PRODUCT REQUIREMENTS DOCUMENT

Construction Estimating & Quotation Application

EstimatePro PH

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1. EXECUTIVE SUMMARY

EstimatePro PH is a comprehensive web-based construction estimating application designed specifically for design and build firms in the Philippines. The application streamlines the quotation process by organizing estimates by works, rooms, or scope, while integrating automated quantity computation formulas for accurate material and labor calculations.

1.1 Project Vision

To create an intelligent, context-aware estimating tool that reduces quotation preparation time by 70%, increases accuracy by eliminating manual calculations, and provides multiple organizational views to match different client presentation preferences.

1.2 Key Objectives

- Generate accurate construction quotations with minimal manual input
- Organize estimates flexibly by works, rooms, or scope
- Automate quantity computations using Philippine construction standards
- Maintain current material pricing database for accurate costing
- Generate professional PDF quotations for client presentation
- Track project profitability and historical pricing trends

1.3 Target Users

- Estimators and quantity surveyors in design-build firms
- Project managers preparing client quotations
- Business owners reviewing project costs and margins
- Design professionals needing quick preliminary estimates

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2. PRODUCT OVERVIEW

2.1 Core Features

2.1.1 Flexible Organization System

The application provides three distinct organizational views for estimates:

- **By Works:** Groups items by trade (Electrical, Plumbing, Carpentry, Masonry, Finishing)
- **By Room:** Organizes costs by space (Living Room, Kitchen, Bedroom, Bathroom)
- **By Scope:** Categorizes by major discipline (Civil, Architectural, Mechanical, Electrical, Plumbing)

2.1.2 Automated Quantity Computation

Built-in formulas automatically calculate material and labor quantities based on user inputs:

- Concrete works (slabs, columns, beams, foundations)
- Masonry (CHB walls with reinforcement and mortar)
- Finishing works (painting, tiling, plastering)
- Excavation and earthworks
- Formwork calculations with lumber requirements

2.1.3 Material Database

Centralized database of Philippine construction materials with:

- Current market pricing
- Common local brands (Boysen, Davies, Bato, Union Galvasteel)
- Standard Philippine units (sqm, bags, sheets, board feet)
- Supplier information and lead times
- Price history for trend analysis

2.1.4 Template System

Reusable templates for common scenarios:

- Standard room packages (basic kitchen, luxury bathroom)
- Typical work scopes (house rewiring, bathroom renovation)
- Custom templates created from past projects

2.1.5 Quote Generation

- Professional PDF quotations with company branding
- Itemized breakdown with quantities and rates
- Automatic VAT calculation (12%)
- Markup and contingency application
- Payment terms and validity period
- Version control for quote revisions

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3. TECHNICAL ARCHITECTURE

3.1 Technology Stack

3.1.1 Frontend Technologies

Component	Technology
Framework	React or Next.js (recommended for SEO and server-side rendering)
Styling	Tailwind CSS (utility-first, rapid development)
State Management	Zustand or Redux Toolkit (centralized state for estimates and formulas)
Form Handling	React Hook Form with Zod validation
UI Components	shadcn/ui or Headless UI (accessible, customizable components)

3.1.2 Backend Technologies

Component	Technology
Runtime	Node.js (v18+) with Express or Next.js API routes
Database	PostgreSQL (relational data, complex queries) or MongoDB (flexible schema)
ORM	Prisma (type-safe, excellent developer experience)
Authentication	NextAuth.js or Clerk (OAuth, email/password, role-based access)
PDF Generation	React-PDF or Puppeteer (HTML to PDF conversion)

3.1.3 Deployment & Infrastructure

Component	Technology
Hosting	Vercel (zero-config Next.js deployment) or Railway
Database Hosting	Supabase (PostgreSQL with real-time) or Railway
File Storage	AWS S3 or Cloudinary (PDF storage, company logos)
Version Control	Git (GitHub or GitLab)

3.2 Database Schema

3.2.1 Core Entities

Project

- id (UUID, primary key)
- clientId (foreign key to Client)
- projectName (string)
- location (string)
- projectType (residential, commercial, renovation)
- floorArea (decimal, sqm)
- status (draft, sent, approved, rejected)
- createdAt, updatedAt (timestamps)
- estimates (one-to-many relationship)

Estimate

- id (UUID, primary key)
- projectId (foreign key)
- organizationType (works, rooms, scope)
- version (integer, for revision tracking)
- subtotal (decimal)
- markup (decimal, percentage)
- vat (decimal, percentage, default 12%)
- totalAmount (decimal)
- validityDays (integer)
- paymentTerms (text)

- notes (text)
- lineItems, computations (one-to-many relationships)

LineItem

- id (UUID, primary key)
- estimateId (foreign key)
- category (string, e.g., 'Electrical', 'Living Room', 'Civil')
- description (string)
- quantity (decimal)
- unit (string, e.g., 'sqm', 'bags', 'pcs')
- materialCost (decimal, per unit)
- laborCost (decimal, per unit)
- totalCost (computed: quantity × (materialCost + laborCost))
- source (manual, template, computation)
- computationId (optional, foreign key)

ComputationTemplate

- id (UUID, primary key)
- name (string, e.g., 'Concrete Slab', 'CHB Wall')
- category (concrete, masonry, finishing, excavation)
- description (text)
- inputs (JSON, defines required fields and types)
- formula (JSON, computation logic)
- outputs (JSON, materials and labor generated)
- isActive (boolean)

ComputationInstance

- id (UUID, primary key)
- estimateId (foreign key)
- templateId (foreign key)
- inputValues (JSON, user's measurements)
- computedResults (JSON, calculated quantities)
- notes (text)
- generatedItems (one-to-many to LineItem)

Material

- id (UUID, primary key)
- name (string)
- category (cement, steel, blocks, paint, etc.)
- brand (string, optional)
- unit (string)
- currentCost (decimal)
- supplier (string, optional)
- lastUpdated (timestamp)

Client

- id (UUID, primary key)
- name (string)
- email (string)
- phone (string)
- address (text)
- projects (one-to-many relationship)

3.3 Application Architecture

3.3.1 Directory Structure

```
/src
  /app
    /dashboard
    /projects
    /estimates
    /materials
    /clients
    /api
  /components
    /quotation
    /formulas
    /materials
    /templates
    /ui (shadcn components)
  /lib
    /formulas (computation logic)
    /calculations
    /pdf-generator
    /db (Prisma client)
  /types
  /hooks
/prisma
  schema.prisma
  /migrations
```

3.3.2 Key Workflows

Creating a Quotation with Formulas:

1. User selects/creates a project
2. Chooses organization method (works/rooms/scope)
3. Clicks 'Add with Formula' or 'Add Manually'
4. If using formula: selects computation type (e.g., 'CHB Wall')
5. Enters measurements (length, height, thickness, etc.)
6. System computes quantities using formula library
7. Preview shows materials, quantities, and costs
8. User confirms → line items auto-generated
9. Applies markup and calculates totals with VAT
10. Generates PDF quotation for client

4. FORMULA COMPUTATION SYSTEM

4.1 Formula Categories

4.1.1 Concrete Works

Concrete Slab Formula

Inputs:

- Length (meters)
- Width (meters)
- Thickness (millimeters)
- Wastage percentage (default 5%)

Computation:

- Volume = Length × Width × (Thickness ÷ 1000)
- Volume with wastage = Volume × (1 + Wastage%)
- Cement = Volume × 6.5 bags/cu.m (Class A mix)
- Sand = Volume × 0.5 cu.m
- Gravel = Volume × 1.0 cu.m

Outputs: Line items for cement (bags), sand (cu.m), gravel (cu.m), and labor (sq.m)

Concrete Column Formula

Inputs:

- Width and Depth (millimeters)
- Height (meters)
- Number of columns
- Main rebar count and size
- Ties spacing (millimeters)

Computation:

- Concrete volume per column
- Main rebar length (with lap splicing factor 1.5)
- Ties length (perimeter × number of ties)
- Formwork area (plywood and lumber)

Outputs: Cement, sand, gravel, main rebar, ties, tie wire, plywood, lumber, labor

4.1.2 Masonry Works

CHB Wall Formula

Inputs:

- Wall length (meters)
- Wall height (meters)
- Block size (4 inch or 6 inch)
- Openings area (sq.m, for doors/windows)
- Wastage percentage (default 10%)

Computation:

- Net area = Gross area - Openings
- CHB quantity = Net area × 12.5 blocks/sq.m
- Mortar volume = Net area × 0.02 cu.m/sq.m
- Vertical and horizontal rebar (at 600mm spacing)
- Tie wire for rebar connections

Outputs: CHB blocks, cement, sand, rebar (vertical), rebar (horizontal), tie wire, labor

4.1.3 Finishing Works

Painting Formula

Inputs:

- Area (sq.m)
- Number of coats (default 2)
- Paint type (acryla-tex, weather shield, gloss)
- Surface type (smooth or rough)

Coverage rates:

- Smooth surface: 16-20 sq.m per liter
- Rough surface: 10-14 sq.m per liter

Outputs: Paint (gallons and liters), thinner, sandpaper, putty, labor

Tile Installation Formula

Inputs:

- Length and width (meters)
- Tile size (200×200mm, 300×300mm, 400×400mm, 600×600mm)
- Wastage percentage (default 10%)

Outputs: Tiles (pieces), tile adhesive (kg), grout (kg), spacers, labor

Plastering Formula

Inputs:

- Wall area (sq.m)
- Plaster thickness (default 12mm)
- Mix ratio (1:4, 1:5, or 1:6 cement to sand)

Outputs: Cement (bags), sand (cu.m), labor

4.1.4 Excavation & Foundation

Excavation Formula

Inputs:

- Length, width, depth (meters)
- Soil type (loose, medium, hard)

Swell factors:

- Loose soil: 1.1
- Medium soil: 1.25
- Hard soil/clay: 1.4

Foundation (Footing) Formula

Inputs:

- Length, width, thickness (meters)
- Number of footings
- Rebar spacing (default 150mm)

Outputs: Concrete materials, rebar grid (both directions), tie wire, labor

4.2 Formula Implementation Strategy

4.2.1 Formula Library Structure

Formulas are organized in separate modules by category:

- /lib/formulas/concrete.js
- /lib/formulas/masonry.js
- /lib/formulas/finishing.js
- /lib/formulas/excavation.js

Each formula object contains:

- name (display name)
- inputs (array of field definitions with validation)
- compute() function (takes inputs, returns materials and labor)

4.2.2 User Interface Flow

1. User clicks 'Add with Formula' button in estimate
2. Modal/drawer opens with formula categories
3. User selects specific formula (e.g., 'Concrete Slab')
4. Dynamic form renders based on formula inputs
5. User enters measurements and parameters
6. System validates inputs and runs computation
7. Preview shows computed quantities and costs
8. User can adjust manually if needed
9. Confirm → multiple line items added to estimate

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5. DEVELOPMENT ROADMAP

5.1 Phase 1: MVP (Weeks 1-3)

5.1.1 Core Functionality

- User authentication (email/password)
- Project creation with client information
- Basic estimate creation (single organization view)

- Manual line item entry
- Cost calculations (subtotal, markup, VAT, total)
- Simple PDF quotation generation

5.1.2 Formula Integration (Initial Set)

- Concrete slab formula
- CHB wall formula
- Painting formula

5.1.3 Material Database (Starter)

- 50-100 common Philippine materials
- Basic CRUD operations
- Price lookup during line item creation

5.1.4 Success Criteria

- User can create a complete quotation from scratch
- Formula computation reduces manual entry by 50%
- Generated PDF is client-presentable

5.2 Phase 2: Enhanced Features (Weeks 4-6)

5.2.1 Multi-View Organization

- Toggle between Works/Rooms/Scope views
- Dynamic re-categorization of line items
- Subtotals per category

5.2.2 Complete Formula Library

- All concrete formulas (column, beam, foundation)
- All masonry formulas
- All finishing formulas (tiling, plastering)
- Excavation and foundation formulas

5.2.3 Template System

- Create templates from existing estimates

- Pre-built common templates (standard bathroom, kitchen)
- Apply templates to new estimates

5.2.4 Enhanced Material Database

- 200+ materials with multiple brands
- Bulk price updates
- Price history tracking

5.2.5 Quote Versioning

- Save multiple versions of same estimate
- Compare versions side-by-side
- Revision notes and change log

5.3 Phase 3: Advanced Features (Weeks 7-8)

5.3.1 Analytics Dashboard

- Project profitability analysis
- Average markup by project type
- Material cost trends
- Most quoted items

5.3.2 Client Portal (Optional)

- Clients can view quotes online
- Digital acceptance/signature
- Comment threads for clarifications

5.3.3 Advanced Export Options

- Export to Excel (detailed breakdown)
- CSV export for accounting software
- Branded PDF templates with company logo

5.3.4 Mobile Responsiveness

- Fully responsive design for tablets and phones
- On-site formula computation capability

5.3.5 Team Collaboration

- Multi-user access with roles (admin, estimator, viewer)
- Activity log (who edited what, when)
- Approval workflow for quotes

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6. PHILIPPINE-SPECIFIC CONSIDERATIONS

6.1 Tax and Pricing

- VAT rate: 12% (mandatory on total)
- Philippine Peso (₱) as currency
- Typical markup ranges: 15-20% for institutional, 20-30% for residential
- Contingency: 5-10% for unforeseen costs

6.2 Units of Measurement

- Area: square meters (sqm)
- Volume: cubic meters (cu.m)
- Cement: 40kg bags
- Lumber: board feet (bd.ft)
- Plywood: sheets (typically 4×8 ft = 2.88 sqm)
- Rebar: linear meters (lm) or kilograms (kg)
- Paint: gallons (4L) or liters
- Tiles, CHB: pieces (pcs)

6.3 Common Philippine Materials (Starter Database)

6.3.1 Cement and Aggregates

- Portland cement (various brands: Holcim, Eagle, Fortune, Apo)
- Sand (washed, ordinary)
- Gravel (3/4", 1/2")

6.3.2 Masonry

- CHB 4" (100mm) - various brands

- CHB 6" (150mm)
- Red bricks
- Adobe blocks

6.3.3 Steel and Reinforcement

- Rebar: 6mm, 10mm, 12mm, 16mm, 20mm (brands: Union Galvasteel, Steel Asia, BSP)
- Tie wire #16
- Wire mesh (various gauges)

6.3.4 Paint

- Boysen (Acryla-tex, Permacoat, Weather Shield)
- Davies (various lines)
- Bato (economy brand)
- Paint thinner, primer, putty

6.3.5 Lumber and Plywood

- Yakal, Narra, Lawaan (hardwoods)
- Guijo, Apitong (construction lumber)
- 2×2, 2×3, 2×4, 4×4 (sizes in inches)
- Plywood: 1/4", 1/2", 3/4" (marine, ordinary)

6.3.6 Electrical

- PVC conduit (1/2", 3/4", 1")
- THHN/THWN wire (various AWG sizes)
- Junction boxes, outlet boxes
- Breakers, switches, outlets (brands: Schneider, ABB, Omni, 3M)

6.3.7 Plumbing

- PVC pipes (1/2", 3/4", 1", 2", 3", 4")
- PVC fittings (elbow, tee, coupling, etc.)
- Toilet bowls, lavatories (brands: American Standard, Hans Grohe)
- Faucets, showerheads, accessories

6.3.8 Tiles and Finishing

- Floor tiles: 200×200mm, 300×300mm, 400×400mm, 600×600mm
- Wall tiles: similar sizes
- Tile adhesive (Bostik, Mapei)
- Grout (various colors)

6.4 Labor Rates (2026 Philippine Market)

Typical daily rates or rates per unit:

- Mason: ₱600-800 per day
- Carpenter: ₱600-800 per day
- Electrician: ₱700-900 per day
- Plumber: ₱700-900 per day
- Painter: ₱500-700 per day or ₱50-80 per sqm
- Helper/laborer: ₱400-500 per day
- Foreman: ₱800-1,000 per day

Note: Rates vary by region (Metro Manila vs provinces) and skill level.

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7. USER INTERFACE DESIGN

7.1 Key Screens

7.1.1 Dashboard

- Recent projects grid
- Quick stats (total quotes, pending, approved)
- Quick actions (New Project, New Estimate)
- Notifications (price updates, quote expirations)

7.1.2 Estimate Builder

- Organization toggle (Works/Rooms/Scope buttons)
- Category accordion sections
- Line item table (description, quantity, unit, rate, amount)
- Action buttons: Add Manual, Add with Formula

- Live totals sidebar (subtotal, markup, VAT, grand total)
- Save Draft, Generate PDF buttons

7.1.3 Formula Modal

- Category tabs (Concrete, Masonry, Finishing, etc.)
- Formula cards with icons and descriptions
- Selected formula → dynamic input form
- Real-time computation preview
- Confirm and Add to Estimate button

7.1.4 Material Database Manager

- Searchable, filterable table
- Category grouping
- Bulk edit capabilities
- Price history chart per material
- Import/export CSV

7.1.5 PDF Quotation Preview

- Company letterhead
- Client and project information
- Itemized breakdown by category
- Summary section (subtotal, markup, VAT, total)
- Payment terms and validity period
- Signature blocks

7.2 Design Principles

- Clean, professional interface suitable for construction industry
- Minimize clicks to common actions
- Clear visual hierarchy (primary actions prominent)
- Responsive design (desktop-first, tablet-friendly)
- Immediate feedback on user actions
- Consistent color scheme (blue/gray professional palette)

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8. NON-FUNCTIONAL REQUIREMENTS

8.1 Performance

- Page load time < 2 seconds
- Formula computation < 500ms
- PDF generation < 5 seconds
- Support 100+ line items without lag

8.2 Security

- HTTPS encryption for all traffic
- Secure password hashing (bcrypt)
- Role-based access control (RBAC)
- Data isolation between organizations
- Regular automated backups

8.3 Reliability

- 99.5% uptime target
- Auto-save draft estimates every 30 seconds
- Error logging and monitoring
- Graceful degradation on network issues

8.4 Usability

- New users can create first estimate in < 10 minutes
- Inline help tooltips for complex features
- Keyboard shortcuts for power users
- Undo/redo functionality

8.5 Scalability

- Support 10-50 concurrent users (single organization)
- Handle 1,000+ projects per organization
- Database optimization for large datasets

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9. SUCCESS METRICS

9.1 Development Metrics

- MVP delivered in 3 weeks
- All Phase 2 features in 6 weeks
- Zero critical bugs in production

9.2 User Adoption Metrics

- 80% of quotations use formula computation
- Average quotation creation time < 15 minutes
- 5+ quotes generated per week per user
- User satisfaction score > 4/5

9.3 Business Impact Metrics

- 70% reduction in quotation preparation time
- 95% accuracy in material quantity estimates
- 50% increase in number of quotes delivered
- 10% improvement in quote-to-project conversion rate

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10. RISKS AND MITIGATION

10.1 Technical Risks

Risk	Mitigation
Formula accuracy issues	Validate against real projects; allow manual override; continuous testing with industry standards
Performance degradation with large estimates	Database indexing; pagination; lazy loading; performance testing with 500+ line items
Data loss during auto-save	Implement versioning; localStorage backup; transaction logging

10.2 Business Risks

Risk	Mitigation
User resistance to new system	Training sessions; video tutorials; gradual rollout; maintain Excel export for familiarity
Material prices become outdated	Quarterly price update reminders; bulk edit tools; supplier API integration (future)
Scope creep during development	Strict phase definitions; feature parking lot for post-MVP; regular stakeholder alignment

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11. FUTURE ENHANCEMENTS (POST-LAUNCH)

11.1 Short-term (3-6 months)

- Mobile app (React Native)
- Integration with accounting software (QuickBooks, Xero)
- Email quotations directly to clients
- Advanced analytics (win rate, seasonal trends)

11.2 Medium-term (6-12 months)

- AI-powered quantity estimation from floor plans
- Supplier marketplace integration
- Project tracking (actual costs vs estimates)
- Multi-currency support for international projects

11.3 Long-term (12+ months)

- BIM (Building Information Modeling) integration
- Machine learning for cost prediction
- Marketplace for custom formulas (community-contributed)
- White-label solution for other construction firms

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12. APPENDICES

12.1 Glossary

- **CHB:** Concrete Hollow Blocks
- **cu.m:** Cubic meter
- **sqm:** Square meter
- **bd.ft:** Board feet
- **MEP:** Mechanical, Electrical, Plumbing
- **VAT:** Value Added Tax
- **Rebar:** Reinforcement bar (steel)

12.2 Sample Estimate Structure

Example: 2-Bedroom House Renovation (By Works)

- **Demolition Works**
  - Wall demolition, floor tile removal, etc.
- **Masonry Works**
  - CHB walls, plastering, etc.
- **Electrical Works**
  - Rewiring, outlets, fixtures
- **Plumbing Works**
  - New pipes, fixtures, water heater
- **Carpentry Works**
  - Doors, windows, cabinets
- **Painting & Finishing**
  - Wall paint, floor tiles, ceiling

12.3 References

- Philippine National Building Code
- DPWH (Department of Public Works and Highways) Standards
- Philippine Institute of Civil Engineers (PICE) Guidelines
- Local material supplier price lists (2026)

DOCUMENT END

For questions or clarifications, contact the development team.