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NGORONGORO CONSERVATION AREA AUTHORITY

Software Requirements Specification

NCAA Digital Transformation - Gate Operations Module

Version: 1.0

Date: 2025-11-06

Status: Draft

https://www.ncaa.go.tz

Table of Contents

1 Document Information

Field	Value
Project Name	NCAA Digital Transformation - Gate Operations Module
Version	1.0
Date	2025-11-06
Project Manager	TBD
Tech Lead	TBD
Qa Lead	TBD
Platforms	['Web', 'PWA', 'Desktop', 'Tablet']
Document Status	Draft
Module Code	GATE_OPS
Parent Project	NCAA Digital Transformation - Ngorongoro Gateway System

2 Project Overview

2.1 What Are We Building

2.1.1 System Function

Comprehensive visitor and vehicle management system for 9 gates handling tourist registration, permit verification, check-in/check-out, vehicle logging, capacity tracking, and payment processing. System operates offline-first with automatic synchronization across gates.

2.1.2 Users

- Gate Staff: Registration officers, Permit checkers, Vehicle loggers
- Old HQ Staff: Payment processors, Report generators, Permit issuers
- Visitors: Tourists, Safari operators, Tour guides, Pilots
- Management: Operations managers, Capacity managers

2.1.3 Problem Solved

Manual paper-based registration causing errors, slow system synchronization (30min+ wait times), no real-time capacity tracking, manual vehicle logging (1000+ entries/day per guard causing burnout), paper permit verification prone to fraud, no emergency permit extension capability, lack of ID verification at Karatu (handling 300+ locals daily), no aviation payment system at Ndutu

2.1.4 Key Success Metric

Registration processing <2 minutes per visitor, permit verification <30 seconds, automatic capacity updates within 15 minutes across all gates, zero manual vehicle logging, 100% permit fraud detection, emergency extension capability at all gates

2.2 Scope

2.2.1 In Scope

- Visitor registration (sleeping/passing/tourist categories)
- Permit generation and verification
- Vehicle logging and tracking

- Check-in/check-out processing

- Capacity management across 9 gates

- Payment processing at Old HQ

- Aviation landing fee processing at Ndutu

- Accommodation tracking at Lemala camps

- Activity registration at Olduvai Gorge

- Emergency permit extensions

- Manual fallback procedures

- Report generation and audit trail

2.2.2 Out Of Scope

- Online booking system for tourists

- Integration with tour operator systems

- Wildlife tracking

- Lodge/hotel management

3 User Requirements

3.1 Visitor Registration

Feature Code	I Want To	So That I Can	Priority	Notes
FT-GATE-REG-TOURIST	Register tourists with category (sleeping/ passing) and generate quotes	Process up to 300 visitors/day efficiently at Karatu during high season	Must	Paper-based self-registration backup for locals without proper IDs. System must handle high volume without slowing down.
FT-GATE-REG-ID-VERIFICATION	Verify visitor ID documents during registration	Reduce fraud and ensure accurate visitor records, especially for Maasai communities with limited ID access	Must	Optional ID field for locals. Support for passport, national ID, driving license.
FT-GATE-REG-SELF-SERVICE	Allow tourists to self-register basic information on tablet	Speed up registration process and reduce staff workload at Karatu	Should	Tablet-friendly PWA interface. Multilingual support (English, Swahili).
FT-GATE-REG-GROUP	Register groups of tourists traveling together in one transaction	Handle safari tour groups efficiently	Must	Link all members to primary visitor. Generate single invoice for group.

3.2 Permit Management

Feature Code	I Want To	So That I Can	Priority	Notes
FT-GATE-PERMIT-GENERATE	Generate digital permits at Old HQ after payment verification	Issue permits quickly without relying on network at gates	Must	Permits must sync to all gates within 15 minutes. Offline permit generation capability at Old HQ.
FT-GATE-PERMIT-VERIFY	Verify permit validity at gates using permit number or QR code	Ensure only authorized visitors enter, handling 500 cars/day at Seneto	Must	Offline verification against local database. Phone copies of permits accepted. Visual validation interface.
FT-GATE-PERMIT-EXTENSION	Issue emergency permit extensions at gates when network is down	Avoid visitor frustration and maintain service continuity	Must	Manager approval required. Extension syncs to system when network restored. Audit trail maintained.
FT-GATE-PERMIT-CHECK-VALIDITY	Check permit expiry and visitor overstay status during checkout	Enforce park rules and detect issues (Main Gate reports false overstay errors)	Must	Grace period for checkout timing. Manual override with documented reason.
FT-GATE-PERMIT-INTERAGENCY	Verify Serengeti permits at Nabi shared gate for cross-border visitors	Coordinate with TANAPA at inter-agency checkpoint	Must	Manual order forms as fallback when system down. Integration with TANAPA

Feature Code	I Want To	So That I Can	Priority	Notes
				system future phase.

3.3 Vehicle Management

Feature Code	I Want To	So That I Can	Priority	Notes
FT-GATE-VEHICLE-LOG	Automatically log vehicle entry with plate number, type, and timestamp	Eliminate manual logging of 1000+ vehicles/day per guard	Must	Camera-based plate recognition. Manual entry fallback. Vehicle type classification (car, safari jeep, bus, trailer).
FT-GATE-VEHICLE-TRACK	Track vehicle movement across gates (entry/exit)	Maintain accurate vehicle count and detect anomalies	Must	Real-time sync between gates. Alert if vehicle detected at multiple gates simultaneously.
FT-GATE-VEHICLE-CREDENTIAL	Verify vehicle credentials and driver authorization	Ensure only authorized vehicles and drivers enter conservation area	Must	Driver license verification. Vehicle registration check. Commercial operator license for safari vehicles.
FT-GATE-VEHICLE-TRAILER	Detect and log vehicles with trailers	Track additional equipment entering the area	Should	Object detection model fine-tuning required for trailers.

3.4 Capacity Management

Feature Code	I Want To	So That I Can	Priority	Notes
FT-GATE-CAPACITY-REALTIME	View real-time capacity across all 9 gates	Monitor total visitors and vehicles in the conservation area	Must	Dashboard showing current capacity vs limits. Color-coded warnings when approaching capacity.
FT-GATE-CAPACITY-CRATER	Track crater-specific capacity at Seneto, Lemala 1, and Lemala 2	Manage the ~200 cars/day limit for crater area	Must	Separate tracking for in-crater vs out-of-crater. Accommodation tracking at camps.
FT-GATE-CAPACITY-ALERT	Receive alerts when capacity limits are approached	Take action before reaching maximum capacity	Must	SMS/email alerts to management. Configurable thresholds (e.g., 80%, 90%, 100%).
FT-GATE-CAPACITY-REPORT	Generate daily capacity reports showing entry/exit patterns	Analyze trends and optimize gate operations	Should	Historical data analysis. Peak hour identification. Gate-by-gate breakdown.

3.5 Payment Processing

Feature Code	I Want To	So That I Can	Priority	Notes
FT-GATE-PAYMENT-VERIFY	Verify payment receipts at Old	Ensure accurate revenue collection for 300	Must	Receipt number validation. Payment

Feature Code	I Want To	So That I Can	Priority	Notes
	HQ before permit issuance	billion TZS annual operations		method tracking (cash, card, bank transfer, mobile money).
FT-GATE-PAYMENT-AVIATION	Process aviation landing fees at Ndutu airstrip	Handle ~100 aviation visits/day with proper payment tracking	Must	Manual payment processing when network unavailable. Receipt generation. Sync to central system.
FT-GATE-PAYMENT-QUOTE	Generate payment quotes based on visitor category and duration	Provide accurate pricing before payment	Must	Quote extensions for visitors extending stay. Price variations for locals vs international tourists.

3.6 Accommodation Tracking

Feature Code	I Want To	So That I Can	Priority	Notes
FT-GATE-ACCOM-CHECKIN	Register visitors checking into crater camps at Lemala 1 & 2	Track in-crater accommodation and enforce camping regulations	Must	Manual process currently. Digital form on tablet. Offline operation required (low connectivity).
FT-GATE-ACCOM-VERIFY	Verify accommodation permits for overnight stays	Ensure only authorized camping in crater area	Must	Cross-reference with permit system. Alert if no valid accommodation permit.

3.7 Activity Registration

Feature Code	I Want To	So That I Can	Priority	Notes
FT-GATE-ACTIVITY-REGISTER	Register visitors for activities at Olduvai Gorge	Track ~300 visitors/day attending tourist activities	Must	Activity types: museum visit, guided tour, archaeological site. Slow internet requires offline capability.
FT-GATE-ACTIVITY-PAYMENT	Process activity fees separately from entry permits	Track revenue from tourist activities	Should	Optional add-on to entry permit. Separate receipt generation.

3.8 Manual Fallback

Feature Code	I Want To	So That I Can	Priority	Notes
FT-GATE-FALLBACK-FORMS	Use manual order forms when system is down	Maintain operations during outages (currently used at Nabi)	Must	Printable form templates. Data entry into system when restored. Reconciliation process.
FT-GATE-FALLBACK-SYNC	Sync manually entered data when network restored	Maintain complete records without data loss	Must	Batch data entry interface. Duplicate detection. Validation rules.

3.9 Reporting

Feature Code	I Want To	So That I Can	Priority	Notes
FT-GATE-REPORT-DAILY	Generate daily gate reports showing all transactions	Track operations and identify issues	Must	Visitor count, vehicle count, revenue, capacity metrics. Export to PDF/Excel.
FT-GATE-REPORT-REVENUE	Generate revenue reports for 300 billion TZS annual operations	Track financial performance and ensure revenue integrity	Must	Payment method breakdown. Gate-by-gate comparison. Variance analysis.
FT-GATE-REPORT-AUDIT	Maintain complete audit trail of all gate transactions	Support financial audits and dispute resolution	Must	Immutable logs. User actions tracked. Manual overrides flagged.

4 Technical Requirements

4.1 Performance Standards

Requirement	Target	How To Test
Visitor registration	< 2 minutes per visitor	Timed user testing with 50 sample registrations
Permit verification	< 30 seconds	Timed permit lookup tests with 100 sample permits
Gate-to-gate sync	≤ 15 minutes maximum delay	Network monitoring and sync logs
System uptime	99% uptime despite network failures	Offline operation tests, uptime monitoring
PWA load time	< 3 seconds on desktop/tablet	Performance testing on target hardware

4.2 Platform Requirements

Platform	Minimum Version	Target Version	Notes
Desktop PC	Windows 10 / Ubuntu 22.04	Windows 11 / Ubuntu 22.04 LTS	Primary workstation at each gate
Tablet	Android 8 / iOS 12	Android 13 / iOS 16	Mobile registration and inspection
Browser	Chrome 90, Firefox 88, Safari 14	Latest stable versions	PWA support required

4.3 Security Privacy

Requirement	Must Have	Implementation
Visitor data encryption	True	AES-256 at rest on NUC NVMe SSD; TLS 1.2+ for gate-to-gate sync
User authentication	True	Username/password with role-based access. Session timeout after 30 min inactivity.
Audit trail	True	Immutable logs for all transactions. User actions tracked with timestamp.
Payment data security	True	PCI compliance not required (no card processing). Receipt numbers encrypted.

5 External Dependencies

5.1 Third Party Services

Service	What It Does	Criticality	Backup Plan
SMS Gateway	Send capacity alerts and notifications	Nice to have	Email notifications only

5.2 Device Requirements

Feature	Required	Optional	Notes
Camera for vehicle inspection	True	False	Adjustable camera for varied vehicle heights
Barcode/QR scanner	False	True	For permit scanning. Manual entry fallback.
Receipt printer	True	False	For payment receipts and permits

6 Release Planning

6.1 Development Phases

Phase	Features Included	Timeline	Success Criteria
Phase 1 (MVP - 3 Pilot Gates)	['Visitor registration', 'Permit verification', 'Vehicle logging', 'Basic capacity tracking', 'Offline operation']	12 weeks	3 gates operational (Karatu, Seneto, Main Gate) with 90% reduction in manual processes
Phase 2 (Full Deployment)	['Remaining 6 gates', 'Gate-to-gate sync', 'Full capacity management', 'Advanced reporting']	8 weeks	All 9 gates operational with real-time sync and capacity tracking
Phase 3 (Enhancements)	['Mobile app for visitors', 'Payment gateway integration', 'Advanced analytics']	12 weeks	Self-service capabilities and revenue optimization

6.2 Release Checklist

- All Must-Have features complete and tested
- Offline operation verified at each gate
- Staff training completed with SOPs
- Manual fallback procedures documented
- Backup systems operational (NAS, UPS)
- No critical bugs in production
- Performance baselines met (registration < 2min, verification < 30sec)

7 Risks Assumptions

7.1 Risks

Risk	Probability	Impact	Mitigation
Poor cellular network at remote gates (Ndutu, Lemala 2)	High	High	Offline-first architecture, local data storage, manual sync procedures
Staff resistance to digital system after years of manual processes	Medium	High	Comprehensive training program, gradual rollout, on-site support during transition
Power outages affecting system availability	Medium	High	UPS providing 2-4hr backup at each gate, solar system upgrades where needed
Hardware failure at remote locations	Medium	Medium	Spare NUC units at Old HQ, 10% spare parts buffer, remote troubleshooting capabilities

7.2 Assumptions

- Gate staff have basic computer literacy or can be trained
- Internet connectivity available intermittently (even if slow) for sync
- Power supply stable enough for UPS-backed operations
- NCAA management committed to digital transformation
- Budget available for ~$22,600 hardware investment

8 Market Specific Considerations

8.1 Primary Market

- Ngorongoro Conservation Area, Tanzania

8.2 Target Demographics

- Gate staff with varying technical skills
- International tourists
- Local Maasai communities
- Safari tour operators

8.3 Local Considerations

- Swahili language support for local staff and Maasai communities
- Limited ID availability for Maasai population
- Remote locations with infrastructure challenges (1959-era buildings at Lemala)
- High season visitor volume (300-500 visitors/vehicles per day)
- Cultural sensitivity for Maasai staff and visitors

8.4 Payment Preferences

Preference	Value
Mobile Money	15%
Cash	30%
Cards	20%
Bank Transfer	35%

8.5 Competition

- Safari portal (existing system being replaced)

9 Sign Off

9.1 Approval

Role	Name	Signature	Date

9.2 Document History

Version	Date	Changes Made	Changed By
1.0	2025-11-06	Initial draft based on field report and gate architecture	Development Team

10 Detailed Feature Requirements

10.1 Ft Gate Reg Tourist

10.1.1 Priority

Must Have

10.1.2 User Story

As a gate staff member, I want to register tourists with their category (sleeping/passing) so that I can process up to 300 visitors/day efficiently at Karatu during high season

10.1.3 Preconditions

Gate staff authenticated and logged in; registration form available offline

10.1.4 Postconditions

Tourist registered in local database; quote generated; data queued for sync

10.1.5 Test Cases

Id	Description	Weight
GATE-REG-TC-001	Register sleeping tourist with valid passport	High
GATE-REG-TC-002	Register passing tourist with national ID	High
GATE-REG-TC-003	Generate quote for sleeping category	High
GATE-REG-TC-004	Handle 300+ registrations in a day without performance degradation	High

10.2 Ft Gate Reg Id Verification

10.2.1 Priority

Must Have

10.2.2 User Story

As a gate staff member, I want to verify visitor ID documents during registration so that I can reduce fraud and ensure accurate visitor records

10.2.3 Preconditions

Registration form open; ID scanner or manual entry available

10.2.4 Postconditions

ID verified and stored; visitor identity confirmed

10.2.5 Test Cases

Id	Description	Weight
GATE-REG-TC-005	Verify passport number format	High
GATE-REG-TC-006	Verify national ID format	High
GATE-REG-TC-007	Allow registration with optional ID for Maasai locals	Medium
GATE-REG-TC-008	Validate driving license as acceptable ID	Medium

10.3 Ft Gate Reg Self Service

10.3.1 Priority

Should Have

10.3.2 User Story

As a tourist, I want to self-register basic information on a tablet so that registration is faster

10.3.3 Preconditions

Tablet available at gate; PWA loaded; multilingual support active

10.3.4 Postconditions

Basic information captured; staff reviews and completes registration

10.3.5 Test Cases

Id	Description	Weight
GATE-REG-TC-009	Self-register in English language	Medium
GATE-REG-TC-010	Self-register in Swahili language	Medium
GATE-REG-TC-011	Tablet interface responsive and touch-friendly	Medium

10.4 Ft Gate Reg Group

10.4.1 Priority

Must Have

10.4.2 User Story

As a gate staff member, I want to register groups of tourists traveling together in one transaction so that I can handle safari tour groups efficiently

10.4.3 Preconditions

Registration form supports group entry; primary visitor designated

10.4.4 Postconditions

All group members linked; single invoice generated

10.4.5 Test Cases

Id	Description	Weight
GATE-REG-TC-012	Register safari group of 10 tourists	High
GATE-REG-TC-013	Link all members to primary visitor	High
GATE-REG-TC-014	Generate single group invoice	High

10.5 Ft Gate Permit Generate

10.5.1 Priority

Must Have

10.5.2 User Story

As Old HQ staff, I want to generate digital permits after payment verification so that I can issue permits quickly without relying on network at gates

10.5.3 Preconditions

Payment verified; visitor registration complete; Old HQ system online

10.5.4 Postconditions

Digital permit generated; synced to all gates within 15 minutes

10.5.5 Test Cases

Id	Description	Weight
GATE-PERMIT-TC-001	Generate permit after cash payment verification	High
GATE-PERMIT-TC-002	Generate permit with QR code	High

Id	Description	Weight
GATE-PERMIT-TC-003	Verify permit syncs to all 9 gates within 15 minutes	High
GATE-PERMIT-TC-004	Generate permit offline at Old HQ during network outage	High

10.6 Ft Gate Permit Verify

10.6.1 Priority

Must Have

10.6.2 User Story

As a gate staff member, I want to verify permit validity using permit number or QR code so that I can ensure only authorized visitors enter

10.6.3 Preconditions

Permit database synced locally; scanner or manual lookup available

10.6.4 Postconditions

Permit verified as valid or invalid; entry logged

10.6.5 Test Cases

Id	Description	Weight
GATE-PERMIT-TC-005	Verify valid permit by permit number	High
GATE-PERMIT-TC-006	Verify permit by scanning QR code	High
NGATE-PERMIT-TC-007	Reject expired permit	High
GATE-PERMIT-TC-008	Accept phone photo of permit	Medium
GATE-PERMIT-TC-009		High

Id	Description	Weight
	Verify 500 permits/day at Seneto without delays	

10.7 Ft Gate Permit Extension

10.7.1 Priority

Must Have

10.7.2 User Story

As a gate manager, I want to issue emergency permit extensions when network is down so that I can avoid visitor frustration

10.7.3 Preconditions

Manager authenticated; permit exists in local database; network unavailable

10.7.4 Postconditions

Permit extended locally; extension synced when network restored; audit trail created

10.7.5 Test Cases

Id	Description	Weight
GATE-PERMIT-TC-010	Issue emergency extension with manager approval	High
GATE-PERMIT-TC-011	Sync extension to central system when network restored	High
GATE-PERMIT-TC-012	Maintain audit trail of emergency extensions	High

10.8 Ft Gate Permit Check Validity

10.8.1 Priority

Must Have

10.8.2 User Story

As a gate staff member, I want to check permit expiry and visitor overstay status during checkout so that I can enforce park rules

10.8.3 Preconditions

Visitor checking out; permit in database

10.8.4 Postconditions

Overstay detected and flagged or checkout approved

10.8.5 Test Cases

Id	Description	Weight
GATE-PERMIT-TC-013	Detect visitor overstay beyond permit expiry	High
GATE-PERMIT-TC-014	Allow checkout within grace period	Medium
GATE-PERMIT-TC-015	Manual override with documented reason	Medium

10.9 Ft Gate Permit Interagency

10.9.1 Priority

Must Have

10.9.2 User Story

As Nabi gate staff, I want to verify Serengeti permits for cross-border visitors so that I can coordinate with TANAPA

10.9.3 Preconditions

Visitor at Nabi shared gate; Serengeti permit presented

10.9.4 Postconditions

Cross-border entry logged; manual order form as fallback

10.9.5 Test Cases

Id	Description	Weight
GATE-PERMIT-TC-016	Verify Serengeti permit at Nabi gate	Medium
GATE-PERMIT-TC-017	Use manual order form when system down	High
GATE-PERMIT-TC-018	Log cross-border movement	Medium

10.10 Ft Gate Vehicle Log

10.10.1 Priority

Must Have

10.10.2 User Story

As a gate staff member, I want to automatically log vehicle entry with plate number and type so that I can eliminate manual logging of 1000+ vehicles/day

10.10.3 Preconditions

Camera system operational; vehicle at checkpoint

10.10.4 Postconditions

Vehicle logged with plate, type, timestamp; manual entry fallback available

10.10.5 Test Cases

Id	Description	Weight
GATE-VEHICLE-TC-001	Capture license plate using camera	High
GATE-VEHICLE-TC-002	Classify vehicle type (car, jeep, bus, trailer)	High
GATE-VEHICLE-TC-003	Manual entry fallback when camera fails	High
GATE-VEHICLE-TC-004	Process 1000+ vehicles/day without delays	High

10.11 Ft Gate Vehicle Track

10.11.1 Priority

Must Have

10.11.2 User Story

As a gate staff member, I want to track vehicle movement across gates so that I can maintain accurate vehicle counts

10.11.3 Preconditions

Vehicle logged at entry gate; sync operational

10.11.4 Postconditions

Vehicle movement tracked; anomalies detected

10.11.5 Test Cases

Id	Description	Weight
GATE-VEHICLE-TC-005	Track vehicle from entry to exit gate	High

Id	Description	Weight
GATE-VEHICLE-TC-006	Alert if vehicle detected at multiple gates simultaneously	High
GATE-VEHICLE-TC-007	Real-time sync between gates	High

10.12 Ft Gate Vehicle Credential

10.12.1 Priority

Must Have

10.12.2 User Story

As a gate staff member, I want to verify vehicle credentials and driver authorization so that only authorized vehicles enter

10.12.3 Preconditions

Vehicle at checkpoint; credentials presented

10.12.4 Postconditions

Vehicle and driver verified; entry approved or denied

10.12.5 Test Cases

Id	Description	Weight
GATE-VEHICLE-TC-008	Verify driver license	High
GATE-VEHICLE-TC-009	Verify vehicle registration	High
GATE-VEHICLE-TC-010	Verify commercial operator license for safari vehicles	High

10.13 Ft Gate Vehicle Trailer

10.13.1 Priority

Should Have

10.13.2 User Story

As a gate staff member, I want to detect and log vehicles with trailers so that I can track additional equipment

10.13.3 Preconditions

Camera system with trailer detection model

10.13.4 Postconditions

Trailer detected and logged

10.13.5 Test Cases

Id	Description	Weight
GATE-VEHICLE-TC-011	Detect vehicle with trailer using object detection	Medium
GATE-VEHICLE-TC-012	Log trailer separately in vehicle record	Medium

10.14 Ft Gate Capacity Realtime

10.14.1 Priority

Must Have

10.14.2 User Story

As a gate manager, I want to view real-time capacity across all 9 gates so that I can monitor total visitors and vehicles

10.14.3 Preconditions

All gates synced; dashboard accessible

10.14.4 Postconditions

Real-time capacity displayed with warnings

10.14.5 Test Cases

Id	Description	Weight
GATE-CAPACITY-TC-001	Display current capacity vs limits for all 9 gates	High
GATE-CAPACITY-TC-002	Color-coded warnings when approaching capacity	High
GATE-CAPACITY-TC-003	Update capacity within 15 minutes of gate entry/exit	High

10.15 Ft Gate Capacity Crater

10.15.1 Priority

Must Have

10.15.2 User Story

As a capacity manager, I want to track crater-specific capacity so that I can manage the 200 cars/day limit

10.15.3 Preconditions

Crater gates (Seneto, Lemala 1, Lemala 2) operational

10.15.4 Postconditions

Crater capacity tracked separately; limit enforced

10.15.5 Test Cases

Id	Description	Weight
GATE-CAPACITY-TC-004	Track in-crater vs out-of-crater vehicles	High
GATE-CAPACITY-TC-005	Alert when crater capacity reaches 180 cars (90%)	High
GATE-CAPACITY-TC-006	Track accommodation at Lemala camps	Medium

10.16 Ft Gate Capacity Alert

10.16.1 Priority

Must Have

10.16.2 User Story

As a manager, I want to receive alerts when capacity limits are approached so that I can take action

10.16.3 Preconditions

Alert thresholds configured; notification system operational

10.16.4 Postconditions

Alerts sent via SMS/email when thresholds reached

10.16.5 Test Cases

Id	Description	Weight
GATE-CAPACITY-TC-007	Send SMS alert at 80% capacity	High
GATE-CAPACITY-TC-008	Send email alert at 90% capacity	High
GATE-CAPACITY-TC-009	Configurable threshold settings	Medium

10.17 Ft Gate Capacity Report

10.17.1 Priority

Should Have

10.17.2 User Story

As a manager, I want to generate daily capacity reports showing entry/exit patterns so that I can analyze trends

10.17.3 Preconditions

Historical data available; reporting module accessible

10.17.4 Postconditions

Report generated with trends and insights

10.17.5 Test Cases

Id	Description	Weight
GATE-CAPACITY-TC-010	Generate daily capacity report	Medium
GATE-CAPACITY-TC-011	Identify peak hours from historical data	Medium
GATE-CAPACITY-TC-012	Gate-by-gate capacity breakdown	Medium

10.18 Ft Gate Payment Verify

10.18.1 Priority

Must Have

10.18.2 User Story

As Old HQ staff, I want to verify payment receipts before permit issuance so that I can ensure accurate revenue collection

10.18.3 Preconditions

Payment received; receipt number provided

10.18.4 Postconditions

Receipt verified; payment logged; permit ready for generation

10.18.5 Test Cases

Id	Description	Weight
GATE-PAYMENT-TC-001	Verify cash payment receipt	High
GATE-PAYMENT-TC-002	Verify bank transfer receipt	High
GATE-PAYMENT-TC-003	Verify mobile money payment	High
GATE-PAYMENT-TC-004	Reject duplicate receipt numbers	High

10.19 Ft Gate Payment Aviation

10.19.1 Priority

Must Have

10.19.2 User Story

As Ndutu airstrip staff, I want to process aviation landing fees so that I can handle ~100 aviation visits/day

10.19.3 Preconditions

Aviation visitor at Ndutu; landing fee applicable

10.19.4 Postconditions

Fee processed; receipt generated; synced to central system

10.19.5 Test Cases

Id	Description	Weight
GATE-PAYMENT-TC-005	Process aviation landing fee	High
GATE-PAYMENT-TC-006	Generate aviation receipt	High
GATE-PAYMENT-TC-007	Manual payment processing when network unavailable	High

10.20 Ft Gate Payment Quote

10.20.1 Priority

Must Have

10.20.2 User Story

As gate staff, I want to generate payment quotes based on visitor category and duration so that I can provide accurate pricing

10.20.3 Preconditions

Visitor category known; duration specified; pricing rules configured

10.20.4 Postconditions

Quote generated; displayed to visitor

10.20.5 Test Cases

Id	Description	Weight
GATE-PAYMENT-TC-008	Generate quote for sleeping tourist (2 days)	High
GATE-PAYMENT-TC-009	Generate quote for passing tourist	High
GATE-PAYMENT-TC-010	Generate quote extension for extended stay	Medium

Id	Description	Weight
GATE-PAYMENT-TC-011	Apply local vs international pricing	High

10.21 Ft Gate Accom Checkin

10.21.1 Priority

Must Have

10.21.2 User Story

As Lemala camp staff, I want to register visitors checking into crater camps so that I can track in-crater accommodation

10.21.3 Preconditions

Visitor at Lemala 1 or 2; accommodation permit valid

10.21.4 Postconditions

Accommodation logged; offline operation supported

10.21.5 Test Cases

Id	Description	Weight
GATE-ACCOM-TC-001	Register camp check-in at Lemala 1	High
GATE-ACCOM-TC-002	Operate offline during low connectivity	High
GATE-ACCOM-TC-003	Sync accommodation data when network restored	Medium

10.22 Ft Gate Accom Verify

10.22.1 Priority

Must Have

10.22.2 User Story

As camp staff, I want to verify accommodation permits for overnight stays so that I can ensure only authorized camping

10.22.3 Preconditions

Visitor presenting accommodation permit

10.22.4 Postconditions

Permit verified; camping authorized or denied

10.22.5 Test Cases

Id	Description	Weight
GATE-ACCOM-TC-004	Verify valid accommodation permit	High
GATE-ACCOM-TC-005	Alert if no valid accommodation permit	High
GATE-ACCOM-TC-006	Cross-reference with main permit system	Medium

10.23 Ft Gate Activity Register

10.23.1 Priority

Must Have

10.23.2 User Story

As Olduvai Gorge staff, I want to register visitors for activities so that I can track ~300 visitors/day

10.23.3 Preconditions

Visitor at Olduvai Gorge; activity selected

10.23.4 Postconditions

Activity registration logged; offline capable

10.23.5 Test Cases

Id	Description	Weight
GATE-ACTIVITY-TC-001	Register museum visit	High
GATE-ACTIVITY-TC-002	Register guided tour	High
GATE-ACTIVITY-TC-003	Register archaeological site visit	Medium
GATE-ACTIVITY-TC-004	Operate offline with slow internet	High

10.24 Ft Gate Activity Payment

10.24.1 Priority

Should Have

10.24.2 User Story

As activity staff, I want to process activity fees separately so that I can track revenue from tourist activities

10.24.3 Preconditions

Visitor registered for activity; fee applicable

10.24.4 Postconditions

Fee processed; separate receipt generated

10.24.5 Test Cases

Id	Description	Weight
GATE-ACTIVITY-TC-005	Process activity fee as add-on to entry permit	Medium
GATE-ACTIVITY-TC-006	Generate separate activity receipt	Medium

10.25 Ft Gate Fallback Forms

10.25.1 Priority

Must Have

10.25.2 User Story

As gate staff, I want to use manual order forms when system is down so that I can maintain operations during outages

10.25.3 Preconditions

System unavailable; printable forms accessible

10.25.4 Postconditions

Manual forms completed; data entered when system restored

10.25.5 Test Cases

Id	Description	Weight
GATE-FALLBACK-TC-001	Use manual order form at Nabi during outage	High
GATE-FALLBACK-TC-002	Print blank form templates	Medium
GATE-FALLBACK-TC-003	Reconcile manual forms with system data	High

10.26 Ft Gate Fallback Sync

10.26.1 Priority

Must Have

10.26.2 User Story

As gate staff, I want to sync manually entered data when network restored so that I can maintain complete records

10.26.3 Preconditions

Manual forms completed during outage; network restored

10.26.4 Postconditions

All manual data entered into system; duplicates detected

10.26.5 Test Cases

Id	Description	Weight
GATE-FALLBACK-TC-004	Batch entry interface for manual forms	High
GATE-FALLBACK-TC-005	Detect and flag duplicate entries	High
GATE-FALLBACK-TC-006	Validate manual data against business rules	Medium

10.27 Ft Gate Report Daily

10.27.1 Priority

Must Have

10.27.2 User Story

As a manager, I want to generate daily gate reports so that I can track operations and identify issues

10.27.3 Preconditions

Daily transaction data available; reporting module accessible

10.27.4 Postconditions

Comprehensive daily report generated; exported to PDF/Excel

10.27.5 Test Cases

Id	Description	Weight
GATE-REPORT-TC-001	Generate daily report with visitor count	High
GATE-REPORT-TC-002	Include vehicle count and revenue in report	High
GATE-REPORT-TC-003	Include capacity metrics	Medium
GATE-REPORT-TC-004	Export report to PDF	Medium
GATE-REPORT-TC-005	Export report to Excel	Medium

10.28 Ft Gate Report Revenue

10.28.1 Priority

Must Have

10.28.2 User Story

As a financial manager, I want to generate revenue reports so that I can track financial performance for 300 billion TZS operations

10.28.3 Preconditions

Revenue data collected; financial reporting module accessible

10.28.4 Postconditions

Revenue report generated with breakdown and analysis

10.28.5 Test Cases

Id	Description	Weight
GATE-REPORT-TC-006	Generate revenue report with payment method breakdown	High
GATE-REPORT-TC-007	Gate-by-gate revenue comparison	High
GATE-REPORT-TC-008	Variance analysis vs expected revenue	Medium

10.29 Ft Gate Report Audit

10.29.1 Priority

Must Have

10.29.2 User Story

As an auditor, I want to access complete audit trail of all gate transactions so that I can support financial audits

10.29.3 Preconditions

Audit trail enabled; all transactions logged

10.29.4 Postconditions

Immutable audit log accessible; manual overrides flagged

10.29.5 Test Cases

Id	Description	Weight
GATE-REPORT-TC-009	Access immutable transaction logs	High
GATE-REPORT-TC-010	Track user actions with timestamps	High
GATE-REPORT-TC-011	Flag all manual overrides for review	High

Id	Description	Weight
GATE-REPORT-TC-012	Export audit trail for external audit	Medium

11 Additional Context

11.1 Success Metrics

11.1.1 Visitor Processing Time

< 2 minutes per visitor (currently 5-10 minutes)

11.1.2 Permit Verification Time

< 30 seconds (currently 2-3 minutes with manual checks)

11.1.3 System Uptime

99% (currently ~70% with Safari portal)

11.1.4 Staff Workload Reduction

60% reduction in manual data entry

11.1.5 Capacity Tracking Accuracy

Real-time accuracy across all 9 gates

11.1.6 Revenue Integrity

100% audit trail for 300 billion TZS operations