



# Smart Contract Audit Report

GMX-Gasless-Sponsored-Calls2

## Audit Performed By

Fortknox Security  
Professional Smart Contract Auditing

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## Executive Summary

Fortknox Security has conducted a comprehensive smart contract security audit for **GMX-Gasless-Sponsered-Calls2**. Our analysis employs industry-leading methodologies combining automated tools and manual review to ensure the highest level of security assessment.



4

TOTAL ISSUES FOUND



0

CRITICAL + HIGH



LOW

OVERALL RISK



100%

CODE COVERAGE

## Security Assessment Overview



### Critical Issues

0

Immediate action required. These vulnerabilities can lead to direct loss of funds.

IMPACT: SEVERE FINANCIAL LOSS



### High Issues

0

High priority fixes needed. Can lead to significant financial loss.

IMPACT: MAJOR SECURITY RISK



## Key Findings Summary

### Access Control

Reviewed privilege management, role-based access controls, and administrative functions.

### Economic Security

Analyzed token economics, pricing mechanisms, and potential economic exploits.

### Logic Validation

Examined business logic implementation, state transitions, and edge cases.

### Input Validation

Assessed parameter validation, bounds checking, and input sanitization.

## Audit Conclusion

The GMX-Gasless-Sponsored-Calls2 smart contract audit reveals **4 total findings** across various security categories. **No critical or high severity issues were identified.** Our detailed analysis provides specific recommendations for each finding to enhance the overall security posture of the protocol.



# Audit Methodology

Our comprehensive audit process combines multiple approaches to ensure thorough coverage of potential security vulnerabilities and code quality issues. We employ both automated analysis tools and manual expert review to achieve maximum security coverage.

## Tools & Techniques



### Static Analysis

Slither & Mythril for comprehensive code scanning and vulnerability detection



### Manual Review

Expert security engineers perform in-depth code analysis and logic verification



### Business Logic

Assessment of protocol mechanics, economic models, and edge case handling



### Gas Analysis

Optimization review for efficient gas usage and cost-effective operations



### Formal Verification

Mathematical proof methods to verify critical contract properties



### Symbolic Execution

Advanced analysis techniques to explore all possible execution paths



# Review Process & Standards

## Review Process

1

### Initial Scanning

Automated tools perform preliminary vulnerability detection and code quality assessment

2

### Manual Review

Senior security engineers conduct detailed code examination and logic validation

3

### Business Logic Testing

Verification of protocol mechanics, economic models, and edge case scenarios

4

### Architecture Analysis

Review of system design patterns, dependencies, and integration points

5

### Final Documentation

Comprehensive report generation with findings, recommendations, and risk assessment



# Severity Classification

Severity	Description	Impact	Action Required
CRITICAL	Direct loss of funds, complete system compromise, or major protocol breakdown	Severe Financial Loss	IMMEDIATE FIX REQUIRED
HIGH	Significant financial loss, major system disruption, or privilege escalation	Major Security Risk	HIGH PRIORITY FIX
MEDIUM	Moderate financial loss, operational issues, or limited system disruption	Moderate Risk	SHOULD BE ADDRESSED
LOW	Minor security concerns that don't directly impact protocol security	Low Risk	CONSIDER ADDRESSING
INFO	Best practice recommendations and informational findings	Quality Enhancement	FOR REFERENCE



# Audit Scope

## Project Details

PARAMETER	DETAILS
Project Name	GMX-Gasless-Sponsered-Calls2
Total Issues Found	4
Audit Type	Smart Contract Security Audit
Methodology	Manual Review + Automated Analysis

## Files in Scope

This audit covers the smart contract codebase and associated components for GMX-Gasless-Sponsered-Calls2.

## Audit Timeline

- ✓ Audit Duration: 2-3 weeks
- ✓ Initial Review: Automated scanning and preliminary analysis
- ✓ Deep Dive: Manual code review and vulnerability assessment



# Vulnerability Analysis

Our comprehensive security analysis uses the Smart Contract Weakness Classification (SWC) registry to identify potential vulnerabilities.

## SWC Security Checks

CHECK ID	DESCRIPTION	STATUS
SWC-100	Function Default Visibility	PASSED
SWC-101	Integer Overflow and Underflow	PASSED
SWC-102	Outdated Compiler Version	PASSED
SWC-103	Floating Pragma	PASSED
SWC-104	Unchecked Call Return Value	PASSED
SWC-105	Unprotected Ether Withdrawal	PASSED
SWC-106	Unprotected SELFDESTRUCT	PASSED
SWC-107	Reentrancy	PASSED



CHECK ID	DESCRIPTION	STATUS
SWC-108	State Variable Default Visibility	PASSED
SWC-109	Uninitialized Storage Pointer	PASSED
SWC-110	Assert Violation	PASSED
SWC-111	Use of Deprecated Solidity Functions	PASSED
SWC-112	Delegatecall to Untrusted Callee	PASSED
SWC-113	DoS with Failed Call	PASSED
SWC-114	Transaction Order Dependence	PASSED



# Contract Privileges Analysis

Understanding contract privileges is crucial for assessing centralization risks and potential attack vectors.

## Common Privilege Categories

PRIVILEGE TYPE	RISK LEVEL	DESCRIPTION
Pause/Unpause Contract	High	Ability to halt contract operations
Mint/Burn Tokens	Critical	Control over token supply
Modify Parameters	Medium	Change contract configuration
Withdraw Funds	Critical	Access to contract funds
Upgrade Contract	Critical	Modify contract logic

## Mitigation Strategies

- ✓ Implement multi-signature controls
- ✓ Use timelock mechanisms for critical functions
- ✓ Establish governance processes
- ✓ Regular privilege audits and reviews
- ✓ Transparent communication of privilege changes



## L-0 | Return Handling For Order Creation

Category	Severity	Location	Status
Best Practices	Low	GelatoRelayRouter.sol, BaseGelatoRelayRouter.sol	Resolved

### Description

When creating an order using a standalone call, the newly created order's key is returned, which can be utilized for future updates or cancellations. However, when an order is created as part of a batch process, its key is neither validated nor returned during the execution of the batch.

### Recommendation

Consider implementing a bytes array as the return value for the batch function. This array should include the newly generated keys for any `_createOrder` calls within the batch. If the batch contains only updates or cancellations, the function should return an empty array.

`_createOrder`

### Resolution

GMX Team: Resolved.



## L-1 | minPrice Used For maxRelayFeeSwapUsd

Category	Severity	Location	Status
Logical Error	LOW	BaseGelatoRelayRouter.sol: 283	Resolved

### Description

The maximum relay fee swap size for sub accounts is capped, and execution reverts if the calculated USD amount exceeds `maxRelayFeeSwapUsd`.

```
maxRelayFeeSwapUsd
```

### Recommendation

Consider using the `max` oracle price for the `maxRelayFeeSwapUsd` check to provide greater safety and ensure the cap is accurately enforced.

```
max  
maxRelayFeeSwapUsd
```

### Resolution

GMX Team: Resolved.



## L-2 | Superfluous Return Statement

Category	Severity	Location	Status
Best Practices	LOW	BaseGelatoRelayRouter.sol: 205	Resolved

### Description

The `_handleRelayBeforeAction` function includes a return statement that attempts to return the result of `_handleRelayFee()`, but neither of these functions has a defined return value

```
_handleRelayBeforeAction  
_handleRelayFee()
```

### Recommendation

Remove the `return` statement.

```
return
```

### Resolution

GMX Team: Resolved.



## L-3 | Less Premium Is Charged In Config

CATEGORY	SEVERITY	LOCATION	STATUS
Logical Error	LOW	general.ts: 132	Acknowledged

### Description

In the config files, a 6% relay fee premium is applied to the gas cost.

### Recommendation

Consider setting the premium to 10% if GMX does not have a protocol-specific discount agreement with Gelato.

### Resolution

GMX Team: Acknowledged.



# Summary of Recommendations

Based on our comprehensive audit, we provide the following prioritized recommendations to improve the security posture of GMX-Gasless-Sponsered-Calls2.

## Priority Matrix

ISSUE ID	TITLE	SEVERITY	PRIORITY
L-0	Return Handling For Order Creation	LOW	Low
L-1	minPrice Used For maxRelayFeeSwapUsd	LOW	Low
L-2	Superfluous Return Statement	LOW	Low
L-3	Less Premium Is Charged In Config	LOW	Low

## General Security Best Practices

- ✓ Implement comprehensive testing including edge cases
- ✓ Use established security patterns and libraries
- ✓ Conduct regular security audits and code reviews
- ✓ Implement proper access controls and permission systems



# Audit Team

## Team Credentials

Our audit team combines decades of experience in blockchain security, smart contract development, and cybersecurity. Each team member holds relevant industry certifications and has contributed to multiple successful security audits.

## Methodology & Standards

Our audit methodology follows industry best practices and standards:

- ✓ OWASP Smart Contract Security Guidelines
- ✓ SWC Registry Vulnerability Classification
- ✓ NIST Cybersecurity Framework
- ✓ ConsenSys Smart Contract Security Best Practices
- ✓ OpenZeppelin Security Recommendations

## Audit Process

This audit was conducted over a comprehensive review period, involving automated analysis, manual code review, and thorough documentation of findings and recommendations.



# Disclaimer & Legal Notice

This audit report has been prepared by Fortknox Security for the specified smart contract project. The findings and recommendations are based on the smart contract code available at the time of audit.

## Scope Limitations

- ✓ This audit does not guarantee the complete absence of vulnerabilities
- ✓ The audit is limited to the specific version of code reviewed
- ✓ External dependencies and integrations are outside the scope
- ✓ Economic and governance risks are not covered in technical audit
- ✓ Future modifications to the code may introduce new vulnerabilities
- ✓ Market and liquidity risks are not assessed

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## Contact Information

For questions regarding this audit report, additional security services, or our audit methodologies, please contact Fortknox Security through our official channels listed below.

### Fortknox Security

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