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1. Introduction

These technical requirements scope document serves as the foundational specification for the Smart Reception Area Transformation project at Eskom Research and Innovation centre (ERIC). It provides contractors, suppliers, and project stakeholders with detailed technical specifications and bill of quantities for cost estimates.

2. Existing RT&D reception area architecture

(Figure 1) below shows the actual RT&D Reception Plan floorplan. Area A is the main reception area and area B is the offices space, boardroom and sitting area.

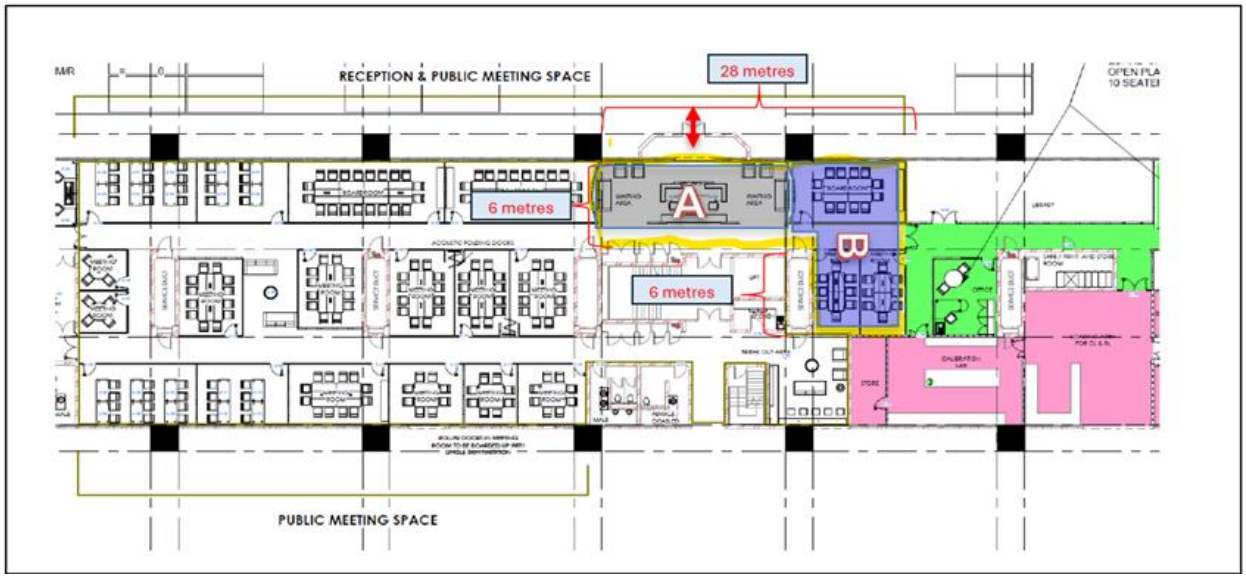

Figure 1: Main Reception area

3. New Scope for a Smart RT&D reception area

The power systems sector is experiencing unprecedented technological evolution, demanding research facilities that can support increasingly complex, data-intensive investigations with cross-disciplinary collaboration. This digital transformation of the RT&D's reception will deliver:

- A modern, secure, and efficient reception experience.
- Effective showcasing of research innovation.
- Enhanced visitor engagement through digital amenities.

- Improved collaboration opportunities.
- Showcase leadership in technological innovation and sustainability.

The Smart Reception Area Transformation is based on the actual RT&D Reception Plan floorplan (Figure 1). The specific spatial assignments are for area A (main reception) which will be an enhanced reception area and Area B which will be converted to technology showcase/pods. The architecture is designed for a linear 28m-wide space, creating an immersive, technology-forward environment that demonstrates innovation while providing efficient access control and visitor management.

3.1 AREA A - Main Reception Zone (72m²)

3.1.1 Interactive Welcome Wall

The Interactive Welcome Wall will serve as the centerpiece of the reception area, providing an immersive visual experience that showcases the organization's achievements, research initiatives, and real-time performance metrics. The wall will feature:

- **Physical Specifications**: 3m × 2m 4K LED Video Wall with high brightness (minimum 800 nits) and wide viewing angle (minimum 160 degrees) to ensure visibility from all areas of the reception.
- **Display Technology**: Seamless LED panels with pixel pitch of 1.5mm or less to ensure crisp image quality at close viewing distances.
- **Interactive Capabilities**: Capacitive touch overlay with multi-touch support (minimum 10 simultaneous touch points) to enable intuitive interaction with displayed content.
- **Content Management System**: Custom-developed CMS (Content Management System) with user-friendly interface for authorized staff to update and manage displayed content without specialized technical knowledge.
- **Real-time Data Integration**: API-based integration with facility management systems, power grid monitoring systems, and renewable energy generation systems to display live performance metrics.
- **Resolution:** 3840 × 2400 pixels
- **Refresh rate:** 120Hz
- **Operating hours:** 9 hours/day
- **Fast Network connectivity**

- **Climate control considerations for heat dissipation**

Content Types:

- Facility performance dashboards showing real-time sustainability metrics (energy consumption, water usage, carbon footprint)
- Interactive exploration of current and past research initiatives with multimedia content
- Multi-language support for international visitors (minimum English, Afrikaans, Zulu, and two additional languages based on visitor demographics)
- Emergency notification and evacuation system with automatic triggering from the building management system
- Brand storytelling content highlighting organizational achievements and vision
- Real-time power grid visualization with dynamic data integration from operational systems
- Live renewable energy generation metrics with geographic mapping of generation sources

3.1.2 Reception Desk with integrated systems

Desk Specifications:

- Round curved desk
- Material: Solid surface countertop with integrated cable management
- Built-in 27" touchscreen monitor (visitor management)
- Dual 24" staff monitors
- Integrated keyboard/mouse storage
- Cable management system
- Power outlets
- Network ports
- Magnetic door locks with emergency override

3.1.3 Advanced Visitor Management System

The Advanced Visitor Management System will streamline the visitor check-in process while enhancing security and providing valuable analytics on facility utilization. The system will include:

- **Self-Service Kiosks**: Minimum of three freestanding kiosks with 22-inch touchscreens, integrated cameras for facial recognition, fingerprint scanners, ID document scanners, and thermal imaging cameras for contactless temperature monitoring
- **Sanitization station integration and Wheelchair accessible height adjustment**
- **Visitor Pre-Registration Portal:** Web-based portal and mobile application for pre-registration of visitors, generating QR codes for expedited check-in.
- **Host Notification System:** Automated notifications to hosts via email, SMS, and mobile app push notifications when visitors arrive, with real-time location tracking of visitors within designated areas.
- **Custom Eskom branding and interface**
- **Visitor Analytics Platform:** Comprehensive analytics dashboard providing insights on visitor patterns, peak times, dwell times, and facility utilization to inform operational decisions.
- **Health Screening Integration:** Automated health screening questionnaire and contactless temperature monitoring with configurable thresholds and alert protocols.
- **Security Integration:** Seamless integration with access control systems to generate temporary credentials with appropriate access levels based on visitor type and purpose.
- **Data Management:** Secure storage of visitor data with configurable retention policies in compliance with POPIA (Protection of Personal Information Act) and GDPR (General Data Protection Regulation) requirements.

3.1.4 Digital Visitor experience

3.1.4.1 Connected Comfort features

The Connected Comfort Features will enhance the visitor experience through technology-enabled amenities that provide convenience, information, and comfort. These features will include:

- **Interactive Information Kiosks:** Minimum of two wall-mounted 32-inch touchscreen kiosks providing research information, company information and newsletter, wayfinding, event calendar integration and emergency instructions in multiple languages.
- **Smart Seating:** Modular seating arrangements with integrated power outlets (minimum 2 per seat) and wireless charging pads (minimum 1 per seat).

- **High-Speed Secure Wi-Fi:** Enterprise-grade Wi-Fi network with minimum 1Gbps bandwidth, WPA3 encryption, and simplified guest access through QR code or SMS verification.
- **Smart Water Dispensers:** Minimum of two intelligent water dispensers with touchless operation, consumption tracking, and environmental impact display showing plastic bottles saved.
- **Smart Coffee Machine:** The commercial grade automatic espresso machine must feature a 7-inch touchscreen interface, Wi-Fi 6 and Bluetooth 5.0 connectivity with mobile app control, voice commands, and cloud-based analytics. The system offers a full range of coffee beverages, teas, and hot chocolate with customizable settings. AI-powered features include predictive maintenance, automatic inventory management, energy optimization, and seamless integration with building management and visitor management systems for optimal operation.
- **Digital Signage:** Supplementary digital signage displays (minimum 3) for wayfinding, announcements, and real-time information updates.
- **Accessibility Features:** Comprehensive accessibility features including screen readers, hearing loop systems, and wheelchair-accessible design elements.
- **Wi-Fi hotspot capabilities**

3.1.5 Next Generation security and Access Control

The Multi-Factor Biometric System will provide state-of-the-art security through advanced authentication methods while maintaining efficient access for authorized personnel. The system will feature:

- **Biometric Authentication Methods:** Multi-modal biometric authentication combining facial recognition, fingerprint verification, and optional iris scanning for highest security areas.
- **Anti-Spoofing Technology:** Advanced live detection and anti-spoofing measures to prevent unauthorized access through fake biometrics.
- **Mobile Credential Support:** Secure mobile credentials using NFC and Bluetooth Low Energy with encryption and dynamic validation to enable smartphone-based access.
- **Processing Speed:** High-speed processing with authentication completion in under 60 seconds to prevent congestion during peak periods.
- **Time and Attendance Tracking:** Automated time and attendance tracking with customizable reporting.

- **Identity Management Integration:** Integration with organization-wide identity management systems to maintain a single source of truth for user credentials and access rights.
- **Scalability:** Support for a minimum of 5,000 registered users with capacity for future expansion.
- **Compliance:** Adherence to international standards including ISO/IEC 27001 for information security and ISO/IEC 24745 for biometric information protection, as well as South African standards and regulations.

3.1.6 AI Enhanced Security Monitoring system

The AI-Enhanced Security Monitoring system will leverage artificial intelligence and computer vision to provide proactive security monitoring and threat detection. The system will include:

- **AI Camera Infrastructure:** Minimum of 12 high-resolution (4K) security cameras with wide dynamic range and low-light capabilities strategically positioned throughout the reception area and entry points. 360° coverage with facial recognition.
- **Computer Vision Analysis:** Real-time video analysis using computer vision algorithms to detect and classify objects, people, and activities.
- **Behavioural Analytics**: AI-powered behavioural analytics to identify potential security anomalies such as tailgating, loitering, or unauthorized access attempts.
- **License Plate Recognition:** Automated license plate recognition at vehicle entry points with database integration for authorized vehicle verification.
- **Alert System:** Real-time alert system with configurable notification protocols for security staff via mobile devices, desktop applications, and control room displays.
- **Digital Incident Logging:** Automated incident logging with video evidence preservation, timestamp verification, and chain of custody documentation for forensic purposes.
- **Privacy Protection:** Privacy-by-design approach with automated masking of sensitive areas and configurable retention policies in compliance with privacy regulations.
- **Analytics Dashboard:** Comprehensive security analytics dashboard providing insights on security events, patterns, and trends to inform security policy decisions.

3.1.7 Human Centric Lighting

The Human-Centric Lighting system will provide advanced illumination that supports human wellbeing while minimizing energy consumption through intelligent control. The system will include:

- **Circadian Rhythm Programming:** Dynamic lighting that adjusts colour temperature and intensity throughout the day to support natural circadian rhythms and enhance wellbeing.
- **Natural Light Harvesting:** Photosensors and automated controls that adjust artificial lighting based on available natural light to reduce energy consumption.
- **Scene-Based Lighting:** Programmable lighting scenes for different operational modes (standard operation, presentations, emergency, after-hours) with one-touch activation.
- **Occupancy-Based Control:** Integrated occupancy sensors that automatically adjust lighting based on presence and activity to minimize waste.
- **LED Technology:** High-efficiency LED fixtures with tunable white capability (2700K-6500K) and minimum CRI of 90 for accurate colour rendering.
- **Emergency Lighting:** Automated emergency lighting with instant activation upon power failure or security incidents, with minimum 3-hour battery backup.
- **Control System:** Centralized lighting control system with intuitive interface for manual adjustments and programming of automated schedules.
- **Energy Monitoring:** Real-time monitoring of lighting energy consumption with historical data analysis and efficiency reporting.

3.1.8 Environmental intelligence controls

3.1.8.1 Precision Climate Management

The Precision Climate Management system will create an optimized environment that enhances comfort while minimizing energy consumption through intelligent monitoring and control. The system will feature:

- **Zone-Based Temperature Control:** Adequate controlled climate zones with occupancy sensing to optimize comfort and energy efficiency.
- **Air Quality Monitoring:** Comprehensive air quality monitoring system measuring CO2, volatile organic compounds (VOCs), particulate matter (PM2.5 and PM10), temperature, and humidity.
- **Sensor Infrastructure:** Network of wireless sensors (minimum 2 per zone) providing real-time environmental data to the central management system.
- **Humidity Regulation:** Intelligent humidity control with seasonal adjustment algorithms to maintain optimal levels (40-60% relative humidity) throughout the year.

- **Predictive Load Management:** AI-driven predictive load management that anticipates occupancy patterns and weather conditions to optimize HVAC operation.
- **Energy Optimization:** Continuous monitoring and adjustment of HVAC parameters to minimize energy consumption while maintaining comfort conditions.
- **Building Management System Integration:** Seamless integration with existing building management systems for coordinated control of all environmental systems.
- **Reporting and Analytics:** Comprehensive reporting and analytics dashboard providing insights on environmental conditions, energy consumption, and system performance.
- **Emergency lighting compliance**

3.2 AREA B – Technology Showcase Zone (36m²)

3.2.1 Nine Research Display stands

Common Specifications (per stand):

1. **Consistent Design Language**:
   - White countertop surfaces with navy blue front panels
   - Clean, minimalist aesthetic with clear labeling
   - Wall-mounted displays above physical exhibits
   - Integrated lighting to highlight key components
2. **Digital Integration**:
   - Large wall-mounted screens for visual content
   - Secondary touchscreens or interactive displays
   - QR codes linking to additional information
   - Digital signage with clear thematic labeling
3. **Physical Elements**:
   - Working models and prototypes
   - Tactile interactive components
   - Relevant physical objects that represent the theme
   - Clear acrylic information holders
4. **User Engagement**:
   - Interactive touchscreens

- Physical controls and interfaces
- Visual data representations
- Demonstration capabilities

3.2.1.1 Smart Grids Display

Theme: “Power Networks of Tomorrow”

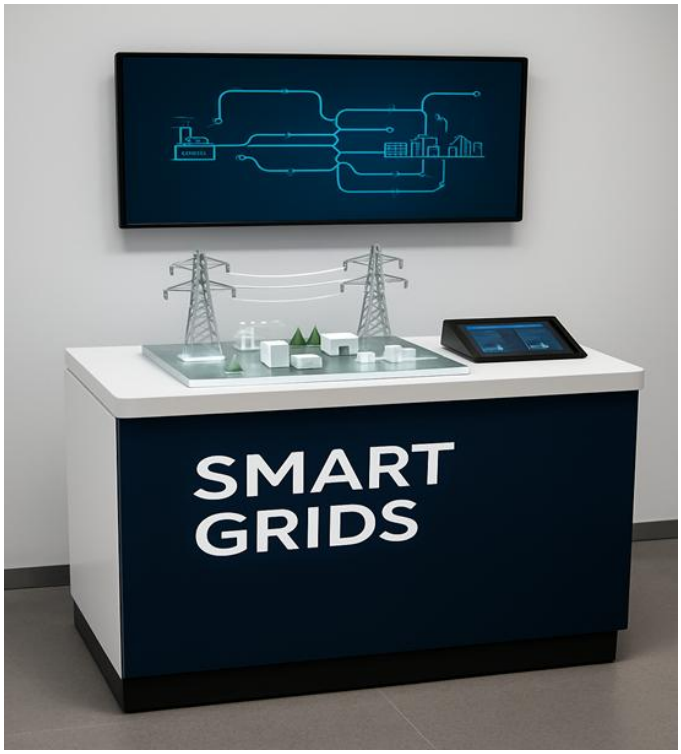

Figure 2: Smart Grids Stand Display

Physical Components:

- Miniature smart grid model with illuminated power lines showing real-time power flow
- Physical smart meters with interactive displays
- Scale model of a smart substation with working components
- Transparent solar panel section showing internal technology

Digital Elements:

- 55” wall-mounted touchscreen displaying real-time grid simulation
- 15” secondary touchscreen for visitor interaction with grid parameters
- Digital power flow visualization with color-coded efficiency metrics
- Interactive load balancing game demonstrating grid stability challenges

Interactive Features:

- Visitors can trigger simulated demand events and observe grid response
- Touch-activated comparison between traditional and smart grid infrastructure
- Real-time energy optimization visualization
- QR code linking to detailed technical specifications and research papers

Design Specifications:

- White countertop (120cm × 80cm) with navy blue front panel labeled “Smart Grids”
- Recessed LED lighting highlighting the physical grid model
- Cable management system for clean aesthetic
- Acrylic information panels with key research achievements

3.2.1.2 Green Hydrogen Display

Theme: “Clean Energy Catalyst”

Figure 3:Green Hydrogen Display Stand

Physical Components:

- Working miniature electrolyzer demonstrating hydrogen production
- Transparent fuel cell showing conversion of hydrogen to electricity
- Physical hydrogen storage solutions (various types in cross-section)
- 3D-printed models of industrial hydrogen applications.

Digital Elements:

- 55” wall-mounted screen showing hydrogen production cycle animation
- 15” touchscreen control panel for electrolyzer demonstration
- Digital efficiency metrics display comparing hydrogen to other energy sources
- Interactive periodic table highlighting hydrogen properties.

Interactive Features:

- Visitor-activated electrolyzer demonstration producing small hydrogen bubbles
- Interactive energy conversion efficiency calculator

- “Hydrogen Economy” touchscreen exploration of applications
- Before/after carbon footprint comparison with traditional fuels.

Design Specifications:

- White countertop (120cm × 80cm) with navy blue front panel labelled “Green Hydrogen”
- Water feature integrated into electrolyzer demonstration
- Blue LED accent lighting representing water and hydrogen
- Safety information clearly displayed regarding hydrogen technology.

3.2.1.3 Advanced Water Treatment Plant Display

Theme: “Purification Innovation”

Figure 4:Advanced Water Treatment Display Stand

Physical Components:

- Multi-stage filtration system with transparent sections showing water quality changes
- Working membrane technology demonstration with visible filtration process
- Physical samples of filtration media in clear containers

- Before/after water samples showing treatment effectiveness

Digital Elements:

- 55” wall-mounted screen showing microscopic contaminant removal process
- Water quality monitoring display with real-time parameters
- Interactive touchscreen water treatment plant simulation
- Digital comparison of treatment technologies with efficiency metrics

Interactive Features:

- Visitor-activated water treatment demonstration
- Microscope camera showing contaminants on digital display
- Interactive water usage and conservation calculator
- “Design Your Treatment” touchscreen allowing visitors to solve water challenges

Design Specifications:

- White countertop (120cm × 80cm) with navy blue front panel labeled “Advanced Water Treatment”
- Integrated water circulation system with clear tubing
- Blue and green accent lighting representing clean water
- Acrylic information panels with water quality standards and achievements.

3.2.1.4 Coal Rig Power Station Simulator

Theme: “Power Generation Excellence”

Figure 5: Coal Rig Display Stand

Physical Components:

- Detailed scale model of a coal power plant boiler with cutaway sections
- Working simulator showing steam generation and flow
- Cross-section of boiler tubes showing heat exchange process
- Physical control panel with operational indicators

Digital Elements:

- 55” wall-mounted screen showing boiler operation simulation
- Real-time temperature and pressure visualization
- Efficiency metrics dashboard with comparative analysis
- Emissions monitoring and control system display

Interactive Features:

- Visitor-controlled boiler operation simulation
- Interactive efficiency optimization challenge
- “Plant Operator” experience with multiple parameter control
- Emissions reduction technology comparison and selection

Design Specifications:

- White countertop (120cm × 80cm) with navy blue front panel labeled “Coal Rig”

- LED lighting showing heat flow through the boiler system
- Steam effect using ultrasonic mist technology
- Amber/orange accent lighting representing combustion process

3.2.1.5 Smart Lighting Lab display

Theme: “Illuminating Efficiency”

Figure 6: Smart Lighting Lab display Stand

Physical Components:

- Array of different lighting technologies (LED, OLED, traditional) for comparison
- Cut-away models showing internal components of smart lighting
- Working smart lighting control system with sensors
- Heat dissipation demonstration comparing lighting technologies.

Digital Elements:

- 55” wall-mounted screen showing energy consumption visualization
- Light spectrum analyzer display showing quality differences

- Interactive lighting control panel demonstrating smart features
- Digital efficiency calculator showing ROI of smart lighting.

Interactive Features:

- Visitor-controlled lighting scenes demonstrating different applications
- Motion and occupancy sensor demonstration - Colour temperature and brightness adjustment interface
- "Design Your Space" lighting planner with energy consumption feedback

Design Specifications:

- White countertop (120cm × 80cm) with navy blue front panel labelled "Smart Lighting Lab"
- Integrated lighting demonstration area with various fixtures
- Colour-changing ambient lighting showing smart control capabilities
- Light measurement tools showing real-time efficiency metrics

3.2.1.6 Micro Grid Display

Theme: "Energy Independence & Resilience"

Figure 7: Micro Grid Stand

Physical Components:

- Scale model of a complete micro grid system with solar panels, wind turbines, battery storage, and buildings
- Working battery storage demonstration with charge/discharge visualization
- Physical control panel with manual override capabilities
- Miniature distribution system with visible power flow indicators

Digital Elements:

- 55” wall-mounted touchscreen showing real-time micro grid simulation
- Energy flow visualization with dynamic load balancing
- Weather impact simulation showing adaptation to changing conditions
- Interactive energy management dashboard

Interactive Features:

- Visitor-controlled weather scenario generator (sunny, cloudy, stormy)
- Load management simulation with drag-and-drop interface
- “Island mode” demonstration showing grid separation and independence
- Energy storage optimization challenge game

Design Specifications:

- White countertop (120cm × 80cm) with navy blue front panel labeled “Micro Grid”
- Integrated LED lighting showing power flow through the model
- Solar-powered elements in the display model for authenticity
- Interactive elements color-coded for intuitive understanding

3.2.1.7 Digitalisation and AI display

Theme: “Intelligent Power Systems”

Figure 8: Digitalisation and AI Display Stand

Physical Components:

- Transparent server rack model showing edge computing infrastructure
- Physical neural network representation with LED pathways showing data flow
- Interactive camera system demonstrating computer vision capabilities
- 3D-printed models of AI-optimized components

Digital Elements:

- 55” wall-mounted screen showing AI visualization and data processing
- Predictive maintenance simulation with equipment health indicators
- Machine learning demonstration showing pattern recognition in power systems
- Real-time data analytics dashboard

Interactive Features:

- Visitor-activated AI anomaly detection challenge
- Voice-controlled digital assistant for energy management queries
- “Train the AI” interactive game showing learning progression
- Before/after comparison of manual vs. AI-optimized systems

Design Specifications:

- White countertop (120cm × 80cm) with navy blue front panel labeled “Digitalization & AI”
- Pulsing LED pathways representing neural networks and data flow
- Holographic-style display for AI visualization (using transparent LCD)
- Ambient lighting that responds to AI activity levels

3.2.1.8 Industrial IoT(Internet of Things) Display

Theme: “Connected Industrial Ecosystem”

Figure 9: Industrial IoT(Internet of Things) Display Stand

Physical Components:

- Collection of industrial sensors and controllers with visible connectivity
- Miniature factory floor model with working IoT-enabled equipment
- Cross-section of smart industrial components showing embedded sensors
- Physical gateway devices showing data aggregation

Digital Elements:

- 55” wall-mounted screen showing real-time sensor data visualization
- Digital twin of the physical factory model showing virtual monitoring

- Predictive maintenance dashboard with component health indicators
- Network topology map showing device connectivity

Interactive Features:

- Visitor-activated sensor demonstration with real-time data collection
- “Find the Fault” interactive game using IoT diagnostics
- QR code scanning to access detailed component information
- Drag-and-drop interface for creating custom sensor networks

Design Specifications:

- White countertop (120cm × 80cm) with navy blue front panel labeled “Industrial IoT”
- Visible wireless connectivity visualization using LED light paths
- Transparent components showing embedded sensor technology
- Color-coded status indicators showing equipment health

3.2.1.9 Extended Reality and Digital twins Display

Theme: “Virtual Visualization & Simulation”

Figure 10:Extended Reality and Digital twins Display Stand

Physical Components:

- Physical equipment model paired with transparent display showing digital overlay

- AR/VR headset demonstration station with guided experience
- 3D-printed models of facilities with projection mapping
- Cross-section model showing layers of digital twin data

Digital Elements:

- 55” wall-mounted screen showing digital twin visualization
- Real-time simulation of equipment operation with performance metrics
- Side-by-side comparison of physical and virtual environments
- Predictive scenario modelling with outcome visualization

Interactive Features:

- Visitor-accessible AR experience via tablet devices
- Interactive digital twin manipulation with real-time feedback
- “What-if” scenario generator for maintenance and operations
- Virtual walkthrough of power generation facilities

Design Specifications:

- White countertop (120cm × 80cm) with navy blue front panel labelled “Extended Reality & Digital Twins”
- Holographic-style display showing floating 3D models
- Projection mapping onto physical models for enhanced visualization
- Ambient lighting that transitions between real and virtual states

3.2.2 Integration with Reception Area Transformation

These display stands are designed to complement the Smart Reception Area Transformation project by:

- Consistent Aesthetic: Maintaining the same design language and materials for visual cohesive
- Digital Integration: Sharing network infrastructure with the reception area systems
- Visitor Flow: Positioned strategically to create a natural exploration path from reception

- Data Sharing: Connected to the central system for displaying real-time research metrics on the main welcome wall
- Brand Reinforcement: Consistent labelling and information presentation style

Materials and Construction

All display stands will feature:

- Countertops: High-pressure laminate in white with seamless edges
- Structure: Powder-coated steel frame for durability
- Front Panels: Navy blue acrylic with CNC-cut lettering, backlit with LED
- Display Mounts: VESA-compatible mounting systems for screens
- Cable Management: Integrated channels and access points for clean appearance
- Lighting: Programmable LED systems with scene control
- Interactive Elements: Industrial-grade touch interfaces with tempered glass protection

Technology Infrastructure

Each stand will connect to a central control system allowing:

- Remote content updates and monitoring
- Synchronized demonstrations across multiple stands
- Data collection on visitor interactions for engagement analysis
- Energy management for efficient operation
- Scheduled demonstrations and content rotation

This infrastructure will integrate with the broader Smart Reception Area digital backbone for seamless operation and maintenance.

3.2.3 Digital Meeting Pods(x2)

The Digital Collaboration Pods will provide on-demand meeting spaces for impromptu discussions, video conferences, and collaborative work. (Converting existing boardroom to pods) The pods will feature:

- **Physical Design:** Minimum of three semi-enclosed pods with sound-absorbing materials, glass partitions, and seating for 4-6 people per pod.
- **Video Conferencing:** Integrated video conferencing system with 4K camera, beamforming microphone array, and high-quality speakers optimized for speech clarity.
- **Interactive Displays:** 55-inch 4K interactive display in each pod with wireless content sharing, annotation capabilities, and cloud storage integration.
- **Acoustic Privacy:** Sound masking technology and acoustic design ensuring minimum 45 dB sound isolation between pods and surrounding areas.
- **Environmental Controls**: Individual climate and lighting controls within each pod for personalized comfort.
- **Booking System:** Digital booking system with status indicators outside each pod, calendar integration, and automatic release of unused reservations.
- **Connectivity:** Multiple connectivity options including HDMI, USB-C, and wireless screen sharing supporting major platforms (AirPlay, Miracast, Google Cast).
- **Power and Charging:** Integrated power outlets and wireless charging pads at each seat position.

3.2.4 Smart Seating Areas

Specifications:

- 4 × collaborative seating clusters
- Integrated device charging stations
- Proximity sensors for lighting control
- Acoustic treatment for noise reduction
- Modular design for reconfiguration

3.2.5 Automated Windows/Smart Blinds System

Hardware Requirements:

- Motorized blinds with quiet operation (<35dB)
- Battery-powered with solar charging capability
- Wi-Fi and Zigbee connectivity for redundancy
- Manual override capability for emergency situations

- Weather-resistant materials for durability
- Fire-rated fabrics meeting building code requirements

Control Features:

- Smartphone app control with scheduling
- Voice control integration
- Light sensors for automatic adjustment
- Integration with building management system
- Individual and group control capabilities
- Preset positions (open, closed, privacy, daylight optimization)

Integration Requirements

Environmental Control Integration:

- Daylight harvesting coordination with smart lighting
- Temperature sensors to prevent overheating
- UV protection scheduling based on sun position
- Occupancy sensor integration for privacy modes

3.3 Integration Requirements

The Smart Reception Area Transformation will require integration with various existing systems to ensure seamless operation and data flow. The following integration points will be addressed:

3.3.1 Building Management System Integration

- Integration with existing building management systems for coordinated control of HVAC, lighting, and other building services.
- Bi-directional data exchange for environmental monitoring, energy management, and emergency response.
- Implementation of standard protocols as appropriate for existing systems.
- Development of custom integration adapters where standard protocols are not supported.

3.3.2 Security System Integration

- Integration with existing access control and security monitoring systems to maintain a unified security posture.
- Synchronization of user credentials and access rights between new biometric systems and existing access control databases.
- Coordinated alarm management and response procedures between new and existing security systems.
- Unified security monitoring interface incorporating feeds from both new and existing camera systems.

3.3.3 IT Infrastructure Integration

- Integration with corporate network infrastructure with appropriate security segmentation.
- Authentication integration with existing Active Directory services for unified identity management.
- Integration with existing data backup and disaster recovery systems.
- Compliance with organizational IT policies and security standards.

3.3.4 Data Integration

- Integration with relevant organizational databases for visitor management, employee information, and operational data.
- Real-time information from various data sources (e.g Time series data, asset data etc) display on the Interactive Welcome Wall.
- Development of data transformation services to ensure compatibility between systems.
- Implementation of data governance procedures to maintain data quality and security in accordance to the Eskom data standards.

3.4 Digital Backbone Infrastructure

The Digital Backbone Infrastructure will provide the foundational technology layer that supports all smart reception components and ensures seamless integration, security, and performance. This infrastructure will include:

- **Network Infrastructure:** Enterprise-grade network infrastructure with redundant fiber optic backbone, minimum 1Gbps core switching, and segregated VLANs for different system types. Guest network isolation.
- **Edge Computing:** Local edge computing resources for latency-sensitive applications and continued operation during internet outages.
- **Cloud Integration:** Secure cloud integration for data storage, analytics, and remote management capabilities.
- **Cybersecurity Measures:** Comprehensive cybersecurity implementation including next-generation firewalls, intrusion detection/prevention systems, and continuous vulnerability management.
- **Power Management:** Uninterruptible power supply (UPS) systems with minimum 4 hours runtime for critical systems and automated failover mechanisms.
- **System Integration Platform:** Middleware integration platform enabling communication between disparate systems.
- **Data Management:** Centralized data management system with appropriate security controls, backup procedures, and retention policies.
- **Monitoring and Management:** Comprehensive monitoring and management system for all infrastructure components with automated alerting and reporting. Main distribution board upgrade

3.5 Audio Visual Infrastructure

Audio Visual Distribution:

- Digital audio distribution system
- Integrated control system
- Cable management and distribution
- Fire alarm integrated into the system audio

3.6 Compliance Requirements

The Smart Reception Area Transformation will comply with all relevant international and South African standards and regulations, including but not limited to:

3.6.1 Security and Privacy Standards

- ISO/IEC 27001: Information Security Management
- ISO/IEC 27701: Privacy Information Management
- ISO/IEC 24745: Biometric Information Protection
- POPIA (Protection of Personal Information Act)
- GDPR (General Data Protection Regulation) for handling data of EU citizens

3.6.2 Building and Safety Standards

- SANS 10400: South African National Building Regulations
- SANS 10142: Electrical Wiring Code
- SANS 10139: Fire Detection and Alarm Systems
- SANS 10114: Interior Lighting
- SANS 204: Energy Efficiency in Buildings

3.6.3 Accessibility Standards

- SANS 10400-S: Facilities for Persons with Disabilities
- Web Content Accessibility Guidelines (WCAG) 2.1 for digital interfaces
- Universal Design principles for physical and digital elements

3.6.4 Technology Standards

- IEEE 802.11ax (Wi-Fi 6) for wireless networking
- IEEE 802.3bt for Power over Ethernet
- ONVIF Profile S for IP-based security cameras
- Open Connectivity Foundation (OCF) standards for IoT device interoperability

4. Project items

4.1 Digital Welcome Experience

Table 1: Interactive Welcome Wall

Item	Description	Quantity

LED Video Wall	3m × 2m 4K LED panels with 1.5mm pixel pitch	**1 system**
Touch Overlay	Capacitive touch system with multi-touch support	**1 system**
Content Management System	Custom CMS with user interface and API integrations	**1 system**
Content Development	Initial content creation including animations and visualizations	**1 package**
Data Integration Services	API development for real-time data integration	**1 package**
Installation and Calibration	**Physical installation, calibration, and testing**	**1 service**

Table 2: Advanced Visitor Management System

Item	Description	Quantity
Self-Service Kiosks	22-inch touchscreen kiosks with integrated peripherals	3 units
Visitor Management Software	Enterprise software with pre-registration and analytics	1 system
Mobile Application	Custom mobile app for visitor pre-registration	1 system
Thermal Imaging Cameras	Contactless temperature monitoring cameras	3 units
Integration Services	Integration with security and notification systems	1 package
Reception Desk	Smart Half moon/ half round Reception Desk with cabinets, Staff workstation and branded LED lighting.	1 system

4.2 Next-Generation Security and Access Control

Table 3:Multi-Factor Biometric System

Item	Description	Quantity
Biometric Access Points	Multi-modal biometric readers with anti-spoofing	**6 units**
Biometric Server	Central server with biometric processing capabilities	**1 system**
Identity Management Software	Enterprise software for credential management	**1 system**
Mobile Credential System	NFC/BLE credential system with encryption	**1 system**
Integration Services	**Integration with existing access control systems**	**1 package**

Table 4: AI-Enhanced Security Monitoring

Item	Description	Quantity
4K Security Cameras	High-resolution cameras with wide dynamic range	12 units
Video Analytics Server	AI-powered server for video processing	1 system
Video Analytics Software	Computer vision and behavioral analytics software	1 system
License Plate Recognition	LPR cameras and software for vehicle entry points	2 units
Security Dashboard	Custom security monitoring and alert dashboard	1 system
Installation and Configuration	Camera installation, wiring, and system configuration	1 service
Route software	Way finding (Directions) of areas in the building	1 System/License

4.3 Environmental Intelligence

Table 5: Precision Climate Management

Item	Description	Quantity
Environmental Sensors	Wireless sensors for temperature, humidity, air quality	18 units
Zone Controllers	Independent climate zone controllers	6 units
Central Management System	AI-driven climate management software	1 system
BMS Integration Gateway	Hardware/software for building management integration	1 system
Installation and Configuration	Sensor installation, wiring, and system configuration	1 service
Window blinds	Motorized smart roller blinds with smart blinds control	1 System

Table 6: Human-Centric Lighting

Item	Description	Quantity
Tunable LED Fixtures	High-CRI LED fixtures with tunable white capability	40 units
Lighting Controllers	Zone-based lighting controllers with scene support	6 units
Photosensors	Natural light harvesting sensors	12 units
Occupancy Sensors	Advanced occupancy detection sensors	12 units
Lighting Control Software	Circadian rhythm programming and management software	1 system
Installation and Configuration	Fixture installation, wiring, and system configuration	1 service

4.4 Digital Visitor Experience

Table 7:Connected Comfort Features

Item	Description	Quantity
Information Kiosks	32-inch wall-mounted touchscreen kiosks	**2 units**
Smart Seating	Modular seating with integrated power and charging	**12 seats**
Enterprise Wi-Fi System	High-speed secure Wi-Fi with guest access	**1 system**
Smart Water Dispensers	Intelligent water dispensers with tracking	**2 units**
Smart Coffee Machine	Smart Coffee machine with full range coffee choices, Touch screen display, predictive maintenance and self cleaning.	
Digital Signage Displays	**43-inch displays with content management**	**3 units**

Table 8: Digital Collaboration Pods

Item	Description	Quantity
Pod Construction	Physical construction with acoustic materials	**3 pods**
Video Conferencing Systems	4K camera, microphone array, and speakers	**3 systems**
Interactive Displays	55-inch 4K interactive displays	**3 units**
Pod Control Systems	Environmental and AV control systems	**3 systems**
Booking System	**Digital booking system with status indicators**	**1 system**

Table 9: Digital Backbone Infrastructure

Item	Description	Quantity
Core Network Equipment	Enterprise switches, routers, and firewalls	**1 system**
Edge Computing Infrastructure	Local servers for edge computing applications	**2 units**
UPS Systems	Uninterruptible power supplies for critical systems	**2 units**
System Integration Platform	Middleware for cross-system integration	**1 system**
Network Cabling	Fiber optic and copper cabling infrastructure	**1 package**
Cybersecurity Implementation	**Security appliances and software**	**1 system**

5. Project Schedule

Item	Key Dates (Completion date)
Kick Off Meetings/ Contract Award	20 February 2026
Complete Designs and Approval by Employer	20 March 2026
Complete Procurement of all items	30 May 2026
Complete Installation of all Items	31 July 2026
Compete Commissioning and Testing	30 August 2026
Complete training	15 September 2026
Compete Handover	30 September 2026