

Stray Animals Shelter Management System

Schema Documentation

Database: PostgreSQL 16

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1. System Overview

The Stray Animals Shelter Management System manages the lifecycle of stray and surrendered animals across multiple cities and branches. The system handles rescue operations, animal care, adoptions, and sales.

The schema uses PostgreSQL 16 and follows Third Normal Form (3NF) principles.

1.1. Tables

The database contains 14 tables:

- **Reference tables:** city, species, role
- **Organization:** branch, rescue_team
- **Staff:** employee, employee_shift
- **Animals:** animal, animal_care_log
- **Operations:** report, rescue_mission
- **Transactions:** adoption, animal_sale
- **System:** audit_log

2. Normalization

2.1. First Normal Form (1NF)

All columns contain atomic values. No repeating groups exist.

2.2. Second Normal Form (2NF)

All tables use single-column primary keys (SERIAL). No partial dependencies exist.

2.3. Third Normal Form (3NF)

No transitive dependencies. City names are stored in the city table only. Species names are stored in the species table only. Employee roles are stored in the role table only.

3. Data Dictionary

3.1. city

Stores city information.

Column	Type	Description
city_id	SERIAL	Primary key
city_name	VARCHAR(100)	City name (unique, not null)
province	VARCHAR(100)	Province name (not null)
country	VARCHAR(100)	Country (default: Pakistan)

3.2. species

Animal species reference.

Column	Type	Description
species_id	SERIAL	Primary key
species_name	VARCHAR(50)	Species name (unique, not null)
avg_lifespan_years	INT	Average lifespan (check > 0)

3.3. role

Employee roles and base salaries.

Column	Type	Description
role_id	SERIAL	Primary key
role_name	VARCHAR(50)	Role name (unique, not null)
base_salary	NUMERIC(10,2)	Base salary (not null, >= 0)
permissions	TEXT	JSON permissions

3.4. branch

Shelter branches.

Column	Type	Description
branch_id	SERIAL	Primary key
branch_name	VARCHAR(150)	Branch name (not null)
city_id	INT	Foreign key to city (not null)
address	VARCHAR(255)	Street address (not null)
phone	VARCHAR(20)	Phone number
email	VARCHAR(150)	Email (unique)
capacity	INT	Max capacity (not null, > 0)
opened_date	DATE	Opening date (not null)
is_active	BOOLEAN	Active status (default: true)

3.5. employee

Staff members.

Column	Type	Description
employee_id	SERIAL	Primary key
first_name	VARCHAR(80)	First name (not null)
last_name	VARCHAR(80)	Last name (not null)
cnic	CHAR(15)	National ID (unique)
email	VARCHAR(150)	Email (unique, not null)
phone	VARCHAR(20)	Phone number
hire_date	DATE	Hire date (not null)
branch_id	INT	Foreign key to branch (not null)
role_id	INT	Foreign key to role (not null)
salary	NUMERIC(10,2)	Actual salary (not null, >= 0)
is_active	BOOLEAN	Active status (default: true)

3.6. employee_shift

Work shift records.

Column	Type	Description
shift_id	SERIAL	Primary key
employee_id	INT	Foreign key to employee (not null)
shift_date	DATE	Shift date (not null)
start_time	TIME	Start time (not null)
end_time	TIME	End time (not null, > start_time)
hours_worked	NUMERIC(4,2)	Computed hours (generated)

3.7. rescue_team

Rescue teams per branch.

Column	Type	Description
team_id	SERIAL	Primary key
team_name	VARCHAR(100)	Team name (not null)
branch_id	INT	Foreign key to branch (not null)
leader_id	INT	Foreign key to employee
vehicle_plate	VARCHAR(20)	Vehicle plate number
is_active	BOOLEAN	Active status (default: true)

3.8. animal

Animal records.

Column	Type	Description
animal_id	SERIAL	Primary key
name	VARCHAR(80)	Animal name
species_id	INT	Foreign key to species (not null)
breed	VARCHAR(80)	Breed
gender	CHAR(1)	M/F/U
date_of_birth	DATE	Birth date
colour	VARCHAR(50)	Color description
weight_kg	NUMERIC(5,2)	Weight (> 0)
microchip_no	VARCHAR(50)	Microchip (unique)
health_status	VARCHAR(20)	Health status (default: Unknown)
status	VARCHAR(20)	Status (default: In Shelter)
branch_id	INT	Foreign key to branch (not null)
intake_date	DATE	Intake date (default: today)
intake_method	VARCHAR(20)	Intake method (not null)

3.9. report

Public distress reports.

Column	Type	Description
report_id	SERIAL	Primary key
channel	VARCHAR(20)	Report channel (not null)
reporter_name	VARCHAR(150)	Reporter name
reporter_contact	VARCHAR(150)	Reporter contact
description	TEXT	Description (not null)
location_text	VARCHAR(255)	Location (not null)
city_id	INT	Foreign key to city (not null)
reported_at	TIMESTAMPTZ	Report time (default: now)
status	VARCHAR(20)	Status (default: Pending)
assigned_team_id	INT	Foreign key to rescue_team

3.10. rescue_mission

Rescue operations.

Column	Type	Description
mission_id	SERIAL	Primary key
report_id	INT	Foreign key to report
team_id	INT	Foreign key to rescue_team (not null)
animal_id	INT	Foreign key to animal
dispatched_at	TIMESTAMPTZ	Dispatch time (default: now)
completed_at	TIMESTAMPTZ	Completion time
outcome	VARCHAR(20)	Outcome (default: Ongoing)
notes	TEXT	Mission notes

3.11. animal_care_log

Animal care events.

Column	Type	Description
log_id	SERIAL	Primary key
animal_id	INT	Foreign key to animal (not null)
employee_id	INT	Foreign key to employee (not null)
log_date	DATE	Log date (default: today)
care_type	VARCHAR(30)	Care type (not null)
notes	TEXT	Care notes
cost	NUMERIC(8,2)	Cost (≥ 0)

3.12. adoption

Adoption records.

Column	Type	Description
adoption_id	SERIAL	Primary key
animal_id	INT	Foreign key to animal (not null)
adopter_name	VARCHAR(150)	Adopter name (not null)
adopter_cnic	CHAR(15)	Adopter CNIC
adopter_contact	VARCHAR(150)	Adopter contact (not null)
adopter_address	TEXT	Adopter address
employee_id	INT	Foreign key to employee (not null)
adoption_date	DATE	Adoption date (default: today)
adoption_fee	NUMERIC(8,2)	Fee (default: 0, ≥ 0)
status	VARCHAR(20)	Status (default: Pending)

3.13. animal_sale

Animal sales and donations.

Column	Type	Description
sale_id	SERIAL	Primary key
animal_id	INT	Foreign key to animal (not null)
sale_type	VARCHAR(20)	Transaction type (not null)
counterparty_name	VARCHAR(150)	Buyer/donor name
counterparty_contact	VARCHAR(150)	Contact info
employee_id	INT	Foreign key to employee (not null)
transaction_date	DATE	Transaction date (default: today)
amount	NUMERIC(10,2)	Amount (default: 0, >= 0)
notes	TEXT	Transaction notes

3.14. audit_log

System audit trail.

Column	Type	Description
audit_id	SERIAL	Primary key
table_name	VARCHAR(50)	Table name (not null)
record_id	INT	Record ID (not null)
action	VARCHAR(10)	Action type (not null)
old_value	TEXT	Old value
new_value	TEXT	New value
changed_by	VARCHAR(100)	User who made change
changed_at	TIMESTAMPTZ	Change timestamp (default: now)

4. User Roles

The system defines five employee roles:

Role	Base Salary	Responsibilities
Manager	PKR 85,000	Manage employees, approve adoptions, view reports and financial records
Veterinarian	PKR 75,000	Manage animal health records, prescribe treatments, log care events
Rescuer	PKR 45,000	Manage rescue missions, respond to distress reports
Caretaker	PKR 35,000	Log feeding and grooming events, basic animal care
Admin	PKR 40,000	Process adoptions and sales, manage reports

5. Indexes

Key indexes for query performance:

- branch(city_id)
- employee(branch_id, role_id, is_active)
- employee_shift(employee_id, shift_date)
- animal(branch_id, species_id, status, health_status)
- report(status, city_id, assigned_team_id)
- rescue_mission(team_id, animal_id)
- animal_care_log(animal_id, log_date)
- adoption(animal_id, status)

6. Triggers

trg_adoption_status: Updates animal.status to 'Adopted' when adoption.status becomes 'Completed'.

trg_audit_animal_status: Logs changes to animal health_status or status in audit_log.

trg_check_adoption_eligibility: Prevents adoption of animals not in 'In Shelter' status.

7. Views

vw_available_animals: Shows animals available for adoption with species, branch, and city info.

vw_branch_summary: Branch operational dashboard with animal count, capacity, and staff count.

vw_employee_hours_summary: Monthly hours worked per employee for payroll.