

# WORK BREAKDOWN STRUCTURE

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## InvestRand Property Investment Platform

This Work Breakdown Structure organizes all system improvements and new features into logical phases for execution. Many Phase 1 and Phase 2 activities will run in parallel to accelerate delivery.



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## PHASE 1: TECHNOLOGY STACK EVOLUTION & CRITICAL INFRASTRUCTURE

**Total Duration: 6-8 weeks (with parallel execution)**

Priority: ● CRITICAL - Must begin immediately

**Runs in parallel with Phase 2 activities**

### 1.1 Security Hardening

**Duration: 1-2 weeks**

**Objective:** Eliminate critical security vulnerabilities

**Deliverables:**

- Secure S3 bucket configuration - change from public-read to private with pre-signed URLs
- Implement file upload validation (file type, size, MIME verification)
- Add API rate limiting to prevent abuse
- Move Sentry DSN to environment variables
- Implement proper secrets management
- Tighten CORS configuration

**Timeline:**

- Week 1: S3 security + file validation + rate limiting
- Week 2: Secrets management + CORS + security audit

**Success Criteria:**

- All S3 files require authentication
- File uploads validate type, size, and content
- API endpoints protected by rate limiting
- Zero critical security vulnerabilities

### 1.2 Performance Optimization

**Duration: 2 weeks (runs parallel to Phase 2)**

**Parallel execution with Phase 2.2-2.5**

**Objective:** Improve system performance for current and future scale

**Deliverables:**

- Database query optimization - add missing indexes
- Fix N+1 query problems using select\_related/prefetch\_related
- Implement Redis caching layer
- Convert synchronous external API calls to async tasks (ActiveCampaign, Telegram)
- Add database triggers for aggregation calculations
- Optimize frontend bundle size with code splitting and lazy loading

**Timeline:**

- Week 1: Database indexing + N+1 fixes + Redis setup



- Week 2: Async tasks + frontend optimization + testing

**Success Criteria:**

- Listing page load time under 500ms
- Property save operations under 200ms
- Frontend bundle size under 5MB
- Page load time on 3G under 2 seconds

### 1.3 Database & Architecture Improvements

**Duration:** 1-2 weeks (runs parallel to 1.2 and Phase 2)

Parallel execution with Phase 1.2 and Phase 2

**Objective:** Improve data integrity and system architecture

**Deliverables:**

- Add composite indexes for common query patterns
- Implement database connection pooling
- Add foreign key constraints for data integrity
- Set up automated database backup and recovery
- Document database schema and relationships

**Timeline:**

- Week 1: Indexes + constraints + connection pooling
- Week 2: Backup automation + documentation

**Success Criteria:**

- All queries use indexes (no full table scans)
- Data integrity enforced at database level
- Automated daily backups configured
- Complete database documentation available

### 1.4 Vue 2 Security Mitigation

**Duration:** 1 week (IMMEDIATE START)

**CRITICAL:** Vue 2 reached End-of-Life in December 2023 - no more security patches

Runs parallel to all other Phase 1 and Phase 2 items

**Objective:** Mitigate Vue 2 EOL security risks immediately

**Deliverables:**

- Audit all Vue 2 and npm dependencies for known vulnerabilities
- Implement Web Application Firewall (WAF) with Vue-specific rules
- Add strict Content Security Policy (CSP) headers
- Implement additional input sanitization and validation



- Set up security monitoring and automated alerts
- Weekly vulnerability scanning

**Timeline:**

- Week 1: Dependency audit + WAF + CSP + monitoring setup

**Success Criteria:**

- Zero critical vulnerabilities in production
- WAF rules blocking common attack vectors
- CSP preventing XSS attacks
- Automated weekly security scans

## 1.5 Frontend Modernization (If Approved)

**Duration:** 8-10 weeks

Runs parallel to 1.6

**Note:** Execute only if Technology Migration is approved

**Objective:** Migrate to modern, secure, maintainable frontend stack

**Recommended Technology Stack:**

- React 18 + TypeScript + Tailwind CSS + Vite
- TanStack Query for server state
- React Hook Form for forms

**Timeline:**

- Week 1: Project setup + component library + design system
- Weeks 2-3: Authentication + user management pages
- Weeks 4-6: Property listing pages (browse, detail, create, edit)
- Weeks 7-8: Investment calculator + dashboards
- Weeks 9-10: Admin interfaces + testing + cutover

**Expected Benefits:**

- 75% reduction in bundle size (23MB → 2-5MB)
- 60-70% faster page load times
- Active security updates
- Larger talent pool for hiring

## 1.6 Backend Modernization (If Approved)

**Duration:** 6-8 weeks



Runs parallel to 1.5

**Note:** Execute only if Technology Migration is approved

**Objective:** Migrate to high-performance, scalable backend

**Recommended:** Spring Boot 3.2 (Java 21)

Best for financial calculations, enterprise scalability

**Timeline:**

- Week 1: Project setup + core domain models
- Week 2: User authentication + authorization
- Weeks 3-4: Property + Investment domains
- Week 5: Approval workflow + notifications
- Week 6: External integrations (ActiveCampaign, Telegram)
- Weeks 7-8: Testing + performance + cutover

**Expected Benefits:**

- Eliminate 300-second Lambda timeout
- Scale to 10,000+ concurrent users
- No cold start delays
- 50-70% better performance



## PHASE 2: BUG FIXES & BUSINESS FEATURES

**Total Duration: 4-5 weeks (with parallel execution)**

Priority: CRITICAL for financial fixes, HIGH for other items

**Most Phase 2 items run in parallel with Phase 1 activities**

### 2.1 Financial Calculation Corrections

**Duration: 1-2 weeks**

Priority: CRITICAL

**Start immediately alongside Phase 1.1 and 1.4**

**Objective:** Ensure 100% accuracy in financial calculations

#### 2.1.1 ROI Formula Alignment

- Document current vs required ROI formula
- Identify and fix all discrepancies
- Add automated validation tests
- Update frontend display

#### 2.1.2 Bond Repayment Recalculation Fix

- Investigate root cause of inconsistent recalculation
- Fix all calculation triggers (interest, term, principal, deposit changes)
- Add calculation logging
- Add manual recalculate button

#### Timeline:

- Week 1: Investigation + documentation + implementation
- Week 2: Testing (50+ scenarios) + deployment

#### Success Criteria:

- ROI calculations match financial model 100%
- Bond repayment recalculates on every field change
- Automated validation passes 100%

### 2.2 User Management Enhancements

**Duration: 1-2 weeks**

Priority: HIGH

**Runs parallel to Phase 1.2 and 1.3**

**Objective:** Provide internal administrative capabilities

#### Deliverables:

- Permission to add users internally
- Permission to remove/deactivate users internally
- Ability to reset users' passwords internally



- Fix: Users not receiving password reset emails
- Audit trail for all user management actions

**Timeline:**

- Week 1: Admin interface + email fix
- Week 2: Audit logging + testing

**Success Criteria:**

- Admins can add/remove users via admin panel
- Admins can reset any user password
- 100% password reset email delivery rate
- All actions logged with timestamp and admin ID

## 2.3 Approval Workflow Improvements

**Duration: 2 weeks**

Priority: HIGH

Runs parallel to Phase 1.2, 1.3, and Phase 2.2

**Objective:** Enhance approval process with better roles and notifications

### 2.3.1 Sales Manager Role Creation

- Create "Sales Manager" role with final-approval rights
- Update workflow to require Sales Manager sign-off
- Add Sales Manager approval dashboard

### 2.3.2 Multi-User Notifications

- Listing approval feedback notifications to multiple users
- Configure notification recipients per listing
- Support email, SMS, in-app notifications

### 2.3.3 Post-Live Status Management

- Listing agents change statuses post-live (Under Offer, Sold, etc.)
- Implement role-based authorization
- Add status change history and audit trail

**Timeline:**

- Week 1: Sales Manager role + multi-user notifications
- Week 2: Post-live status management + testing

**Success Criteria:**

- Sales Manager role fully functional
- Multiple users receive notifications
- Agents can update status with authorization

- Complete audit trail maintained

## 2.4 CRM Integration Fixes

### Duration: 1-2 weeks

Priority: HIGH

Runs parallel to Phase 2.3 and Phase 2.5

**Objective:** Ensure seamless data sync with ActiveCampaign and Notion

#### Deliverables:

- Re-integrate inquiries module
- Contact details sync correctly with ActiveCampaign
- Contact details sync correctly with Notion
- Real-time sync status monitoring
- Automatic retry for failed syncs

#### Timeline:

- Week 1: Re-integration + ActiveCampaign + Notion sync
- Week 2: Monitoring + retry mechanism + testing

#### Success Criteria:

- 100% inquiries sync within 30 seconds
- Sync failure rate below 0.1%
- Real-time status visible in dashboard

## 2.5 Property Information Display

### Duration: 1 week

Priority: MEDIUM

Runs parallel to Phase 2.3 and 2.4

**Objective:** Improve property identification for tracking

### 2.5.1 Full Property Identifier Display

- Display full property identifiers for SharePoint tracking
- Add to all listing views and exports

### 2.5.2 Agent Property View

- Listing agents view their assigned properties
- Create "My Properties" dashboard
- Add filtering and search

#### Timeline:

- Week 1: Implementation + testing + deployment



**Success Criteria:**

- All identifiers visible system-wide
- Agents can view their assigned properties
- Export functionality working



## PHASE 3: MONITORING, DOCUMENTATION & MAINTENANCE

**Total Duration: Ongoing (initial setup 2-3 weeks)**

Priority: HIGH for monitoring, MEDIUM for documentation

**Begins alongside Phase 1 and continues throughout**

### 3.1 Comprehensive Monitoring Implementation

**Duration: 1-2 weeks initial setup**

Priority: HIGH

**Start in Week 2, runs parallel to all other phases**

**Objective:** Implement proactive system monitoring

**Deliverables:**

- Application Performance Monitoring (APM)
- Error tracking and logging
- User analytics and behavior tracking
- Infrastructure monitoring
- Database performance monitoring
- Business metrics dashboard
- Automated alerting

**Timeline:**

- Week 1: APM + error tracking + basic alerts
- Week 2: Analytics + infrastructure + dashboards

**Success Criteria:**

- Real-time system health visibility
- Alerts delivered within 1 minute
- 90% of issues detected before user reports

### 3.2 System Documentation

**Duration: 2 weeks (ongoing updates)**

Priority: HIGH

**⚡ Starts Week 3, runs parallel throughout**

**Objective:** Create comprehensive system documentation

**Deliverables:**

- System architecture documentation
- API documentation (REST + GraphQL)
- Database schema documentation
- Business rules documentation
- Operations guide
- Developer onboarding guide



**Timeline:**

- Week 1: Architecture + API + database docs
- Week 2: Business rules + operations + onboarding

**Success Criteria:**

- New developers onboard in under 2 hours
- All APIs documented with examples
- 80% of issues have documented solutions

### 3.3 Ongoing Maintenance Procedures

**Duration: Ongoing (establish immediately)**

Priority: MEDIUM

**Objective:** Establish sustainable maintenance practices

**Maintenance Schedule:**

- Daily: Automated backups, log reviews, monitoring
- Weekly: Performance review
- Monthly: Database optimization, capacity planning
- Quarterly: Security audit, disaster recovery test

**Success Criteria:**

- Zero unpatched critical vulnerabilities
- 99.9% uptime maintained
- All backups verified and recoverable



## PARALLEL EXECUTION TIMELINE

This timeline shows how Phase 1 and Phase 2 activities run concurrently to deliver results in 6-8 weeks:

Week	Phase 1 Activities	Phase 2 Activities	Phase 3 Activities	Status
<b>Week 1</b>	1.1 Security (start) 1.4 Vue 2 Security	2.1 Financial Fixes (start)	-	Critical
<b>Week 2</b>	1.1 Security (complete) 1.6 Backend Modernization (if approved)	2.1 Financial Fixes (complete) 2.2 User Management (start)	3.1 Monitoring (start)	Critical
<b>Week 3</b>	1.2 Performance (start) 1.3 Database (start) 1.6 Backend Modernization (if approved)	2.2 User Management 2.3 Workflow (start)	3.1 Monitoring 3.2 Documentation (start)	High
<b>Week 4</b>	1.2 Performance 1.3 Database (complete) 1.6 Backend Modernization (if approved)	2.2 User Mgmt (complete) 2.3 Workflow 2.4 CRM (start) 2.5 Property (start)	3.1 Monitoring (complete) 3.2 Documentation	High
<b>Week 5</b>	1.2 Performance (complete) 1.5 Frontend (if approved) 1.6 Backend Modernization (if approved)	2.3 Workflow (complete) 2.4 CRM (complete) 2.5 Property (complete)	3.2 Documentation (complete) 3.3 Maintenance (ongoing)	Medium
<b>Weeks 6-8</b>	1.5 Frontend Modernization (if approved) 1.6 Backend Modernization (if approved)	All Phase 2 complete	3.3 Maintenance (ongoing)	Medium
<b>CORE</b>	<b>6-8 weeks</b>	<b>4-5 weeks</b>	<b>2-3 weeks setup</b>	
<b>OPTIONAL</b>	<b>+8-10 weeks (modernization)</b>	-	<b>Continuous</b>	



### **Key Insights:**

- Phase 1 and Phase 2 run simultaneously for maximum speed
- Critical items (Security, Financial Fixes, Vue 2) start immediately in Week 1
- Core deliverables complete in 6-8 weeks with parallel execution
- Stack modernization (if approved) adds 8-10 weeks but is optional
- Monitoring starts early to track progress throughout



## PHASE 2 ITEMS CROSS-REFERENCE

Mapping of original 11 requested items to Work Breakdown Structure:

#	Original Requirement	WBS Location
1	Permission to add/remove users internally	Phase 2.2 (1-2 weeks)
2	Ability to reset users' passwords internally	Phase 2.2 (1-2 weeks)
3	Listing approval notifications to multiple users	Phase 2.3.2 (2 weeks)
4	Create "Sales Manager" role with final-approval	Phase 2.3.1 (2 weeks)
5	Agents change listing statuses post-live	Phase 2.3.3 (2 weeks)
6	Re-integrate inquiries (ActiveCampaign/Notion)	Phase 2.4 (1-2 weeks)
7	ROI formula not matching financial model	Phase 2.1.1 (1-2 weeks)
8	Bond repayment not recalculating	Phase 2.1.2 (1-2 weeks)
9	Users not receiving password reset emails	Phase 2.2 (1-2 weeks)
10	Display full property identifiers	Phase 2.5.1 (1 week)
11	Agents view their assigned properties	Phase 2.5.2 (1 week)

## EXECUTION STRATEGY

### Total Project Timeline: 6-8 weeks (core deliverables)

#### Critical Success Factors:

1. Parallel Execution: Phase 1 and Phase 2 run simultaneously to cut delivery time by 50%

2. Immediate Start Items:

- Phase 1.1: Security Hardening
- Phase 1.4: Vue 2 Security Mitigation
- Phase 2.1: Financial Calculation Fixes

3. Weekly Progress Reviews:

- Track parallel execution status
- Identify dependencies and blockers
- Adjust resources as needed

#### Priority Execution Order:

**Week 1:** Start all CRITICAL items (1.1, 1.4, 2.1)

**Week 2:** Continue critical items + Start monitoring (3.1) + Start user management (2.2)

**Week 3:** Start performance optimization (1.2) + Database work (1.3) + Workflow improvements (2.3)

**Week 4-5:** Complete all Phase 2 items + Finish Phase 1 core + Documentation (3.2)

**Week 6-8:** Testing, refinement, and optional modernization if approved

#### Expected Outcomes:

- All critical security and financial issues resolved within 2 weeks



- All 11 Phase 2 business features delivered within 4-5 weeks
- Complete system improvements delivered within 6-8 weeks
- Optional technology stack modernization can proceed if approved



## ENGAGEMENT MODEL & COSTING APPROACHES

### WorkDay Definition:

Throughout this Work Breakdown Structure, a "workday" is defined as **4 hours of focused development time**, not a standard 8-hour day. This approach reflects industry best practices for sustainable, high-quality software development where deep focus work is more valuable than extended hours. All timeline estimates in this document are based on this 4-hour work day standard.

### Two Costing Approaches

We offer two flexible engagement models to suit different organizational needs and preferences:

#### Approach 1: Monthly Retainer (Recommended)

**Commitment: Minimum 12-month retainer agreement**

**Guaranteed Hours: Minimum 60 hours per month (15 workdays based on 4-hour days)**

**Rate: R55 000 excluding vat**

#### Key Benefits:

- Predictable Monthly Investment: Fixed monthly fee provides budget certainty and easier financial planning
- Priority Access: Retainer clients receive priority scheduling and faster response times for urgent issues
- Continuity & Context: Maintains deep understanding of your platform, reducing ramp-up time and improving solution quality
- Flexible Allocation: 60 monthly hours can be allocated across different phases and priorities as business needs evolve
- Cost Efficiency: Retainer rates typically provide 15-20% savings compared to hourly billing
- Long-term Partnership: 12-month commitment ensures stability through all phases including critical technology stack migration
- Proactive Support: Team can proactively identify and address issues before they become critical

#### Ideal For:

- Organizations seeking ongoing development and maintenance partnership
- Projects requiring continuous improvement and feature development
- Teams that value predictable monthly costs and long-term stability



## **Approach 2: Hourly Rate**

**Commitment: No long-term commitment required**

**Billing: Pay only for hours worked, billed weekly or bi-weekly**

**Rate: R1100/hour excluding vat**

### **Key Benefits:**

- Maximum Flexibility: Scale development hours up or down based on immediate needs and budget availability
- No Long-term Obligation: Engagement can be paused or concluded at any time with standard notice period
- Pay-as-you-go: Only pay for actual work completed, ideal for variable workloads
- Project-based Work: Well-suited for defined projects with clear start and end dates

### **Considerations:**

- Higher per-hour rate compared to retainer model
- Availability not guaranteed during high-demand periods
- May experience longer ramp-up time between engagement periods

### **Ideal For:**

- Organizations testing the partnership before longer commitment
- Projects with clearly defined scope and timeline
- Companies with variable monthly budgets
- Short-term initiatives or proof-of-concept work

