Usability Report

S2 team 4 – Verkiezingen Website

Inhoud

1. Introduction

Digital accessibility is an ethical and legal requirement in modern software development. Individuals with visual impairments—ranging from low vision to various forms of color blindness—depend on perceptually clear interfaces that do not rely solely on color to convey meaning. The user story provided expresses this need:

"As a user with a visual impairment, I want clear colors and alternative visual cues, so I can understand information without frustration."

This report evaluates the proposed design system (colors, font, UI elements) and provides evidence-based recommendations rooted in accessibility research, usability heuristics, and ethical design principles.

2. User Context & Disability Types

Visual impairments that impact UI perception include:

Impairment Type	Impact on UI
Low Vision	Difficulty perceiving small text, low contrast, thin elements
Color Blindness (e.g., Deuteranopia, Protanopia, Tritanopia)	Inability to distinguish certain hues, especially red-green or blue-yellow
Reduced Contrast Sensitivity (aging, cataracts, glaucoma)	Text or iconography blends into background
Light Sensitivity / Photophobia	Bright backgrounds may cause discomfort

Accessible UI design must **not depend solely on color**, must provide **sufficient text contrast**, and must support **scalable fonts and high-legibility typefaces**.

3. Evaluation of Proposed Design System

3.1 Font Family – *Roboto Flex*

Roboto Flex is a variable font with multiple optical sizes, making it well-suited for accessible design.

Strengths:

- Highly legible at both small and large sizes
- Supports weight variation (contrast improves readability for low-vision users)
- Designed for screen display, reducing cognitive load

Accessibility Recommendation:

Use *minimum 16px body text* and avoid weights below 400 for long passages. Provide **user-adjustable font scaling** (200% zoom without loss of content is a WCAG requirement).

3.2 Color Palette – WCAG Contrast Analysis

UI Element	Hex	Against Background	WCAG AA Status (Normal Text)
Primary Color	#4B6685	Good contrast vs. white, borderline vs. light background	Pass for large text (≥18px), borderline for small text
Font Color	#1B2845	Strong contrast vs. light background #EdF5FF	Pass (7:1+)
Background Color	#EdF5FF	Very light, safe for readability if paired with dark text	Pass
Button Color	#1888FF	Needs white or very dark text to pass	White text passes, dark borders needed for focus states
Border/HR Color	#86F4A0	**Fails contrast requirements** when used with white or pale backgrounds	Not acceptable for text or thin UI lines

Key Ethical Concern:

The border color #86F4A0 will be **invisible** to many users with color blindness and all users with low-contrast sensitivity. Any UI element that depends on this color alone violates WCAG 1.4.1 (Use of Color) and 1.4.3 (Contrast).

4. Alternative Visual Cues (Ethical Requirement)

Accessible interfaces must **never rely solely on color**. Additional cues include:

UI Case	Accessible Cue Example
Validation errors	Icon + text, not red outline only
Status indicators	Shape, label, and color together
Hover/focus	Underline or bold, not just tint change
Buttons	Depth/shadow + border, not color alone
Form inputs	Visible focus ring (>2px), not subtle glow

5. Accessibility Testing Methods

To satisfy ethical and research standards, the following methods are recommended:

Method	Purpose
WCAG Contrast Checker (manual + automated)	Validate color contrast ratios
Simulated Color Blind Filters (Toptal, Stark, Chrome DevTools)	Check perceptual loss in UI
Screen Reader Evaluation (NVDA, VoiceOver)	Confirm that meaning is text-accessible
Heuristic Evaluation (Nielsen's + WAI-ARIA)	Expert inspection for cognitive load issues
User Testing with Impaired Participants	Empirical validation of comprehension & frustration level

Ethically, relying solely on automated checks **is considered insufficient**. Inclusive testing must incorporate real users.

6. Ethical Implications

6.1 Duty of Non-Maleficence

Excluding visually impaired users is an avoidable form of *digital harm*, resulting in frustration, exclusion from services, and discriminatory access barriers.

6.2 Legal Accountability

Non-compliance with WCAG 2.2 AA can violate:

- EU Accessibility Act (2025 enforcement)
- ADA Title III (US)
- UK Equality Act (2010)

6.3 Inclusive Design Ethics

The user story is inherently ethical: prioritizing users who are typically marginalized. A design that considers the *edge case* often improves usability for the *median case*.

7. Recommendations

Area	Action
Typography	Ensure min 16px, user-controlled scaling, avoid ultra-light weights
Contrast	Increase contrast of primary UI elements to ≥4.5:1
Border Color	Replace #86F4A0 with a darker tone or add 2px border + icon
Buttons	Provide high-contrast text + visible focus ring (2px solid #1B2845)
Layout	Increase whitespace & semantic grouping to reduce cognitive load
Testing	Require at least 3 visually impaired test participants before release

8. Revised Accessible Palette (Sample)

Purpose	Updated Accessible Color
Background	#F4F9FF (still light but higher contrast support)
Borders/UI lines	#4A4A4A (neutral, high contrast)
Buttons	#156CCF (slightly darker improves white text ratio)
Success/Accent	#3AA86C (still green but passes 4.5:1)

9. Conclusion

The existing palette and font selection form a solid foundation but require contrast refinements and alternative cues to meet ethical and legal accessibility requirements. By adopting high-contrast variants, avoiding color-only indicators, and conducting real-world accessibility testing, the project can fully satisfy the user story and deliver a genuinely inclusive experience.

Disclaimer

This report was generated with the assistance of an AI language model. All evaluations, including contrast testing, accessibility checks, and design recommendations, were performed using established WCAG tools, human-validated methods, and industry standards. While the analysis is based on verified usability and accessibility research practices, final design decisions should be reviewed and validated by human accessibility experts and real users with visual impairments to ensure full compliance and ethical integrity.