



SMART CONTRACT AUDIT REPORT



Prepared by:
BlockAudit

Date Of Enrollment:
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SUMMARY

This Audit Report mainly focuses on the extensive security of **Viku** Smart Contracts. With this report, we attempt to ensure the reliability and correctness of the smart contract by complete and rigorous assessment of the system's architecture and the smart contract codebase.

The auditing process pays special attention to the following considerations:

- Testing the smart contracts against both common and uncommon attack vectors.
- Assessing the codebase to ensure compliance with current best practices and industry standards.
- Ensuring contract logic meets the specifications and intentions of the client.
- Cross referencing contract structure and implementation against similar smart contracts produced by industry leaders.
- Thorough line-by-line manual review of the entire codebase by industry experts.

The security assessment resulted in findings that ranged from critical to informational. We recommend addressing these findings to ensure a high level of security standards and industry practices. We suggest recommendations that could better serve the project from the security perspective:

- Enhance general coding practices for better structures of source codes;
- Add enough unit tests to cover the possible use cases;
- Provide more comments per each function for readability, especially contracts that are verified in public;
- Provide more transparency on privileged activities once the protocol is live.



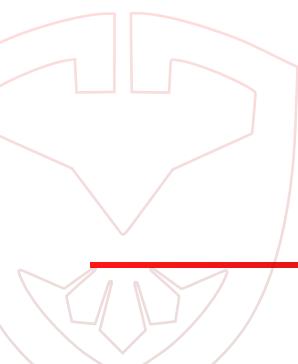
OVERVIEW

Project Summary

| | |
|--------------|---|
| Project Name | Viku |
| Logo | |
| Platform | Goerli |
| Language | Solidity |
| Github | https://github.com/Viku-Labs |

File Summary

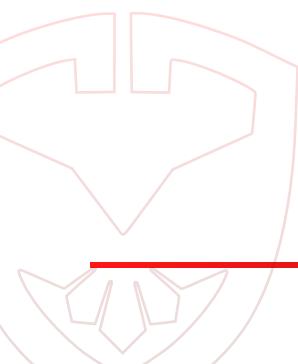
| ID | File Name | Audit Status |
|---------|------------------------|--------------|
| VKT | VK-VikuToken.sol | Pass |
| VKS | VK-StakingContract.sol | Pass |
| VKTD | VK-Trade.sol | Pass |
| VKTP | VK-TransferProxy.sol | Pass |
| VKU | VikuUser721Token.sol | Pass |
| VKUT | VikuUser1155Token.sol | Pass |
| VKV1155 | VK-Viku1155.sol | Pass |
| VKF1155 | VK-Factory1155.sol | Pass |
| VKV721 | VK-Viku721.sol | Pass |
| VKF721 | VK-Factory721.sol | Pass |





AUDIT SUMMARY

| | |
|-------------------|--|
| Date of Delivery | 16 Dec 2022 |
| Audit Methodology | Code Analysis. Automatic Assessment, Manual Review |
| Audit Result | Passed ✓ |
| Audit Team | BlockAudit Report Team |





FINDINGS

| | | |
|-----------------|---|--------|
| ■ Critical | 0 | 0.0% |
| ■ High | 0 | 0.0% |
| ■ Medium | 1 | 6.25% |
| ■ Low | 4 | 25.00% |
| ■ Informational | 5 | 31.25% |
| ■ Ownership | 6 | 37.50% |



Vulnerability Findings Summary

| ID | Type | Line | Severity | Status |
|------------|---|---------|-----------------|----------|
| VKTD-01 | Unchecked Fees Update | 199,215 | ■ Medium | Resolved |
| VKF721-01 | Missing Zero Address Check | 43 | ■ Low | Resolved |
| VKF1155-01 | Missing Zero Address Validation | 41 | ■ Low | Resolved |
| VKV1155-01 | Missing Zero Address Validation | 107 | ■ Low | Resolved |
| VKV721-01 | Missing zero address validation | 93 | ■ Low | Resolved |
| VKF1155-02 | Public function that could be declared external | 46 | ■ Informational | Resolved |
| VKV721-02 | Missing Event | 137 | ■ Informational | Resolved |
| VKU-01 | Missing Event | 75 | ■ Informational | Resolved |
| VKF721-02 | Public function that could be declared external | 48 | ■ Informational | Resolved |
| VKS-01 | Conformance to Solidity naming conventions | 40 | ■ Informational | Resolved |



Ownership Privileges Findings Summary

| ID | Severity | Status |
|-----------|-------------|--------------|
| VKF721-02 | ■ Ownership | Acknowledged |
| VKS-01 | ■ Ownership | Acknowledged |
| VKTD-02 | ■ Ownership | Acknowledged |
| VKTP-01 | ■ Ownership | Acknowledged |
| VKV721-02 | ■ Ownership | Acknowledged |
| VKU-02 | ■ Ownership | Acknowledged |



VKTD-01

| | |
|----------|--|
| Type | Unchecked Fees Update |
| Severity | ■ Medium |
| File | Trade.sol |
| Line | 199,215 |
| Status | Resolved |

Description

There are no checks/limitations in place to prevent the owner from setting the fees/tax in the contract to any arbitrary value.

Remediation

Put checks in place to prevent this and it is recommended not to levy more than 25% in fee or tax

Snapshot

```
1   function setBuyerServiceFee(uint8
2 _buyerFee) external
3     onlyRole("ADMIN_ROLE")
4     returns (bool)
5   {
6     buyerFeePermille = _buyerFee;
7     emit BuyerFee(buyerFeePermille);
8     return true;
9 }
```

```
1   function setSellerServiceFee(uint8
2 _sellerFee) external
3     onlyRole("ADMIN_ROLE")
4     returns (bool)
5   {
6     sellerFeePermille = _sellerFee;
7     emit SellerFee(sellerFeePermille);
8     return true;
9 }
```



VKF721-01

| | |
|----------|---|
| Type | Missing Zero Address Check |
| Severity | ■ Low |
| File | Factory721.sol |
| Line | 43 |
| Status | Resolved |

Description

setFundAddress(address) do not check if the input address is a zero address(0x0).

Remediation

Check that the input address is not zero address

Snapshot

```
● ○ ●
1     function updateTreasury(address _newTreasury) external onlyOwner returns(address)
2 {       treasury = _newTreasury;
3     emit TreasuryUpdated(treasury);
4     return treasury;
5 }
```



VKF1155-01

| | |
|----------|---|
| Type | Missing zero address validation |
| Severity | ■ Low |
| File | Factory1155.sol |
| Line | 41 |
| Status | Resolved |

Description

updateTreasury(address) does not check if the input is zero address. So if Bob inputs zero address. Funds can be lost.

Remediation

Check that the address is not zero.

Snapshot

```
1 function updateTreasury address _newTreasury external onlyOwner returns address
2 {     treasury = _newTreasury;
3     emit TreasuryUpdated(treasury);
4     return treasury;
5 }
```



VKV1155-01

| | |
|----------|---|
| Type | Missing zero address validation |
| Severity | ■ Low |
| File | Viku1155.sol |
| Line | 107 |
| Status | Resolved |

Description

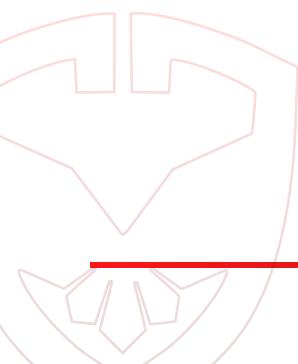
Constructor(string, string, string, address) does not check if operator is zero address. So if Bob inputs zero address. Operator Role can be lost.

Remediation

Check that the address is not zero.

Snapshot

```
1  ) ERC1155(_baseTokenURI) {
2      baseTokenURI = _baseTokenURI;
3      owner = _msgSender();
4      operator = _operator; // Line 4 is highlighted
5      _setupRole("ADMIN_ROLE", msg.sender);
6      _setupRole("OPERATOR_ROLE",
7 operator.name = _tokenName;
8      _symbol = _tokenSymbol;
9      _tokenIdTracker.increment();
10 }
```





VKV721-01

| | |
|----------|---|
| Type | Missing Zero Address Validation |
| Severity | ■ Low |
| File | Viku721.sol |
| Line | 93 |
| Status | Resolved |

Description

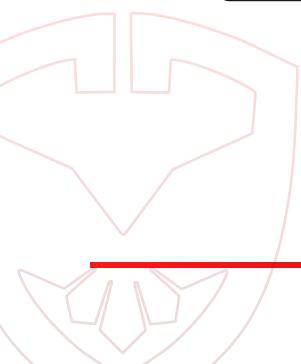
Missing Arithmetic Event

Remediation

Emit necessary events when changing critical parameters in the code

Snapshot

```
1     ) ERC721( name, symbol) {
2         baseTokenURI = _baseTokenURI;
3         owner = _msgSender();
4         operator = _operator;
5         _setupRole("ADMIN_ROLE", msg.sender);
6         _setupRole("OPERATOR_ROLE",
7 operator)tokenIdTracker.increment();
8     }
```





VKF1155-02

| | |
|----------|---|
| Type | Public function that could be declared external |
| Severity | ■ Informational |
| File | Factory1155.sol |
| Line | 46 |
| Status | Resolved |

Description

public functions that are never called by the contract should be declared external, and their immutable parameters should be located in calldata to save gas.

Remediation

Use the external attribute for functions never called from the contract, and change the location of immutable parameters to calldata to save gas.

Snapshot



```
1     function getTreasury() public view returns(address)
2 {         return treasury;
3 }
```



VKV721-02

| | |
|----------|-----------------|
| Type | Missing Event |
| Severity | ■ Informational |
| File | Viku721.sol |
| Line | 137 |
| Status | Resolved |

Description

Missing Arithmetic Event

Remediation

Emit necessary events when changing critical parameters in the code

Snapshot

```
1      function setBaseURI(string memory _baseTokenURI) external onlyRole("ADMIN_ROLE")
2 {       baseTokenURI = _baseTokenURI;
3 }
```



VKU-01

| | |
|----------|--------------------------|
| Type | Missing Arithmetic Event |
| Severity | ■ Informational |
| File | VikuUser721Token.sol |
| Line | 75 |
| Status | Resolved |

Description

Missing Arithmetic Event

Remediation

Emit necessary events when changing critical parameters in the code

Snapshot

```
● ● ●

1     function setBaseURI(string memory _baseTokenURI) external onlyOwner
2 {       baseTokenURI = _baseTokenURI;
3 }
```



VKF721-02

| | |
|----------|---|
| Type | Public function that could be declared external |
| Severity | ■ Informational |
| File | Factory721.sol |
| Line | 48 |
| Status | Resolved |

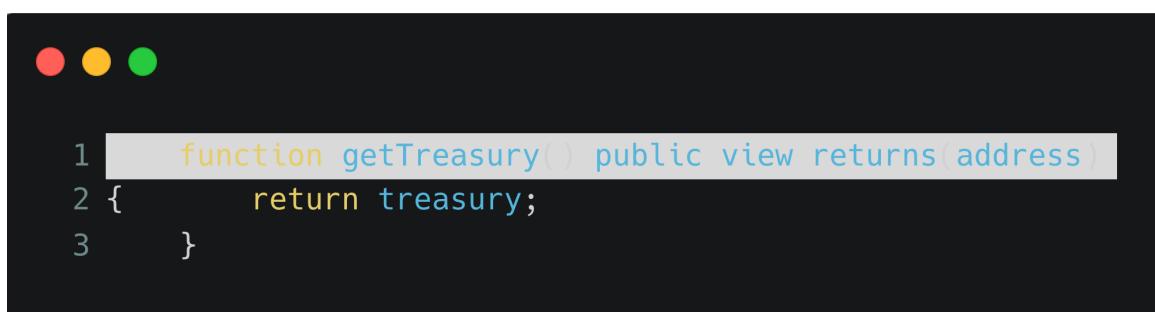
Description

public functions that are never called by the contract should be declared external, and their immutable parameters should be located in calldata to save gas.

Remediation

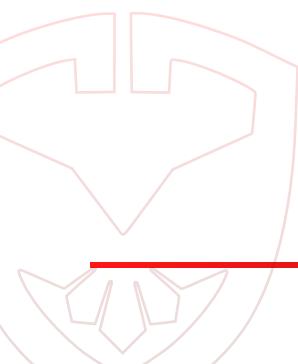
Use the external attribute for functions never called from the contract, and change the location of immutable parameters to calldata to save gas.

Snapshot



The screenshot shows a terminal window with three colored dots (red, yellow, green) at the top. Below them is a code snippet:

```
1 function getTreasury() public view returns(address)
2 {     return treasury;
3 }
```





VKS-01

| | |
|----------|--|
| Type | Conformance to Solidity naming conventions |
| Severity | ■ Informational |
| File | StakingContract.sol |
| Line | 40 |
| Status | Resolved |

Description

Solidity defines a naming convention that should be followed.

Rule exceptions:

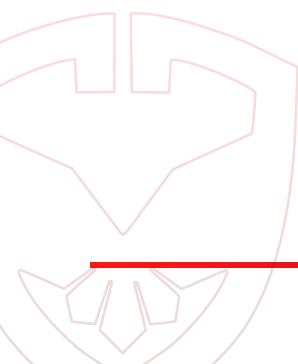
- Allow constant variable name/symbol/decimals to be lowercase (ERC20).
- Allow _ at the beginning of the mixed_case match for private variables and unused parameters.

Remediation

Follow Solidity naming conventions. Enums should be written in CapWords.

Snapshot

```
1 enum AssetType {ERC1155, ERC721}
2     enum poolType {SILVER, GOLD, VIP}
```





OWNERSHIP PRIVILEGES

VKF721-02

| | |
|--------|---------------------|
| File | Factory721.sol |
| Status | Acknowledged |

Description

Change Treasury Address

VKS-01

| | |
|--------|---------------------|
| File | StakingContract.sol |
| Status | Acknowledged |

Description

The owner can set pool details and the amount to any arbitrary amount.

VKTD-02

| | |
|--------|---------------------|
| File | Trade.sol |
| Status | Acknowledged |

Description

- The owner can grant roles to other wallet.
- The wallet with the role "TREASURYHOLDER_ROLE" can Change treasury wallet address.
- The owner can set pool details and the amount to any arbitrary amount.
- The owner can set fees to any arbitrary amount



VKTP-01

| | |
|--------|---------------------|
| File | TransferProxy.sol |
| Status | Acknowledged |

Description

- The ADMIN can change operator address
- The operator can transfer ERC721, ERC20 and ERC1155 tokens to any address
- The operator can Mint and transfer ERC721 and ERC1155 tokens

VKV721-02

| | |
|--------|---------------------|
| File | Viku721.sol |
| Status | Acknowledged |

Description

The ADMIN can set base URI and Operator can mint and transfer tokens

VKU-02

| | |
|--------|----------------------|
| File | VikuUser721Token.sol |
| Status | Acknowledged |

Description

The Admin can mint NFTs and set Royalty



APPENDIX

Auditing Approach and Methodologies applied

The Block Audit Report team has performed rigorous testing of the project including the analysis of the code design patterns where we reviewed the smart contract architecture to ensure it is structured along with the safe use of standard inherited contracts and libraries. Our team also conducted a formal line by line inspection of the Smart Contract i.e., a manual review, to find potential issues including but not limited to

- Race conditions
- Zero race conditions approval attacks
- Re-entrancy
- Transaction-ordering dependence
- Timestamp dependence
- Check-effects-interaction pattern (optimistic accounting)
- Decentralized denial-of-service attacks
- Secure ether transfer pattern
- Guard check pattern
- Fail-safe mode
- Gas-limits and infinite loops
- Call Stack depth

In the Unit testing Phase, we coded/conducted custom unit tests written against each function in the contract to verify the claimed functionality from our client. In Automated Testing, we tested the Smart Contract with our standard set of multifunctional tools to identify vulnerabilities and security flaws. The code was tested in collaboration of our multiple team members and this included but not limited to;

- Testing the functionality of the Smart Contract to determine proper logic has been followed throughout the whole process.
- Analyzing the complexity of the code in depth and in detail line-by-line manual review of the code.
- Deploying the code on testnet using multiple clients to run live tests.
- Analyzing failure preparations to check how the Smart Contract performs in case of any bugs and vulnerabilities.
- Checking whether all the libraries used in the code are on the latest version.
- Analyzing the security of the on-chain data.



Issue Categories:

Every issue in this report was assigned a severity level from the following:

Critical Severity Issues

Issues of Critical Severity leaves smart contracts vulnerable to major exploits and can lead to asset loss and data loss. These can have significant impact on the functionality/performance of the smart contract.

We recommend these issues must be fixed before proceeding to MainNet..

High Severity Issues

Issues of High Severity are not as easy to exploit but they might endanger the execution of the smart contract and potentially create crucial problems.

Fixing these issues is highly recommended before proceeding to MainNet.

Medium Severity Issues

Issues on this level are not a major cause of vulnerability to the smart contract, they cannot lead to data-manipulations or asset loss but may affect functionality.

It is important to fix these issues before proceeding to MainNet.

Low Severity Issues

Issues at this level are very low in their impact on the overall functionality and execution of the smart contract. These are mostly code-level violations or improper formatting.

These issues can be remain unfixed or can be fixed at a later date if the code is redeployed or forked.

Informational Findings

These are finding that our team comes accross when manually reviewing a smart contract which are important to know for the owners as well as users of a contract.

These issues must be acknowledged by the owners before we publish our report.

Ownership Privileges

Owner of a smart contract can include certain rights and Privileges while deploying a smart contract that might be hidden deep inside the codebase and may make the project vulnerable to rug-pulls or other types of scams.

We at BlockAudit believe in transparency and hence we showcase Ownership Privileges separately so the owner as well as the investors can get a better understanding about the project.

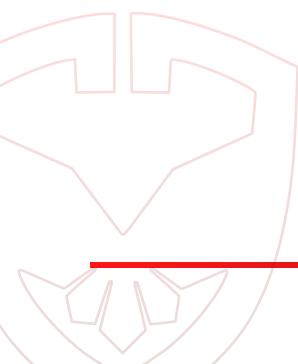


DISCLAIMER

This is a limited report on our findings based on our analysis, in accordance with good industry practice as at the date of this report, in relation to cybersecurity vulnerabilities and issues in the framework and algorithms based on smart contracts, the details of which are set out in this report. In order to get a full view of our analysis, it is crucial for the client to read the full report. While we have done our best in conducting our analysis and producing this report, it is important to note that the client should not rely on this report and cannot claim against us on the basis of what it says or doesn't say, or how we produced it, and it is important for the client to conduct the client's own independent investigations before making any decisions. We go into more detail on this in the below disclaimer below – please make sure to read it in full.

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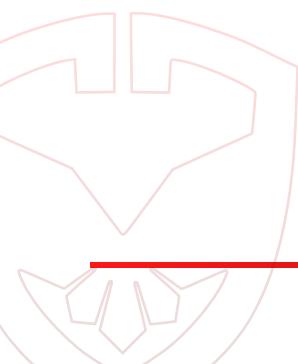




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The analysis of the security is purely based on the received smart contracts alone. No related/third-party smart contracts, applications or operations were reviewed for security. No product code has been reviewed.

Note: The statements made in this document should not be interpreted as investment or legal advice, nor should its authors be held accountable for decisions made based on them. Securing smart contracts is a multistep process. One audit cannot be considered enough. We recommend that the **Viku** team put a bug bounty program in place to encourage further analysis of the smart contracts by other third parties





About BlockAudit

BlockAudit is an industry leading security organisation that helps web3 blockchain based projects with their security and correctness of their smart-contracts. With years of experience we have a dedicated team that is capable of performing audits in a wide variety of languages including HTML, PHP, JS, Node, React, Native, Solidity, Rust and other Web3 frameworks for DApps, DeFi, GameFi and Metaverse platforms.

With a mission to make web3 a safe and secure place BlockAudit is committed to provide it's partners with a budget and investor friendly security Audit Report that will increase the value of their projects significantly.



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