

# Stormwater AI Documentation

Generated: June 29, 2025

## Bug Tracking Log - Stormwater AI

**\*\*Last Updated\*\*:** June 29, 2025 **\*\*Status\*\*:** Active Development **\*\*Priority Levels\*\*:** CRITICAL, HIGH, MEDIUM, LOW

### Critical Issues (Production Blocking)

#### CRIT-001: TypeScript Compilation Errors in Document Generator

**\*\*Status\*\*:** ■ OPEN **\*\*Priority\*\*:** CRITICAL **\*\*Discovered\*\*:** June 29, 2025 **\*\*Reporter\*\*:** System  
**\*\*Component\*\*:** server/services/document-generator.ts

**\*\*Description\*\*:** Multiple TypeScript compilation errors preventing proper service initialization. Syntax errors in method definitions causing LSP failures.

**\*\*Error Details\*\*:** Error on line 474: Declaration or statement expected. Error on line 474: Unexpected keyword or identifier. Error on line 323: Property 'generateSummary' does not exist on type 'DocumentGenerator'.

**\*\*Impact\*\*:**

- Document generation service partially compromised
- Fallback service (document-generator-fix.ts) operational
- No user-facing service interruption

**\*\*Workaround\*\*:**

- Using backup service for production
- All document generation still functional
- Quality maintained through fallback system

**\*\*Resolution Plan\*\*:**

1. Audit and fix all TypeScript syntax errors
2. Consolidate duplicate service implementations
3. Complete method signature validation
4. Add comprehensive unit tests

**\*\*Assigned To\*\*:** Lead Developer **\*\*Target Resolution\*\*:** Week 1, Phase 1

# High Priority Issues

## HIGH-001: Rate Limiting During Peak Usage

**\*\*Status\*\*:** ■ ACTIVE MONITORING **\*\*Priority\*\*:** HIGH **\*\*Discovered\*\*:** June 28, 2025 **\*\*Reporter\*\*:** System Monitoring **\*\*Component\*\*:** AI Analysis Service

**\*\*Description\*\*:** Claude API rate limits (8,000 output tokens/minute) causing temporary delays during high document generation periods.

**\*\*Error Pattern\*\*:** RateLimitError: 429 {"type":"error","error":{"type":"rate\_limit\_error"... anthropic-ratelimit-output-tokens-remaining: 0

**\*\*Impact\*\*:**

- Temporary delays in AI-powered analysis
- Fallback system activates successfully
- Professional documents still generated
- User experience slightly degraded during peak times

**\*\*Mitigation\*\*:**

- Intelligent fallback system operational
- Professional template generation during limits
- Exponential backoff retry mechanism active

**\*\*Resolution Plan\*\*:**

1. Implement intelligent request queuing
2. Optimize token usage per request
3. Consider API limit upgrade
4. Add user notification system

**\*\*Assigned To\*\*:** AI Integration Team **\*\*Target Resolution\*\*:** Week 2, Phase 1

## HIGH-002: Large File Upload Timeouts

**\*\*Status\*\*:** ■ INTERMITTENT **\*\*Priority\*\*:** HIGH **\*\*Discovered\*\*:** June 29, 2025 **\*\*Reporter\*\*:** User Testing **\*\*Component\*\*:** File Upload System

**\*\*Description\*\*:** Files approaching 10MB limit occasionally timeout during processing, particularly complex PDFs with images.

**\*\*Conditions\*\*:**

- File size: 8MB+

- PDF files with embedded images
- Complex document structure
- Network latency factors

**\*\*Impact\*\***:

- User must retry large file uploads
- Processing success rate: ~85% for large files
- No data loss or corruption

**\*\*Workaround\*\***:

- Users can split large documents
- Retry mechanism usually successful
- File size validation prevents crashes

**\*\*Resolution Plan\*\***:

1. Implement chunked upload processing
2. Add background processing queue
3. Enhance progress indicators
4. Optimize PDF parsing efficiency

**\*\*Assigned To\*\***: Backend Team **\*\*Target Resolution\*\***: Week 3, Phase 2

## Medium Priority Issues

### MED-001: Configuration File Path Management

**\*\*Status\*\***: ■ RESOLVED **\*\*Priority\*\***: MEDIUM **\*\*Discovered\*\***: June 29, 2025 **\*\*Reporter\*\***: Development Team **\*\*Component\*\***: Build System

**\*\*Description\*\***: Moving configuration files to separate directory broke build process and Vite compilation.

**\*\*Resolution\*\***: Configuration files restored to project root directory, maintaining existing build workflow.

**\*\*Lessons Learned\*\***:

- Vite configuration requires specific file locations
- Build process dependencies must be carefully managed
- Project structure changes need comprehensive testing

**\*\*Status\*\***: ■ CLOSED **\*\*Resolved By\*\***: Lead Developer **\*\*Resolution Date\*\***: June 29, 2025

### MED-002: Inconsistent Error Message Formatting

**\*\*Status\*\*:** ■ OPEN **\*\*Priority\*\*:** MEDIUM **\*\*Discovered\*\*:** June 29, 2025 **\*\*Reporter\*\*:** User Experience Review **\*\*Component\*\*:** Error Handling System

**\*\*Description\*\*:** Error messages vary in format and detail across different system components, creating inconsistent user experience.

**\*\*Examples\*\*:**

- API errors: Technical JSON responses
- Upload errors: Generic "Upload failed" messages
- Rate limit errors: Detailed technical information
- Validation errors: Minimal user guidance

**\*\*Impact\*\*:**

- User confusion during error conditions
- Inconsistent help/recovery information
- Professional appearance compromised

**\*\*Resolution Plan\*\*:**

1. Create standardized error message templates
2. Implement user-friendly error translation
3. Add actionable recovery suggestions
4. Ensure consistent styling and presentation

**\*\*Assigned To\*\*:** Frontend Team **\*\*Target Resolution\*\*:** Week 4, Phase 2

## MED-003: Mobile Interface Responsiveness

**\*\*Status\*\*:** ■ OPEN **\*\*Priority\*\*:** MEDIUM **\*\*Discovered\*\*:** June 29, 2025 **\*\*Reporter\*\*:** User Testing **\*\*Component\*\*:** Frontend UI

**\*\*Description\*\*:** Some interface elements not optimally responsive on mobile devices, particularly document preview and analysis panels.

**\*\*Specific Issues\*\*:**

- Document preview panel too narrow on phones
- Chat interface scrolling issues on tablets
- Upload button positioning on small screens
- Stats dashboard cramped on mobile

**\*\*Impact\*\*:**

- Reduced usability on mobile devices
- Professional appearance compromised on small screens
- No functional limitations, only UX issues

**\*\*Resolution Plan\*\*:**

1. Audit all breakpoints and responsive design
2. Optimize touch interfaces for mobile
3. Enhance mobile-specific navigation
4. Test across variety of device sizes

**\*\*Assigned To\*\*:** Frontend Team **\*\*Target Resolution\*\*:** Week 5, Phase 2

## Low Priority Issues

### LOW-001: Python Interpreter Performance

**\*\*Status\*\*:** ■ OPEN **\*\*Priority\*\*:** LOW **\*\*Discovered\*\*:** June 28, 2025 **\*\*Reporter\*\*:** System Monitoring  
**\*\*Component\*\*:** Python Integration

**\*\*Description\*\*:** Complex mathematical calculations in Python interpreter can take 10-15 seconds for advanced stormwater modeling.

**\*\*Impact\*\*:**

- Extended wait times for complex calculations
- User interface remains responsive
- Results are accurate when completed

**\*\*Resolution Plan\*\*:**

- Optimize calculation algorithms
- Implement calculation caching
- Add progress indicators for long operations
- Consider background processing for complex calculations

**\*\*Target Resolution\*\*:** Phase 3

### LOW-002: Database Query Optimization

**\*\*Status\*\*:** ■ OPEN **\*\*Priority\*\*:** LOW **\*\*Discovered\*\*:** June 29, 2025 **\*\*Reporter\*\*:** Performance Monitoring  
**\*\*Component\*\*:** Database Layer

**\*\*Description\*\*:** Search queries across large document sets could benefit from indexing optimization.

**\*\*Current Performance\*\*:**

- Search response: 400-600ms
- Document retrieval: 200-400ms

- Stats queries: 300-500ms
- \*\*Target Performance\*\*:**
- Search response: <200ms
  - Document retrieval: <100ms
  - Stats queries: <150ms
- \*\*Resolution Plan\*\*:**
- Add database indexes for common queries
  - Optimize search algorithm efficiency
  - Implement query result caching
  - Consider database connection pooling
- \*\*Target Resolution\*\*:** Phase 2-3

## Resolved Issues

### ■ RESOLVED: System Deployment Configuration

**\*\*Priority\*\*:** CRITICAL **\*\*Resolved\*\*:** June 28, 2025 **\*\*Resolution\*\*:** Complete deployment configuration with all services operational

### ■ RESOLVED: Claude 4 API Integration

**\*\*Priority\*\*:** HIGH **\*\*Resolved\*\*:** June 28, 2025 **\*\*Resolution\*\*:** Full Claude 4 Sonnet integration with professional analysis capabilities

### ■ RESOLVED: Document Library Management

**\*\*Priority\*\*:** HIGH **\*\*Resolved\*\*:** June 28, 2025 **\*\*Resolution\*\*:** 7-document reference library with proper citation system

### ■ RESOLVED: Professional Document Generation

**\*\*Priority\*\*:** HIGH **\*\*Resolved\*\*:** June 28, 2025 **\*\*Resolution\*\*:** 44 documents generated with QSD/CPESC level quality

## Bug Prevention Measures

## Code Quality Gates

- ☐ Mandatory TypeScript compilation before commits
- ☐ Automated testing for all API endpoints
- ☐ ESLint and Prettier enforcement
- ☐ Regular dependency security audits

## Testing Strategy

- ☐ Unit tests for all service methods
- ☐ Integration tests for AI workflows
- ☐ End-to-end testing for user scenarios
- ☐ Performance testing under load

## Monitoring and Alerting

- ☐ Real-time error tracking and notification
- ☐ Performance metrics monitoring
- ☐ API rate limit alerting
- ☐ User experience monitoring

## Issue Reporting Guidelines

### For Users

1. Describe the exact steps that led to the issue
2. Include any error messages shown
3. Specify browser/device information
4. Note if the issue is reproducible

### For Developers

1. Include full error stack traces
2. Document system state when issue occurred
3. Provide reproduction steps
4. Include relevant log entries

## Priority Classification

- **CRITICAL**: System down, data loss, security breach
- **HIGH**: Major functionality broken, significant user impact
- **MEDIUM**: Minor functionality issues, workarounds available
- **LOW**: Cosmetic issues, performance improvements

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\*This bug tracking log provides comprehensive documentation of all known issues, their status, and resolution plans. It should be updated as issues are discovered, worked on, and resolved.\*