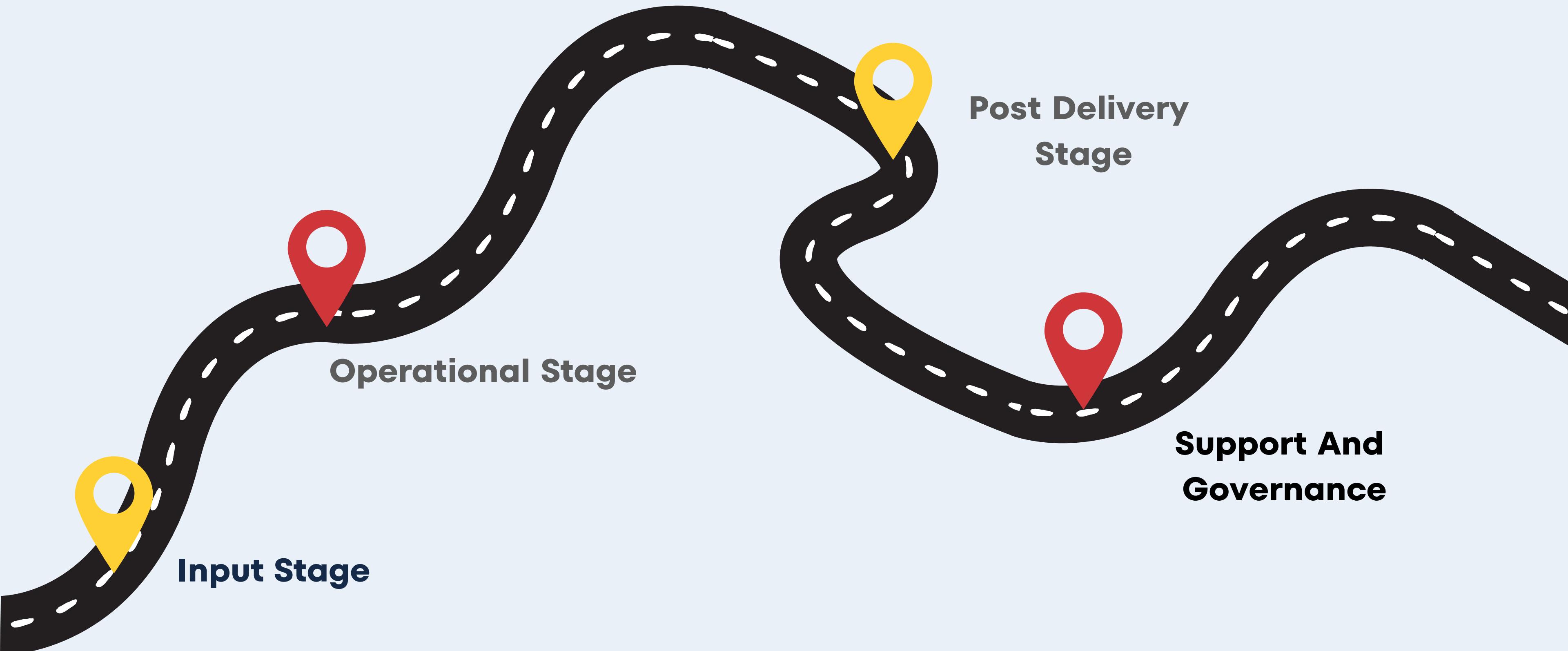
<b>Channel</b>	<b>Role</b>	<b>Outcome</b>
<b>Public Dashboard</b>	Shows live repair status & proof-of-work	Transparency & trust
<b>WhatsApp Notifications</b>	Repair progress updates & closure confirmation	Easy, familiar citizen access
<b>FM Radio Updates</b>	Announce active repair zones & completed roads	Mass reach for commuters
<b>On-Ground Signage</b>	Physical boards at repair sites (“Repair in Progress by RoadPlus”)	Public accountability & safety
<b>Community Bulletin / Campus Groups</b>	Disseminate schedules & hotspots	Local monitoring & participation

# Business Model & Revenue

- Funding: Government maintenance budgets + CSR Adopt-a-Road
- Execution: existing contractors; we orchestrate
- Revenue:
  1. Fee per closed ticket
  2. Paid only if no recurrence in X days
  3. AMC comparison: Engineer cost vs reduced rework %
- Why they pay: lower rework spend, higher satisfaction, measurable CSR impact



# Value Chain



# Input Stage:

Component	Physical Layer	Digital Layer (Control/Concatenation)
<b>Material Sourcing</b>	Bulk waste plastics/slag (80-90% of content) and CRRI Hot/Cold-Mix polymers.	<b>Predictive Sourcing:</b> Algorithm determines optimal material volume/type based on defect severity forecasts.
<b>Inbound Logistics</b>	Rail/Truck haulage to IoT-scanned eco-hubs.	All material batches are logged on a private ledger for origin, quality, and quantity verification, resolving the <b>Transparency Void</b> .
<b>Pre-Ops Data</b>	The physical presence of a repair queue (unit dispatch readiness).	<b>Data Ingestion:</b> Citizen App and data streams are aggregated and translated into a <b>geo-prioritized action queue</b>

# Operational Stage: Input-to-Action Protocol

Component	Physical Layer (Action)	Digital Layer (Prediction/Concatenation)
<b>Execution Shift</b>	Semi-autonomous units (JCB Pro) and technician crews.	<b>Preventive Shift:</b> Predictive Analytics automatically flags "Hotspots" for crack sealing <i>before</i> a pothole forms.
<b>Mixing/Prep</b>	On-truck cold-mixing (3 min/batch) using low-emission processes.	<b>Real-Time QA/QC:</b> IoT sensors monitor mix ratios and process compliance; any deviation flags a non-compliant audit log entry.
<b>Dispatch/Routing</b>	Unit drives to the assigned repair site.	<b>Dynamic Routing:</b> GPS/IoT optimizes the route based on real-time traffic, material inventory, and the automated priority queue.

# Post Delivery Stage:

Proof-of-Work & Auto-Enforcement		
Component	Physical Layer (Proof)	Citizen & Digital Layer (Audit/Concatenation)
Execution	Automated Cut/Clean to Fill/Compact (Ultracrete standard, 24-60 month lifespan).	-
Aftercare	30-day AI re-scans and follow-up crack sealing (if needed).	<b>Auto-SLA Enforcement:</b> Citizen apps (Spothole-inspired) track recurrence. Failure rates (>5%) auto-trigger contractual fine penalties via Smart Contracts.
Closure/Payment	Final repair completion.	<b>SLA Success-Triggered Payment:</b> Blockchain verification of 'No Recurrence' within the SLA period <i>automatically</i> releases payment to PotholeShield.

# Support and Governance

Layer	Focus Area	Value Created
<b>Governance &amp; Audit</b>	CRRI & ISO oversight; transparent tendering	Eliminates corruption & ensures policy-grade accountability
<b>Human Capital</b>	AI-based technician training & inclusive hiring	Skilled, diverse, and certified workforce
<b>Finance &amp; ROI</b>	Smart contracts for payments/fines	25–30% faster ROI, error-free cash flow
<b>Cross-Cutting (Sustainability)</b>	Waste-to-export modular model	30% emission cuts, ESG credits, global scalability

# Additional Considerations

- Climate-resilient materials (polymer asphalt, water-resistant mixes).
- Legal clarity on liability (accidents due to unrepainted roads).
- Public trust via transparency (live dashboards, open repair logs).
- Scalability: adaptable for urban/rural needs, future-proof (autonomous repair bots).
- Integration with city planning + transport upgrades



# Logistics



## MATERIAL LOGISTICS

- Cold/Hot Mix: Must be CRRI-certified. Store under shade; keep temp
- Stockpile in 20-ton heaps. Use FIFO.
- Chemicals like Additives & Paints to store in 200 L drums.

## TRANSPORT & INVENTORY

- Supply Chain:
  - Plant to Depot: Weekly Bulk Truck.
  - Depot to Crew: 0.5 - 1 ton/day via Crew Van.
- Tracking with Use RFID/Barcode. Reorder trigger is 40% stock.
- Milling waste must be recycled into base layer (MoRTH 2023 compliance).



# MACHINERY LOGISTICS

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## Core Fleet

- 3 Pothole Repair Units (CRRI Patch-Fill or JCB).
- 3 Mini Rollers, 6 Hand Compactors.
- 3 Tippers, 1 Water Tanker.

## Preventive Maintenance:

- Daily: Visual check & Fuel Log.
- Weekly: Grease / Filters check.
- Monthly: OEM Inspection Log.

## Deployment & Control:

- Central Fleet Base @ km 20.
- IT Tracking GPS tag
- Downtime Rule: 4-hour mobilization for replacement unit if primary fails.



# Planning and Scheduling

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- Segmentation in 3 operational zones
- Maintenance Window:
  - 1 Routine inspection → weekly.
  - 2 Preventive resurfacing → quarterly.
  - 3 Reactive/pothole → within 24 h of report.
- Crew : Two mobile teams per zone rotating in shifts.
- Scheduling Tools: GIS-based maintenance calendar + Gantt tracker (link to weather feed).
- Performance : km maintained / day | response time (h) | patch life (months).



# Weather & Environment

- Forecast Integration via Daily API
- Operational Adjustments:
  - Cold-mix preferred under 25–45 °C.
  - No surface work during rain
- Environmental Compliance:
  - Use solar-LED lighting for night ops.
  - Waste bitumen collected for recycling.
  - Noise < 75 dB limit per CPCB norm.
- Pre-monsoon major repairs + post-monsoon inspection drive.



# IT & Coordination

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- Core Systems
  - CMMS: for inventory + fleet + HR.
  - GIS Dashboard: map-based status view.
  - Vision Tool - automated crack / pothole index.
- Data Flow
  - App → Cloud server → Central control → Dashboard
- Local Radio + WhatsApp Ops group + daily digital log
- Analytics with monthly reports on material usage vs defect density.
- Cyber Backup with local mirror server + weekly off-site copy.

# Material Procurements

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Material	Source	Quantity (for 40 km/yr)	Logistics
Cold/Hot mix bitumen	CRRI / local plant	60–80 ton	monthly tanker delivery
Aggregate (10–20 mm)	Local quarry	250–300 ton	6–8 truckloads / month
Emulsion & polymer binder	HPCL / IOCL / Ultracrete	10 ton	stored in sealed drums
Paints & sign boards	Local	As per km	1 truck / quarter
Safety gear + tools	Contractor / dealer	sets for 30 workers	centralized stock

# Workforce Structure

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Role	Count	Function
Project Manager	1	overall coordination
Contracter(Site Engineer)	3	section leads (13 km each)
Skilled Technicians	9	machine ops + paving
General Labour	18	cleaning + manual support
Safety & QC Officer	1	compliance + testing
Data Operator	1	logs + digital report
Drivers & Mechanics	6	support fleet

# Equipment & Fleet

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Category	Type	Quantity
Pothole Repair Unit	CRRI Patch-Fill / JCB pothole machine	3
Mini Roller (1 ton)	Ride-on	3
Compactor / Ram	Handheld	4
Bitumen boiler	500 L capacity	1
Generator + lighting	3 sets	3
Trucks (5 ton tipper)	For aggregate / waste	3
Water tanker	3000 L	1
Digital Inspection Van	RoadBotics / camera AI	1

# KPIs

## Primary KPI

% of repairs with zero recurrence in 90 days

This is the single metric we optimize for.

## Supporting Metrics

- Mean Time to Close
  - Verified report → durable closure
- Cost per durable repair
  - Total spend ÷ zero-recurrence repairs
- SLA breach rate
  - % of cases exceeding committed SLA

# The Ask / Partnerships to Forge



## AMC/AUDA/NHAI

MoU for pilot and data access



## Contractors

SLA alignment and QC compliance



## CSR

Corridor sponsorship and visibility



## Institutions

NSS monitoring partnership

# Thank You