

TANAPA TRAFFIC MANAGEMENT



Digital Solutions for Enhanced Traffic Management in the Serengeti National Park

5 April 2022

Prepared by

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Objectives of study as defined by KfW



- 1. Identify alternatives to improve traffic management
- 2. Formulate feasible options to increase effectiveness and efficiency of vehicular movement control in the parks.
- 3. Ensuring the long-term integrity of the Serengeti ecosystems.
- 4. Implementation of state-of-the-art information and communication technologies



Methodology











Internal Roads

Narrow road (approximate area Kemariswe Hills)



Low water bridge to Grumeti airstrip and camp





Gate Operations



Naabi Gate

Ngorongoro Conservation Area exit / entry with next to it the Serengeti entry / exit area



Entry / exit books

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Gate Operations



Ndabaka Gate

Ndabaka Gate



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Gate Operations



Ikoma Gate

Ikoma Gate



Approach road to gate





Traffic Demand Serengeti



Ne	Description	Scenarios					
INO	Description	Low	Medium	High			
а	No beds - as per master plan	14500	14500	14500			
b	% guests travelling at the same time	65%	75%	90%			
С	Average Capacity per vehicle	12	10	8			
d	No of vehicles carrying tourists	1208	1450	1813			
	Tourist Vehicles on the roads at the same time, typically						
e	morning peak period, game viewing (b x d)	785	1088	1631			
	Average staff to tourist ratio, estimate (high end lodges						
f	will be 1:1 or more, cheaper lodges will be 0.3:1)	60.0%	65.0%	70.0%			
g	Number staff	8700	9425	10150			
h	Average Capacity staff transport vehicles, persons	30	25	20			
	Percentage of staff daily commuting in/out of the park in						
i	peak period)	20%	25%	35%			
j	Estimate total Staff vehicles in peak period (g/h x i)	58	94	178			
	Through traffic / ranger vehicles / other in peak period,						
k	estimate based on verbal info from wardens	50	75	100			
	Total vehicles at same time travelling on all roads, peak						
	period, morning peak period (e + j + k)	893	1257	1909			
m	Total vehicles requiring tracking, estimate (d+j+k)	1316	1619	2090			



Serengeti Traffic Problems



Access control and monitoring
 Visitor management, entry and exit at gates
 Logistic management (deliveries to camps and lodges).

2. Speeding

Speeding - frequently occurs, No Enforcement

3. Road adherence

Vehicles can drive where they want, and often drive off road.

4. Crowding and congestion

Crowding occurs at animal sightings Congestion at the Cogatende / Mara river crossing in migration.





- 1. The **wildlife and eco system must be protected** at all costs.
- System should be kept simple, Fast, effective entry and exit "No forms no fuss"
- 3. The **tourist experience must be optimized**, system must be "invisible" or "transparent" to the tourist.
- 4. "The tourist as compliance officer" they must report bad driving
- **5. Redundancy** have duplicate electricity sources, duplicate communication systems for backup
- 6. The design life should be 20 years "forever" **SUSTAINABLE**



Alternative Solutions

Access Gates



- A1 Record manually in paper the registration of vehicle, and passport / ID details of all visitors
- A2 Same as above, but type in details electronically
- A3 Scan the number plates, license disks and passports or Identification documents
- A4 Fingerprint registration for visitors
- A5 Facial recognition for visitors
- A6 Overview CCTV cameras to record vehicles and persons
- A7 Automatic Number plate recognition cameras at gates



Alternative Solutions Speeding



- S1 Spot speed measurement using a laser- or radar device
- S2 Average speed over distance (ASOD) using number plate recognition (ANPR)
- S3 Installing an on-board unit that can be tracked using GPS and communication to download the tracking data to a central point
- S4 ASOD using RFID tags



Alternative Solutions





- R1 More wardens with vehicles
- R2 Education and awareness of tourists
- R3 Vehicle Reporting mechanism
- R4 Aerial surveillance using aircraft or drones
- R5 On-board units with GPS and geofencing





Crowding / Congestion

Alternative Solutions

- C1 More wardens with vehicles
- C2 Education and awareness of tourists
- C3 On-board units with GPS and geofencing
- C4 Overview CCTV cameras at fixed locations
- C5 Booking system and Time limits in certain areas
- C6 Vehicle Reporting mechanism
- C7 Aerial surveillance using aircraft or drones





Proposed Solution –

Architecture







Viewing Areas Congestion Management









Spot vehicles along the roads

Compliance monitoring





Main Issues related to Tour Operators



- 1. On-board unit on top of vehicle, inside
- 2. RFID tags in window
- 3. Registration of all passengers / persons at gate entry / exit
- 4. Tracking and spotting of vehicles
- 5. Mobile application / communication
- 6. Evidence for transgressions speeding, off-roading, congestion areas Implement Fining / self regulation system
- 7. Cost implications OBU, operational / communications cost
- 8. Reporting monthly performance