Ganpati Bandobast 2025 — AI-Built Final Report (Draft v1)

Prepared by: Bandobast AI Unit
Date/Time (IST): 2025-08-27 11:00
Scope: Nashik City & Trimbakeshwar (PS-wise), festival period incl. Eid overlap
Status: Presentation-ready; field-ready after PS contact fills, QR inserts, and final KML locks

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1) Document Control

Version	Date (IST)	Owner	Change summary
v1.0	2025-08-27 11:00	Bandobast AI Unit	First consolidated AI-built draft

Distribution: CP Office, DCPs, ACPs, PIs/SPIs; Disaster Mgmt Cell; NMC; SRPF; Traffic Branch.
Confidentiality: Internal operational use.

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2) Executive Summary

This report consolidates all AI-assisted planning for Ganpati Bandobast 2025. It integrates PS-wise GIS layers (police stations, mandals, immersion routes, ghats, checkpoints, congestion nodes, sensitive areas), a prediction engine for crowd/congestion/risk, and station playbooks with QR-linked maps. Public-shareable links (NotebookLM, Earth maps, BandobastGPT) enable quick queries and visual verification. Next steps: fill PS contacts, insert QR codes per PS route, and attach SRPF/QRT surge tables for peak days.

2A) AI Expert Overview (Leadership)

Purpose: Deploy an AI-first operations layer that forecasts, recommends, and explains actions for PS-wise Ganpati bandobast.

What "good" looks like (targets): - Peak-hour hit rate (±1 hr) ≥ **85%**; Red-segment precision ≥ **80%**; SITREP accuracy ≥ **95%**. - Alert→ack time **<2 min** (control), SRPF/QRT dispatch→on-scene **<8 min**.

What's "safe": - Human-in-the-loop on Reds, full audit trail, reversible diversions, privacy-by-design (no raw face/plate storage by default).

Operational touchpoints: - Control-Room Live Map, PS wallboard, Field PWA (QR), WhatsApp copilot; same truth for all ranks.

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3) Forensic Back-Trace (What's built)

- **Data corpus (10 years):** consolidated briefs and incidents for training/validation.

- **City map layers:** PS boundaries, large/valuable mandals, checkpoints, congestion nodes, sensitive areas (Eid + peak visarjan), immersion routes, ghats.
- **PS playbooks:** one-page templates with counts, routes, QR placeholders, readiness checklist.
- **Prediction engine:** hourly load index, route congestion (Green/Amber/Red), incident risk, and manpower suggestion logic.
- **Leadership brief:** PPT visuals of timelines, peaks, triggers, and roadmap.

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4) Festival Scope & Dates (2025)

- **Operational window:** [Insert exact festival dates + Eid overlap].
- **Peak alerts:** [Insert peak-day windows].
- **Key ghats:** Ramkund cluster, downstream points, and [PS-wise minor ghats].

Note: Confirm final day-wise schedule from NMC/Police circulars and insert in Annex.

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5) GIS & Coordinate Mapping (Method)

Layers (read-only geometry; any derived lines labelled `derived_*`): 1. Police Station boundaries (citywide index).
2. Mandals: Large/valuable + medium + household points.
3. Immersion routes: Station→Mandal→Ghat (`derived_route_*`).
4. Ghats and holding areas; queue spill buffers (200–400m).
5. Checkpoints, barricade nodes, crane locations, first-aid/ambulance, fire points.
6. Congestion hotspots (historic + inferred from graph centrality).
7. Sensitive zones (Eid sites, narrow lanes, high-risk nodes).

Verification: Each PS validates its own layers; city cell approves conflicts.
Exports: KML/KMZ per PS; city roll-up master; QR links per PS.

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6) AI Stack — Tools & Modules (15)

This project is built with AI end-to-end. Confirmed public links are marked (✓). Remaining modules are internal pipeline components.

#	Component / Tool	Role in workflow	Where it appears	Status
1	**NotebookLM** (✓)	Q&A over 10-yr corpus; drafting briefs	Link library	Confirmed
2	**BandobastGPT (ChatGPT custom)** (✓)	Ops copilot; policy look-ups; PS formatting	Link library	Confirmed
3	**Google Earth – City Map** (✓)	Visual layers (PS, mandals, chokepoints, congestion)	Link library	Confirmed

#	Component / Tool	Role in workflow	Where it appears	Status
4	**Google Earth – Sensitive Areas** (✓)	Eid + peak visarjan risk layer	Link library	Confirmed
5	LLM Summarizer	Auto-summaries of PS inputs & daily SITREPs	PS playbooks	Active
6	RAG Engine	Stationwise retrieval from structured docs	PS one-pagers	Active
7	Time-series Forecaster	Hourly crowd/footfall per PS/ ghat	Prediction section	Active
8	Graph Congestion Model	Segment risk (Green/Amber/ Red) from route graph	Diversions	Active
9	Incident Risk Scorer	Ensemble (logistic + rules) with trigger bumps	SOP triggers	Active
10	Optimization Solver	Shift-wise manpower & SRPF/ QRT allocation	Manpower tables	Active
11	Vision Counter (CCTV)	Optional YOLO/ByteTrack for chokepoint counts	Annex (pilot)	Optional
12	Translation Engine	Marathi↔English briefings; SMS/notice texts	Annex templates	Active
13	Prompt QA Guard	LLM output checks (dates, PS names, routes)	All sections	Active
14	Geo-QR Generator	KML/KMZ → QR deep-links	PS QR panels	Active
15	Change-Log Bot	Annotates edits; compiles SITREP deltas	Changelog	Active

7) Prediction Engine — Method (Operational Summary)

Goal: Forecast crowd load, route congestion, and incident risk PS-wise & ghat-wise (hourly) to guide diversions and rosters.

Inputs: Festival day index (D1/D5/D10), hour bands, rain (24h mm), dam discharge (cusecs), weekend/ holiday flags, VIP moves, historic incidents, mandal tiers, graph features (chokepoint density, centrality), sensitive-zone proximity.

Models: - Gradient-boost regression for hourly load (fallback to rolling quantiles if sparse). - Segment classifier for congestion (GAR colors + reason codes). - Risk ensemble (logistic + trigger rules). Triggers (examples): Rain>100mm/24h; Dam>25k cusecs. - Small integer program for surge deployment per shift (travel-time aware).

Outputs: PS Hourly Load Index (0–100), ghat queue-time band, route GAR map with reason, manpower table (base/surge/reserve).

Validation: Backtests on 2015–2024 patterns; PI/SPI face-checks on 10 heavy corridors; confusion matrix for Red segments.

Guardrails: Human confirmation for Reds; all triggers/assumptions logged; reversible diversions.

7A) Model Card — Prediction Engine v1

- **Use-case:** Hourly crowd load, route congestion (GAR), incident risk for PS & ghats.
- **Owners:** Product — DCP (Ops); Model — Bandobast AI Unit; Data — PS/GIS/Traffic.
- **Data:** 2015–2024 incidents, mandal tiers, routes/ghats, weather & dam signals, optional CCTV counts.
- **Features:** temporal (hour/day/D-index), spatial graph (centrality, chokepoints), sensitive-zone proximity, weather/hydrology.
- **Algorithms:** GBDT regression (load), classifier (GAR), logistic + rules (risk), small ILP (manpower).
- **Training/Validation:** rolling-year backtests; k-fold by corridor; confusion matrices for Red; calibration on PI/SPI reviews.
- **Inference:** hourly (PS/ghat); segment-level on demand; rules apply instantly on triggers.
- **Outputs:** Load Index 0–100, GAR + reason code, queue band, manpower table.
- **Performance (pilot):** MAE on ghat load [to fill]; Red precision [to fill]; recall [to fill].
- **Risks/Misuse:** over-trust of Reds without confirm; mitigated via confirm gates + explanations.
- **Update policy:** daily rule refresh; weekly re-fit during season; post-event hard re-train.

7B) Data Provenance & Lineage (Ops view)

Dataset	Source	Freshness	Validation	Retention	Notes
Mandal registry & tiers	PS/City Cell	Pre-season + ad-hoc	Count cross-check; spot calls	Season + 90d	Tier labels drive crowd priors
Routes & ghats	GIS Cell	Pre-season	Topology & continuity tests	Season + 1y	`derived_route_*` are locked
Incidents (10y)	PS records	Static	De-dup + categories	3y rolling	For backtests & priors
Weather (rain)	API	30–60 min	Range & spike checks	1y	Trigger bands (X mm/ 24h)
Dam discharge	WRD/ IRR	30–60 min	Format + monotonicity	1y	Trigger bands (Y cusecs)
CCTV counts (pilot)	Field devices	1–5 min	Device heartbeat	30d	On-device blur/ redaction

7C) Evaluation & Monitoring (MLOps)

- **Pre-season:** backtest MAE, Red precision/recall per corridor; sign-off by DCP/ACP/PI.

- **Live:** drift watch (data & prediction), alert volume sanity, false-positive review windows.
- **Alerting:** if Red FP rate > threshold, auto-throttle + require dual-confirm.
- **Rollbacks:** one-click revert to last good model/ruleset; freeze on continuous ingest failure.
- **A/B gates (pilot):** compare diversified diversion recipes on adjacent corridors.

7D) Assumptions, Limits, Bias Checks

- Sparse historic data on some corridors; rules carry more weight there.
- Household Ganpatis are under-counted; inflow bands widened on peak days.
- VIP movement uncertainty handled via conservative buffers.
- Bias watch: equal false-positive burden across PS and communities.

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8) Traffic Diversion — City Logic (Ramkund Example)

- **Objective:** Keep through-traffic off immersion corridors; prioritize ambulance & fire lanes; minimize residential lock-ins.
- **Instruments:** Timed one-ways, barricade nodes, U-turn pockets, staggered mandal slots, parking buffers with shuttle loops.
- **GAR Triggers:** Amber=pre-emptive soft diversions; Red=hard closure with fallback route opened; reason codes attached.
- **PS Tasking:** Traffic PI to deploy signages at QR-tagged nodes; patrols to enforce diversions; WhatsApp SITREP every 30–60 mins.

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9) Station One-Pager Template (Duplicate for 14 PS)

1) Police Station Details
- Station Name: [_]
- ***In-Charge (PI/SPI): [_]***
- Contact: [____]

2) Mandal Data | Category | Count | |---|---| | Large Mandals | [ ] | | Medium Mandals | [ ] | | Small/Household | [ ] | | **Total** | [ ] |

3) Routes → Ghats (QR-linked) | Mandal/Route | Derived Path ID | Ghat | QR Box | |---|---|---|---| | [ ] | derived_route_### | [ ] | ☐ Insert |

4) Sensitive/Chokepoints | Node | Type | Risk | Notes | |---|---|---|---| | [ ] | [ ] | [ ] | [ ] |

5) Manpower (Shift-wise) | Shift | Base | Surge | Reserve | Notes | |---|---:|---:|---:|---| | Morning | [ ] | [ ] | [ ] | [ ] | | Evening | [ ] | [ ] | [ ] | [ ] | | Night | [ ] | [ ] | [ ] | [ ] |

✅**Station Readiness Checklist**
☐ PI/SPI filled • ☐ QR attached • ☐ Manpower signed • ☐ Routes verified • ☐ Sensitive nodes briefed • ☐ Trigger cards attached

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10) Sensitive Areas — Strategy

- **Eid overlap:** stagger flows; outer cordon + inner escort; coordination with community liaisons.
- **Narrow lanes:** foot-only stretches; no heavy mandal entries; posted marshals.
- **Waterfront pinch points:** pre-lay rope lanes; announce queue rules; emergency ladders & lifebuoys.

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11) Roles & Command Chain

- **City Control:** CP/DCP (Ops), DMC (disaster), NMC (infra), SRPF (surge), Fire, Health.
- **PS Control:** PI/SPI → Beat Officers → Traffic PI.
- **Comms:** 24x7 Control Room; escalation tree; SITREP cadence (hourly peak days).

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12) Logistics & Manpower

- **Assets:** barricades, cranes, boats, ambulances, first-aid, water tankers, lighting towers, gensets.
- **Deployment:** base roster + surge per peak window; QRT near Red segments; SRPF reserve mapped to hotspots.

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13) Triggers & SOP Cards

- **Rain > [X] mm/24h:** elevate riverbank watch, extend barricades, slow procession speed.
- **Dam > [Y] cusecs:** restrict waterfront waiting; shift immersion to alternate ghats if needed.
- **Crowd Index > [Z]:** open bypass route; add shuttle loop; call SRPF surge.

Attach laminated SOP cards to each PS bundle.

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14) QA & Validation

- **Data QA:** name spellings, PS assignments, route continuity, kml geometry locks.
- **Face-checks:** PI/SPI walk-throughs on the top 3 corridors each.
- **Backtests:** compare 2015–2024 peaks against forecasts.

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15) Link Library (Public-Shareable)

- NotebookLM (10-yr corpus): https://notebooklm.google.com/notebook/a4c612ec-d732-4b12-8db8-ebbc05d3d90f
- City Map (PS, mandals, checkpoints, congestion): https://earth.google.com/earth/d/1bn0HzlPOAdUo7Ua5S9nxWeEA2RTGAtOy?usp=sharing
- Sensitive Areas (Eid + peak visarjan): https://earth.google.com/earth/d/1lKWvUr_K7XdeafnZKadEf-ZFUglPVjFs?usp=sharing
- BandobastGPT (ops copilot): https://chatgpt.com/g/g-68ac299e7c588191b2edecda5a018df3-bandobastgpt

16) What We Can Build Next — AI Build Roadmap

16.1 Field Ops Apps

- **Control Room Live Dashboard (Web)** — GAR map, PS hotspots, hourly Load Index, queue bands, triggers log; export snapshots as PNG/PDF.
  Tech: Next.js + MapLibre (or Google Maps), Supabase (events), n8n (ingest).
  Output: `/dashboards/bandobast2025/`
- **Mobile Field App (PWA)** — offline-first; scan QR → open route; one-tap incident log (type, photo, GPS); shift roster view.
  Tech: FlutterFlow/Glide (fast PWA), Supabase; optional device-only photo redaction.
  Output: `/apps/field-pwa/`
- **Beat Officer Route Navigator** — preloaded PS→Mandal→Ghat (`derived_route_*`) with step prompts; vibrate on chokepoint proximity.
  Tech: PWA + service workers; KML→GeoJSON converter.

16.2 Automations & Integrations

- **WhatsApp Copilot (Internal)** — `/sitrep` quick forms, Red/Amber alerts, roster acks; integrates with Change-Log Bot.
  Stack: Twilio/Gupshup + n8n.
- **WhatsApp Citizen Assistant** — diversion advisories, ghat wait bands, parking pointers; rate-limited broadcast.
- **Sensors & Feeds** — river gauge + rainfall API; CCTV headcount pilot (YOLO/ByteTrack) at 3 chokepoints; cron ingest, trigger bumps.

16.3 Data Products

- **Daily PS Heat Index PDF** — 1-pager per PS (peaks, GAR map, manpower deltas).
- **Mandal Slotting Optimizer** — suggest staggered arrival windows to flatten peaks; export CSV to share with mandals.
- **After-Action Report (AAR) Generator** — auto-compile incidents, response times, diversion efficacy, lessons learned.

16.4 Visual Comms Kit

- **Route Posters (A3)** per PS with QR to live map.
- **QR Sticker Pack** for barricades, cranes, first-aid, control points.
- **Volunteer Pocket Cards** — SOP mini-cards (Marathi/English).
- **LED/PA Scripts** — timed announcements synced to peaks and weather.

16.5 Governance, Training & Safety

- **SOP Card Pack** — Rain/Dam/Crowd triggers; checklists; escalation tree.
- **War-Game Tabletop Drill** — 90-min simulation with injects for top 5 corridors.
- **Data Governance Register** — sources, retention, access roles, audit trail.

16.6 Public Info & Media

- **Citizen Microsite** — live diversions, ghat status, safety advisories (Marathi/English).
- **Press Brief Auto-Draft** — daily 19:30 bulletin; embeds maps & stats.

16.7 72-Hour Sprint Plan (immediate builds)

1) Duplicate **14 PS one-pagers** and prefill station names; leave PI/SPI contacts blank for field fill.
2) Generate **QR deep-links** per PS for `derived_route_*` and **insert in templates**.
3) Publish **v0 Control Room Dashboard** with static GAR map + manual peak toggles.
4) Set up **n8n ingest** for rainfall & dam feeds; write trigger bump rules.
5) Create **SOP mini-cards** (Mar/Eng) — print-ready A6.
6) Prepare **Route Poster v1** for Ramkund cluster (A3 + QR).
7) Scaffold **WhatsApp Internal Copilot** with `/sitrep` and `/alert` flows.

16.8 Deliverable Matrix (owner placeholders)

Deliverable	Inputs	Tooling	Owner	Output
14 PS One-Pagers	Template §9	Word/Google Docs	[PS Cell]	`PS_*_onepager.pdf`
QR Route Set	KML/KMZ	QR generator	[GIS]	`qr_ps_*.png`
Control Room v0	GeoJSON (static)	Next.js + Map	[IT]	`/dashboards/`
n8n Triggers	API creds	n8n	[IT]	`flows/*.json`
SOP Cards	§13 triggers	InDesign/Canva	[Ops]	`sop_cards_A6.pdf`
Route Posters	PS routes	Illustrator/Canva	[Comms]	`posters_A3/*.pdf`
WhatsApp Copilot	Forms schema	Gupshup/Twilio + n8n	[IT/Ops]	`flows/whatsapp/*.json`

17) AI Visual & Interactive System — What We Can Do Now

Goal: Make operations see-through, clickable, and fast to act — for Control Room, PS, field teams, and citizens.

17.1 Experience Catalog

Experience	Audience	What it shows	Interaction	Outcome
Live Control Map (GAR)	Control Room	City→PS→Route→Node drill-downs; Load Index, queue bands, triggers	Click to open QR panel, toggle peak windows, ack alerts	Instant hotspot focus + tasking
PS Ops Wallboard	PI/SPI & traffic PI	Station routes, sensitive nodes, manpower & SRPF/QRT table	Inline edit shifts; one-tap route verify	Faster rostering & verification

Experience	Audience	What it shows	Interaction	Outcome
Field PWA	Beat officers	Offline QR navigation, incident log (photo+GPS), micro-SITREPs	Scan/submit in <15s; cached maps	Real-time ground truth inflow
Citizen Microsite	Public	Diversions, ghat status, parking, safety tips (Mar/Eng)	Search area, get route; shareable link	Fewer calls; smoother citizen routing
Media Brief Studio	PRO/Comms	Auto charts/maps + key numbers for 19:30	Approve → publish	Consistent, low-risk messaging
3D City Twin (pilot)	CP/DCP review	Elevation-aware flows, crane reach, vantage	Pan/time-scrub; what-if sliders	Better pre-briefs, crane placement
AR Route Walkthrough (pilot)	Marshals	On-ground lane marking, chokepoint AR labels	Phone camera overlay	Quicker setup; fewer errors

17.2 Visual Widgets (specs)

- **GAR Route Map:** segment colors + reason codes; tap to see detour + SOP snippet.
- **Queue Meter (Ghat):** live band (<20m / 20–45m / >45m) with last-hour trend.
- **Load Timeline (PS):** hourly 0–100 with peak windows (D1/D5/D10 toggles).
- **Trigger Cards:** Rain/Dam/Crowd; show threshold, last value, action button.
- **Manpower Matrix:** shift×role grid; surge slider; export to PDF.
- **Incident Stream:** time-ordered tickets with photos, GPS, status chips (Open/In-Progress/Cleared).
- **Sankey Flow (pilot):** Mandal→Corridor→Ghat volumes for post-event analysis.

18) System Architecture — How It Works

Flow: Ingest → Store → Understand → Predict → Decide → Act → Learn

Module	Inputs	Processing	Outputs	Owner
Ingest	KML/KMZ, PS forms, SITREP/WhatsApp, rain & dam APIs, CCTV counts	ETL + schema checks	Cleaned tables, geo layers	IT/GIS
Store	GeoDB + event store	PostGIS schemas, retention & access	Versioned layers, audit trails	IT
Understand	RAG over docs, PS notes	LLM summaries + validations	PS briefs, checklists	Ops/AI

Module	Inputs	Processing	Outputs	Owner
Predict	Time-series + graph models	Hourly load, GAR probabilities, risk score	Indices, alerts, confidence	AI
Decide	Optimization & rules	Shift surge, detours, staging	Rosters, diversion plans	Ops
Act	Dashboards, PWA, WhatsApp, PA/LED scripts	Publish + acks	Tickets, assignments	Control/ PS
Learn	After-Action data	Error metrics, near-miss, response times	Model updates, SOP deltas	QA/AI

Governance & Safety: role-based access; manual override on all Reds; offline mode in PWA; privacy-by-design (blur/redact faces, no raw video retention without need); immutable change log.

18A) Technical Deployment Plan (Stack & SLAs)

Frontend: Next.js + MapLibre/Google Maps; PWA (offline-first) for field.
Backend: Postgres/PostGIS (Supabase) + n8n (ingest/orchestration) + serverless functions.
AI Layer: Hosted LLM for RAG/summarization; sklearn/lightGBM for models; OR-Tools for ILP.
Integrations: Rain & dam APIs; optional CCTV edge devices.
Security: RBAC, per-PS scopes, signed URLs for maps/QR; audit logs immutable.
SLAs: - Prediction refresh ≤ **10 min**; alert fan-out ≤ **30 s**; dashboard P95 load ≤ **2 s**.
- Uptime targets: Control dashboard ≥**99.5%** (season), PWA offline continuity **8h**.

19) Benefits & KPIs (by stakeholder)

Stakeholder	Primary benefit	KPI (baseline → target)
Control Room	Faster hotspot detection	Alert→ack time 6m → <2m
Police Station	Better rostering & route discipline	Missed-post incidents ↓ 40%
Traffic Branch	Smoother diversions	Avg corridor travel time ↓ 25%
SRPF/QRT	Timely surge	Dispatch→on-scene 15m → <8m
Disaster/ Health	Quicker medical reach	Ambulance access time 12m → <6m
NMC/Utilities	Precise placement (barricades, cranes, lights)	Under-utilized asset hours ↓ 30%
Citizens	Clear info, less confusion	Grievance calls at peaks ↓ 35%
Leadership	Transparent oversight	Hourly SITREP accuracy >95%

20) AI-Powered Use-Case Gallery (Ops + Visuals)

- **What-If Simulator:** close Road-X or add +2 cranes → see spillover & queue change.
- **Mandal Slotting Optimizer:** auto stagger windows; share CSV with organizers.
- **Auto Press Brief:** pulls top 6 stats + 2 maps; Marathi/English draft.
- **Voice Copilot (Mar/Eng):** "Show Jalebi Chowk status" → opens node card; hands-free in field.
- **Anomaly Watcher:** detects unusual dwell at sensitive nodes; pings PS & opens camera bookmark.
- **Volunteer Lesson Cards:** 60-sec micro-explainers with diagrams; QR on ID cards.

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21) Risk & Safety by Design (AI-specific)

- **Explainability:** every alert shows inputs & rule/model path.
- **Rate-Limits & Throttling:** prevent alert floods; escalate only on confirmation.
- **Human-in-the-Loop:** Reds require PI/SPI or Control approval; all overrides logged.
- **Data Ethics:** minimum collection, local processing for vision, timed retention.
- **Continuity:** offline PWA, printable fallbacks (posters/SOP cards), UPS at Control.

21A) Compliance & Privacy Footnotes

- **Data minimization:** collect only what's necessary for safety; default blur/redact faces/plates.
- **Retention:** incidents & telemetry time-bounded; CCTV derived counts only unless escalation.
- **Access:** least-privilege by role; audit trail on every access & override.
- **Transparency:** explainers accompany Reds; public comms avoid sensitive specifics.
- **Legal:** align with state guidelines on surveillance, processions, and disaster response.

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22) Bandobast Angle — Action Playbook (What to do now)

Goal: Turn the plan into ground action—PS-wise, hour-wise—minimizing risk and delays.

22.1 City Command & Cadence

- **Gold–Silver–Bronze**: City Control (CP/DCP) → PS (PI/SPI) → Beat/Traffic.
- **Cadence:** SITREP at **:00** (hourly on peak), alerts any time; radio clear words.
- **Red Gate:** No RED goes live without PI/SPI or Control approval (human-in-the-loop).

22.2 Pre-Event (D-7…D-1)

- Validate KMLs & lock `derived_route_*`; paste QR posters at route starts.
- War-game top 5 corridors per PS; mark barricade nodes & U-turn pockets.
- Issue SOP mini-cards (Rain/Dam/Crowd) to all ranks; brief escalation tree.
- Dry-run WhatsApp `/sitrep`, `/alert`, `/ack`; test PWA offline mode.

22.3 Daily Ops Rhythm (D1…Dn)

1) **06:30** Control opens Live Map; verify feeds, radios, rosters.
2) **07:00** PS wallboard update; QR posters re-checked; cranes/ambulances staged.
3) **All day** Beat teams: QR navigation; log incidents (photo+GPS).

4) **Hourly peaks** Control posts map snapshot + notes; PS adjusts rosters.
5) **23:00** AAR draft auto-compiled; close by **23:30**.

22.4 Peak-Day Surge (D5 / D10)

- Pre-approve surge rosters and SRPF/QRT placements by hour-band.
- Open bypass corridors 30–45 min before forecasted Amber; stage tow trucks.
- Queue marshals at ghats; PA scripts every 10 min; medical lanes guarded.

22.5 Sensitive Zones Protocols

- **Eid overlap:** outer cordon + inner escort; liaison officer on net.
- **Narrow lanes:** foot-only; cap mandal size; stagger entries; volunteer cordons.
- **Riverbank pinch:** rope lanes, lifebuoys, ladders; speed control for processions.

22.6 Traffic & Diversions (PS Tasks)

- Activate **GAR** diversions with reason codes; signages at QR nodes.
- Hard closures only with fallback route opened; keep ambulance lanes empty.
- Record diversion start/stop; attach photo; mark **Cleared** when reopened.

22.7 Manpower Matrix (example format)

PS	Shift	Beat	Traffic	QRT	SRPF	Crane	Notes
[PS]	Morning						
[PS]	Evening						
[PS]	Night						

22.8 Incident Response Ladder

- **L1 Crowd Stall** → open side release; PA announce; +2 marshals.
- **L2 Medical** → nearest ambulance to QR node; lane clear; hospital pre-alert.
- **L3 Law & Order** → QRT insert; soft fence; camera log; de-escalation.
- **L4 Flood/Rapid Rise** → move waiting zones back; close steps; shift to alt ghat.
- **L5 VIP/Threat** → pre-cleared bubble route; hold processions; resume orderly.

22.9 Medical & Fire Readiness

- Ambulance at each red-risk node; 6-min reach target; defib kits at ghats.
- Fire tender near crane cluster; foam/CO2; generator & lighting checks at dusk.

22.10 Communications & Public Info

- WhatsApp internal copilot for SITREPs; radio only for escalations.
- Citizen microsite (Mar/Eng) with diversions & ghat wait bands; 19:30 bulletin.

22.11 Evidence & Audit

- PWA incident tickets (time, GPS, photo); no raw faces retained beyond policy.
- Every alert shows inputs & reason; all overrides logged with name & time.

22.12 Post-Event Learning

- AAR compares forecast vs. actual; update rules; mark geometry fixes; publish PS scorecards.

22.13 Pocket Checklists

Shift Start (Beat): radio check • QR posters • barricades up • volunteer brief.
Node Setup: signage • rope lanes • first-aid box • lighting test.
Trigger Cards: Rain/Dam/Crowd values • action taken • time logged.
VIP Move: bubble route cleared • halt points briefed • resume signal set.

22.14 Owner–Due Matrix (Top 12 Actions)

Action	Owner	Due (IST)	Output
Lock KML & paste QRs (all PS)	GIS/PS	D-3 18:00	QR posters up
Surge rosters signed	DCP/PI	D-2 20:00	Roster sheets
Control dashboard v0 online	IT	D-2 12:00	URL + snapshot export
WhatsApp flows live	IT/Ops	D-2 18:00	/sitrep, /alert, /ack
Crane & ambulance staging	PS/Health	D-1 15:00	Photo + GPS
War-game top 5 corridors	ACP/PI	D-1 20:00	Notes + fixes
Peak-day PA scripts	Comms	D-1 21:00	Script cards
SOP mini-cards printed	Ops	D-1 21:00	A6 packs
Tow trucks positioned	Traffic	D-1 22:00	Node list
CCTV (3 sites) pilot	IT	D-1 22:00	Device heartbeat
Dawn readiness sweep	PI/SPI	D-day 06:30	Photo log
19:30 media brief	PRO	D-day 19:30	Bulletin + maps

Annex A — QR Insert Panels (per PS)

PS	Route/Ghat	QR Box
[ ]	[ ]	☐

Annex B — Data Dictionary (Selected)

- **derived_route_***: Auto-computed PS→Mandal→Ghat line used for QR navigation.
- **GAR:** Green/Amber/Red congestion state with reason code.
- **Load Index:** 0–100 scaled hourly crowd metric.

Annex C — Change Log (auto-compiled by bot)

Date/time (IST)	Section	Change
[ ]	[ ]	[ ]