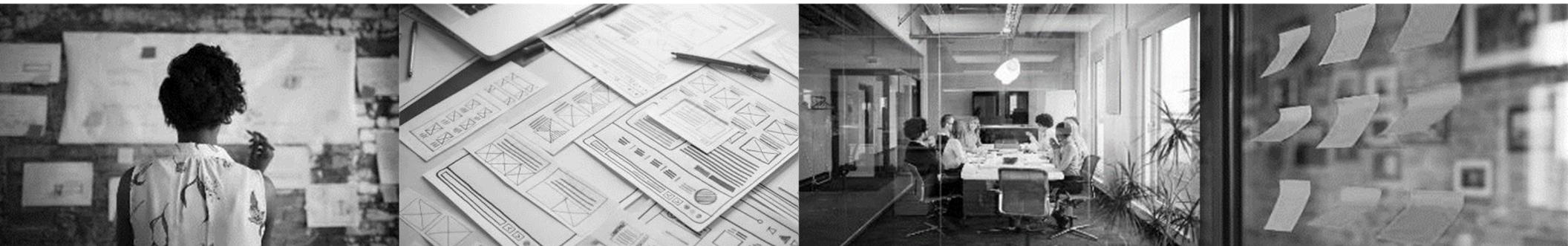




**CRANBERRY**  
CONSULTING COMPANY

GREENFIELD CONTROLS DESIGN

# WHAT WE DO



## Customer Standards

Program standards and specifications to create a customer standard.

- Work with design groups and their disciplines
- Work with owners and their operators for best practices
- Use industry standards to ensure reliability

## Design

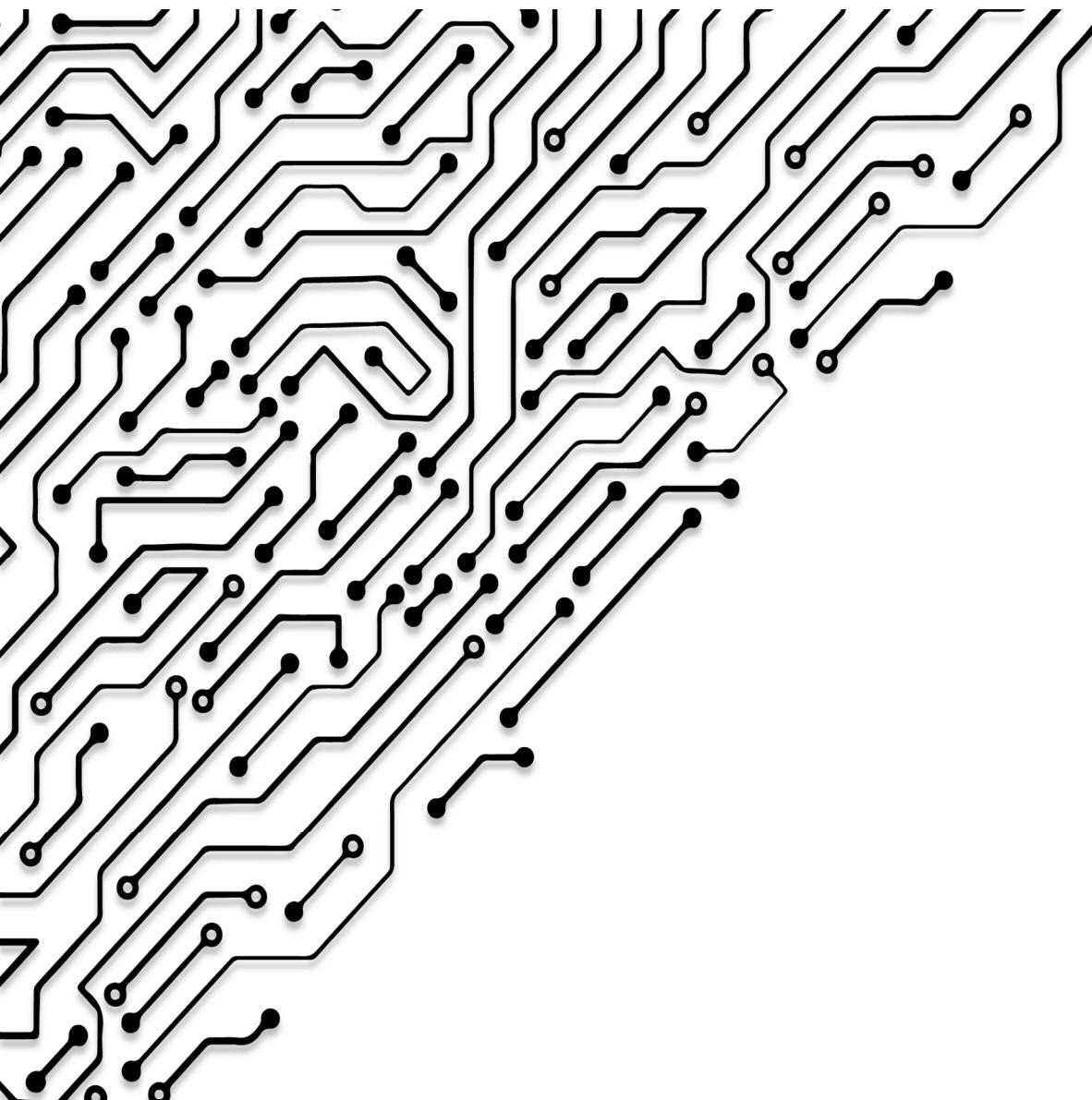
Create hardware and software documentation that alleviates schedule compression.

- Hardware design complete before construction begins
- Sequence of operations in programmer friendly context
- Integrator has detailed specification and design to bid
- Long lead time procurement

## Supplemental Services

Owner's representative and CxA support.

- Engineering & Construction Project Management
- Implementation & Execution Planning and Management
- Software test script creation
- Procurement management
- Vendor/Resource coordination
- Quality Management
- CxA Support



# STAGES OF DESIGN

Master Planning / Conceptual Design

Schematic Design

Design Development

Issue for Permit

Issue for Construction

Construction Administration



# MASTER PLANNING / CONCEPTUAL DESIGN

**Discovery** – Through interviews and review of current documentation or desired industry accepted standards

**Customer Standards** – Creation of BMS/EPMS standards to apply across campuses

**Program Standards** – Creation of standards specific to the flavor of building or equipment that remain consistent across campuses

**Specifications** – Created to align with code, customer standards, program standards, best practices, and industry standards.

**Alignment with Disciples** – Understand the touch points and expectations between the collaborative disciplines – plumbing, electrical, IT, mechanical, etc.

# SCHEMATIC DESIGN (SD)

**System Architecture** – Preliminary map or IT, controllers, and equipment connections

**Connectivity Matrix** – List of all the devices, the controllers they are associate with, and their parameters for programmers and IT professionals to complete their tasks.

**Points Lists** – The preliminary hardware, software, integration, and alarms lists to align with the systems and equipment.

**Hardwired Safety System** – Hand off auto switches for systems and components. Purge systems or steady state manual modes.

# DESIGN DEVELOPMENT (DD)

**Drawings** – Installation details, cabinet labels, BOMs, cabinet and instrumentation locations, control cabinet panels layouts, electrical circuitry and wiring power feeds.

**Calculations** – Control cabinet power calculations, actuator torque calculations, and thermal calculations.

**Schedules** – Valves, damper/actuator, circuits, control cabinets, and other major components.

**Process and Instrumentation Diagrams (P&IDs)** – The component layouts necessary to control the mechanical systems properly applied to mechanical schematics.

# ISSUE FOR PERMIT (IFP)

**Sequence of Operations Narrative** – Document aligned with mechanical system design defining the software points and setpoints for a programmer to create their code.

**Alignment** – Sequences, points lists, drawings, layouts, system architecture, schedules, P&IDs, and connectivity matrix.

INTEGRITY

HONESTY

TRANSPERANCY

SYSTEM

# ISSUE FOR CONSTRUCTION (IFC)

**Design Team Comments** – Align with all design disciplines and ensure comments from owner, contractor, and CxA are addressed.

**Finalize** – Sequences, points lists, drawings, layouts, system architecture, schedules, P&IDs, and connectivity matrix.

**Meetings** – Provide guidance of the design to the integrator.

INTEGRITY

HONESTY

TRANSPERANCY

SYSTEM

8

# CONSTRUCTION ADMINISTRATION (CA)

**Onsite Review and Integrator Support** – Onsite review of supporting disciplines, onsite installation review, RFI responses, and redline review.

**Shop Drawing Review** – Alignment with design documents.

**Software Review** – Bench testing of code for sequences and ensure alignment to design through test scripts.

**Graphics Review** – Aligned with specification.

**Factory Witness Testing** – Ensure equipment BMS integration points and alarms aligned with design.

**Commissioning Support** – Review CxA L4 and L5 Test Scripts.

# THANK YOU



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