Integrated Design Principles for Lab Projects

Canadian Biosafety Symposium 2018

September 13, 2018

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Presentation Objective

The objective of this presentation is to put forward an integrated design approach and specific strategies which can be used by laboratory project delivery teams in order to ensure alignment around critical lab design principles.

Abstract

- Broad and diverse set of stakeholders and decision makers.
- Approach and specific strategies which can be used by laboratory delivery project teams in order to bring alignment around laboratory design principles.
- Formal and informal interaction that can be used.
- Roles and responsibilities which need to be filled.
- Principles and Rules of Engagement that can be deployed on all sizes of projects.
- Specific examples from laboratory projects which are currently being delivered by our practice.
- Best practices and industry tools associated with decision management.
- Project delivery models and construction phase communication techniques which will ensure alignment between project stakeholders and increase the likelihood of meeting project targets.

Communication is everyone’s panacea for everything.

Tom Peters

Stakeholders and Decision Makers

Stakeholders and Decision Makers

Project Consultant Team Complexity

Item	Service	Item	Service
1.1	Structural Consulting Engineering Services	1.15	Interior Design Consulting Services –
1.2	Mechanical Consulting Engineering Services	1.16	Laboratory Design Consulting Services
1.3	Electrical Consulting Engineering Services	1.17	Landscape Architect Consulting Services
1.4	Acoustic Consulting Services	1.18	Lighting Design Consulting Services
1.5	Audio Visual Consulting Services	1.19	Microclimate Consulting Services
1.6	Building Sciences Consulting Services	1.20	Planning Consulting Services
1.7	Energy Modelling Consulting Services	1.21	Security Consulting Services
1.8	Civil Engineering Consulting Services	1.22	Building Security and Communications Systems Consulting Services
1.9	Commissioning Agent Consulting Services	1.23	Traffic Consulting Services
1.10	Cost Estimating Consulting Services	1.24	Vertical Transportation Consulting Services
1.11	Food Services Consulting Services	1.25	[ ] Consulting Services
1.12	Heritage Conservation Consulting Services	1.26	Furniture, Fixtures and Equipment (FF&E) Selection, Procurement, and Installation Coordination
1.13	Archaeological Consulting Services	1.27	Graphic Design and Signage
1.14	Hardware Consulting Services –	1.28	Tenant Improvement Design Services

Project Consultant Team Complexity

Oh. And a few more….

Item	Service
1.33	Coordination of *Client's* Equipment
1.34	Value Engineering Services
1.35	Life Cycle Cost Analysis Services
1.36	Energy Modelling Services –
1.37	Climate Change Analysis
1.38	Enhanced Sustainable Design
1.39	Sustainable Design Certification
1.40	Commissioning
1.41	Multiple Language Services

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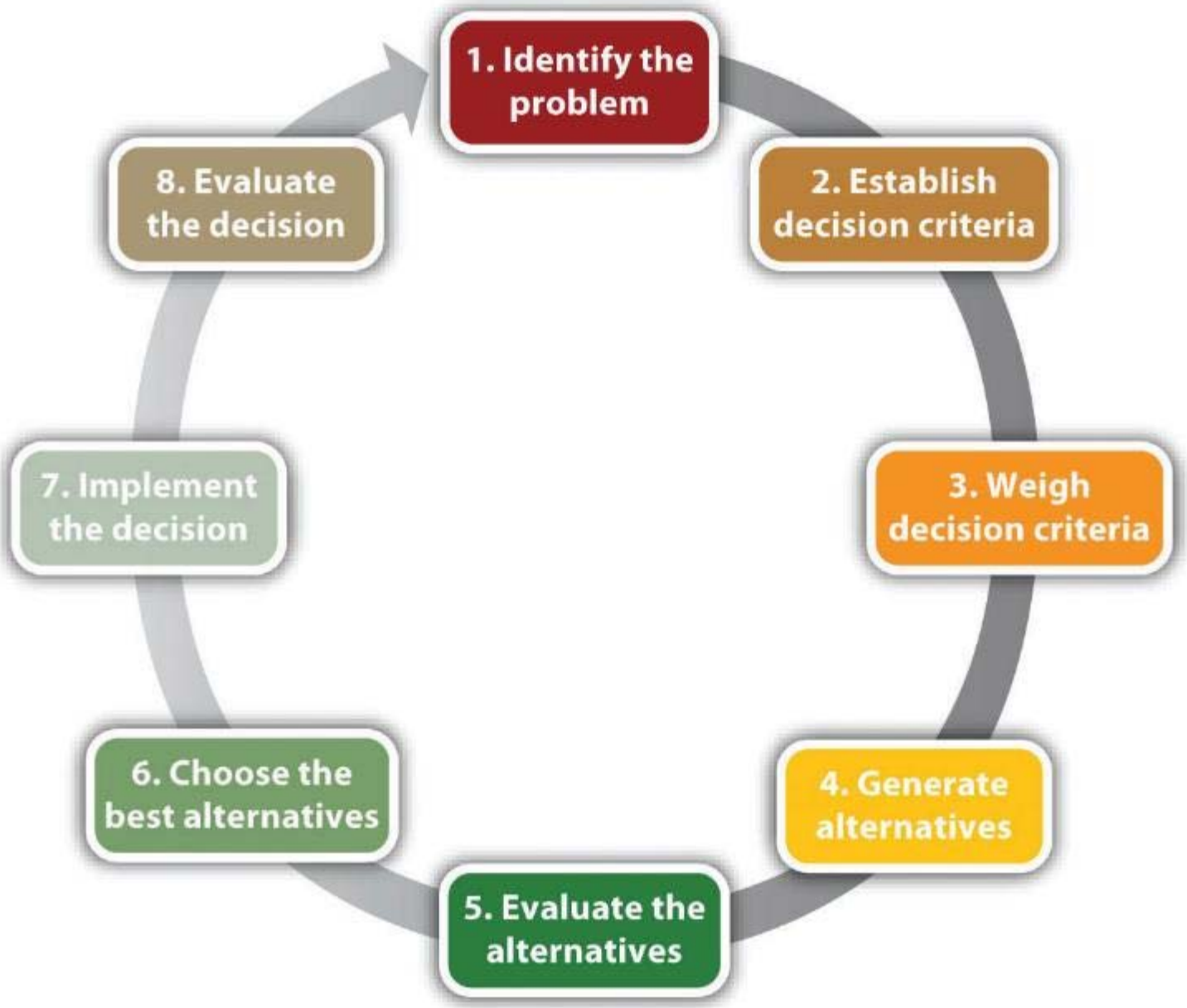
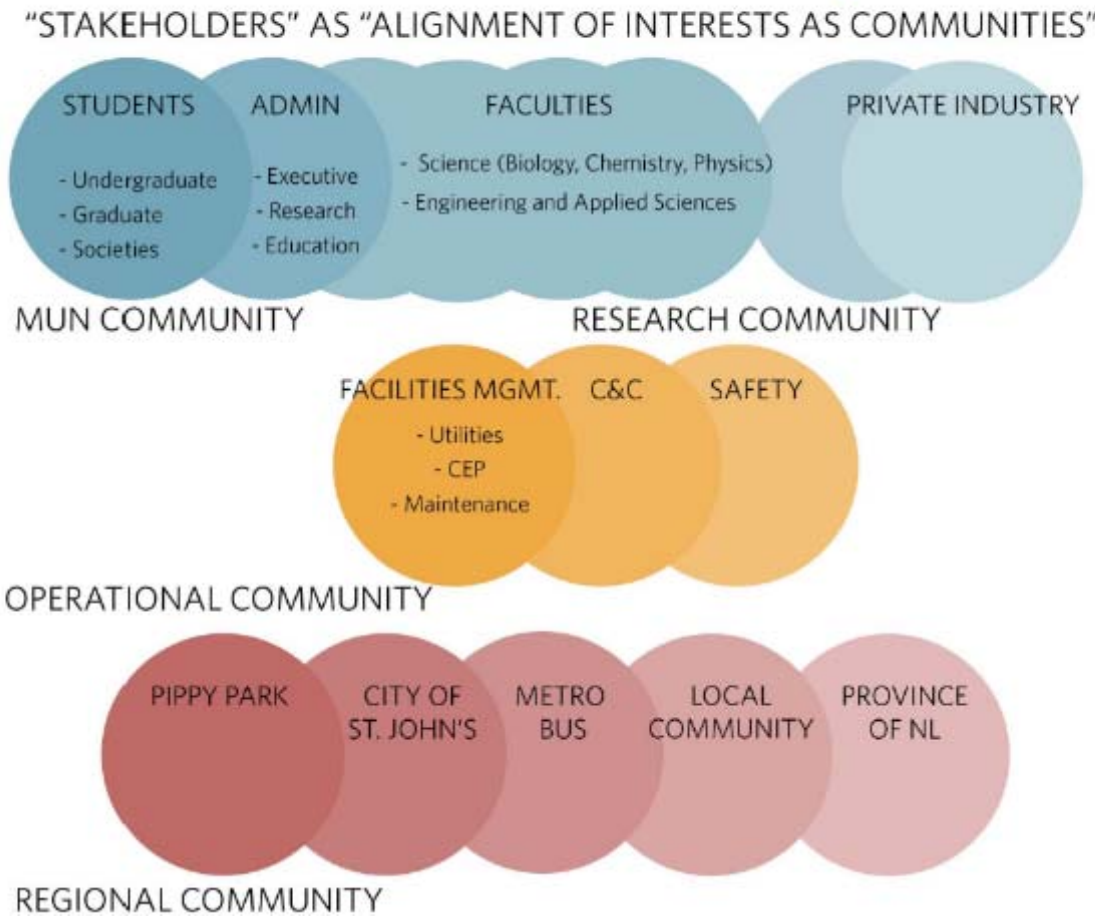
Specific strategies which can be used by laboratory delivery project teams in order to bring alignment around laboratory design principles.

- Meetings / Workshops
  - (Consider Separate Meeting Streams for Management, Consultant, Technical, and **Biosafety/Facility Management**)
- Steering Committee Sessions, IDP Sessions, & **User Group / Science Stakeholder** Sessions
- Site Reviews / Assessments
- Reports
- Emails
- Drawing Packages & Specifications


1. Identify the problem
2. Establish decision criteria
3. Weigh decision criteria
4. Generate alternatives
5. Evaluate the alternatives
6. Choose the best alternatives
7. Implement the decision
8. Evaluate the decision

Approach & Specific Strategies

STAKEHOLDERS: ALIGNMENT/FOCUS



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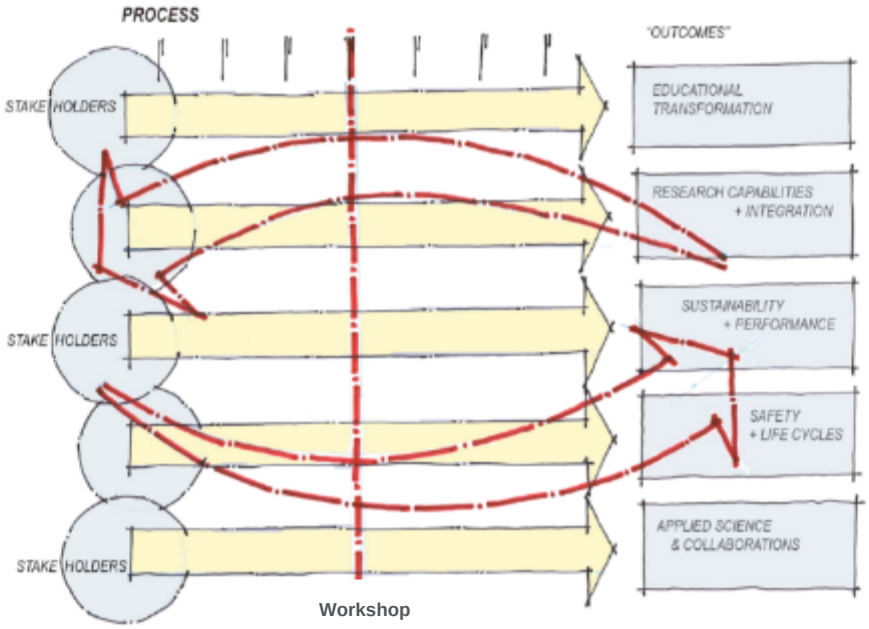
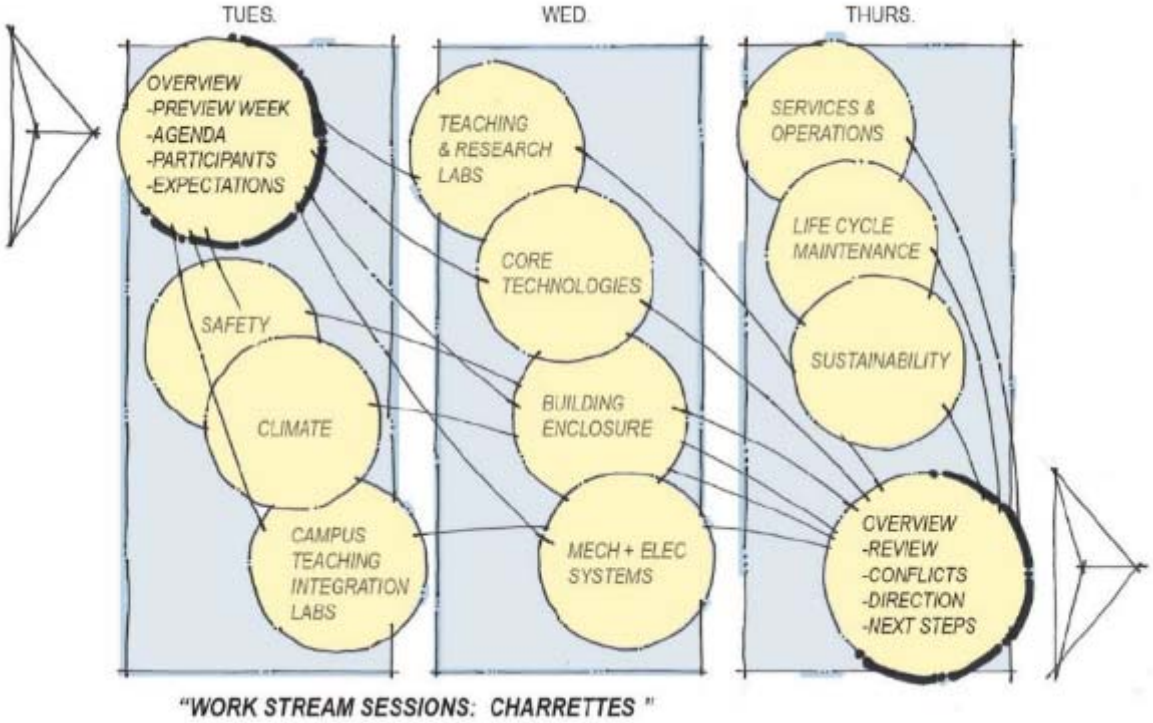
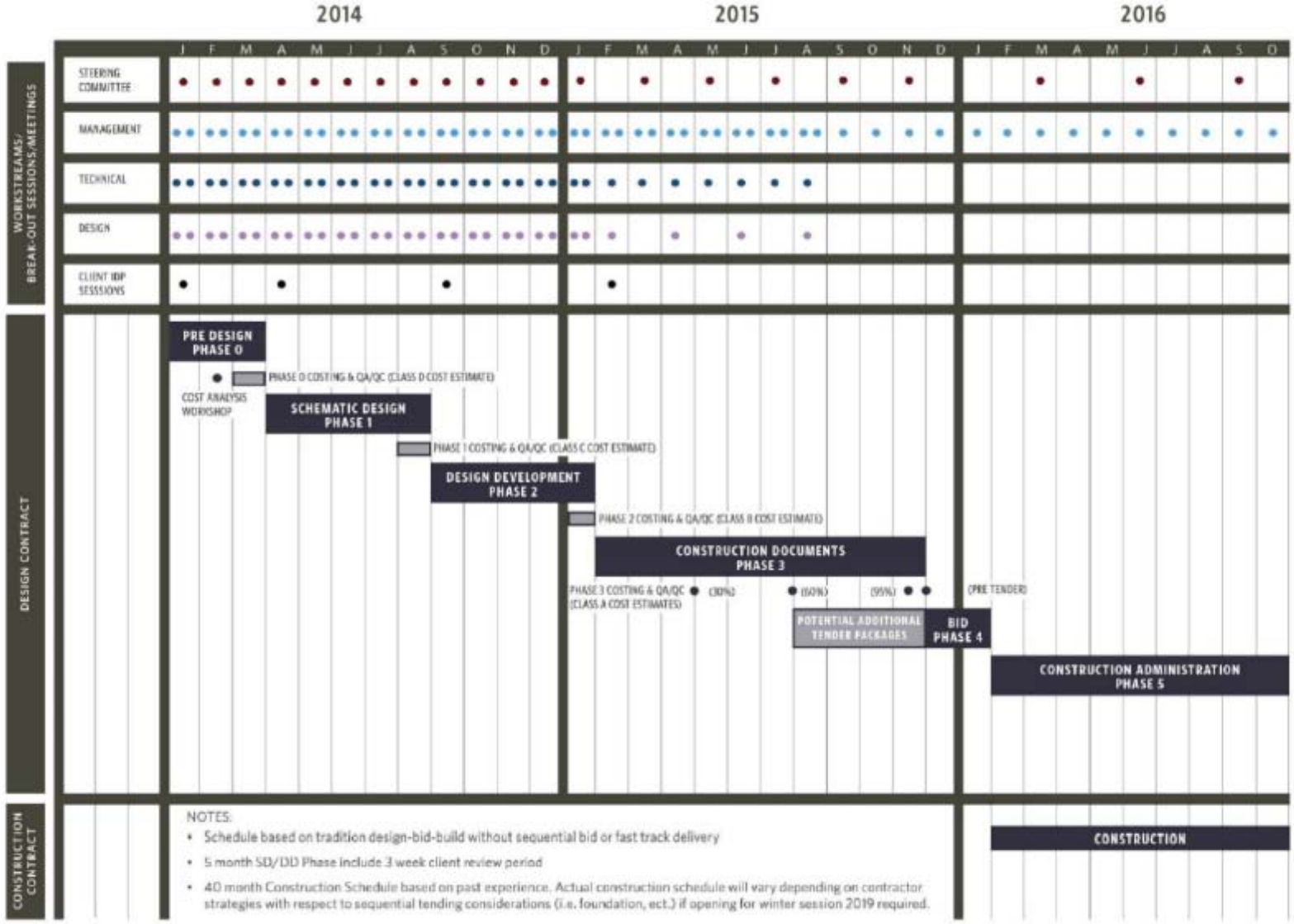
Approach & Specific Strategies





Approach & Specific Strategies



Approach & Specific Strategies

LOOK AHEAD SCHEDULE - SAMPLE

	Mon	Tues	Wed	Thurs	Fri
January			1	2	3
	6	7	8	9	10
	13	14	15	16	17
	20	21	22	23	24
	27	28	29	30	31
February	3	4	5	6	7
	10	11	12	13	14
	17	18	19	20	21
	24	25	26	27	28
March	3	4	5	6	7
	10	11	12	13	14
	17	18	19	20	21
	24	25	26	27	28
	31				
April		1	2	3	4
	7	8	9	10	11
	14	15	16	17	18
	21	22	23	24	25
	28	29	30		

- Steering Committee Meeting
- Management Meeting
- Presentation/Deliverable
- Consultant Meeting
- MUN Technical Meeting
- User Design Meeting
- Holiday
- IDP

Approach & Specific Strategies

COMMUNICATION ELEMENT / EVENT / GOAL	STAKEHOLDERS INVOLVED	FREQUENCY	TOOLS & TECHNIQUES	OUTCOME & BENEFIT
Design Start-Up Meeting	PWGSC, AANDC, Consultants, User Reps.	1 time	• Integrated and In person • Electronic minutes • WBS, Schedule, RAM	• Scope, schedule, and communication alignment between team members
Integrated Design Process Meetings	PWGSC, AANDC, Consultants, User Reps.		• IDP Workshops • Community Town Hall Meetings • Animated fly-throughs	• Design Concepts • System Concepts • Community Impact • Team Alignment
Updated Functional Program	All	1 time	• Digital files, room data sheets, system design criteria, etc – as per RFP	• Coordinated approach to functional and technical project requirements
Bi-Weekly Project Management Meetings & Risk Assessment Sessions	PWGSC, AANDC, Consultant PMs	Biweekly	• In person, or via Webex & Teleconference • 6-8 week look ahead schedules & electronic minutes	• Tracked decisions • Schedule monitoring
Community Consultation Sessions in Cambridge Bay	PWGSC, AANDC, Consultants, User Reps., Community Reps.	Up to 11 times, as per RFP	• Integrated and In person • Graphic and digital media presentations • Electronic minutes	• Community dialogue and understanding
Consultant Coordination Meetings	Consultants	Biweekly	• In person, or via Webex & Teleconference	• Tracked decisions • Schedule monitoring
Team Integration Tools	All	Continual	• Secure FTP Server for secure file and document transfer. • Use of PWGSC Buzzsaw site ensures staff and clients work from most recent published records. • In Office Video Conference Facilities: supporting both ISDN and IP and up to four simultaneous parties • WebEX: Web based worldwide meetings & conferencing • Smart Phones: Staff are in touch with clients and each other worldwide via Smart Phone services	

COMMUNICATION ELEMENT / EVENT / GOAL	STAKEHOLDERS INVOLVED	FREQUENCY	TOOLS & TECHNIQUES	OUTCOME & BENEFIT
User Group Sessions	PWGSC, AANDC, Consultants, User Representatives	At key intervals during design phase	• In person, or via Webex & Teleconference	• Tracked decisions • Data and process input into design
Cost Management Sessions	PWGSC, AANDC, Consultant PMs, Consultant Team	At key intervals during design phase, as req'd	• In person, or via Webex & Teleconference	• Tracked decisions • Updated Cost Plans and bid targets
Special Presentations	Team members, as required	As per Project Workplan and RFP	• In person, and via Webex & Teleconference • Graphic and digital presentations • Electronic minutes	• Team dialogue and understanding
Major Milestone Submissions	All	As per Project Workplan and RFP	• In person, and via Webex & Teleconference • Graphic and digital presentations • Electronic minutes	• Team dialogue and understanding
QA / QC Comment Tracking Documentation	PWGSC, AANDC, Consultants, User Representatives	As per Project Workplan and RFP	• Digital Comment Tracking Documents	• Clear QA/QC input tracking, and follow up
Site Review Meetings	PWGSC, AANDC, Consultant Reps., Resident Site Reps.	At key intervals during design phase, as req'd	• In person, and via Webex & Teleconference	• Tracked decisions and dialogue
Contract Administration Data Flow	PWGSC, AANDC, Consultant Representatives, Resident Site Reps.		• Online Contract Administration Software permits staff and clients to access our data worldwide. • Clear and concise change documentation	

**This framework provides a sample of the communication strategy and will be expanded in the Phase 2 Submission. It will be reviewed at the project start up meeting and further refined to reflect PWGSC requirements.*

Roles

Decision Makers

Conceptual Thinkers

Critical Calculators

Synthesizers

Measurers

Quality Assurance / Quality Control

Peer Review

Constructors

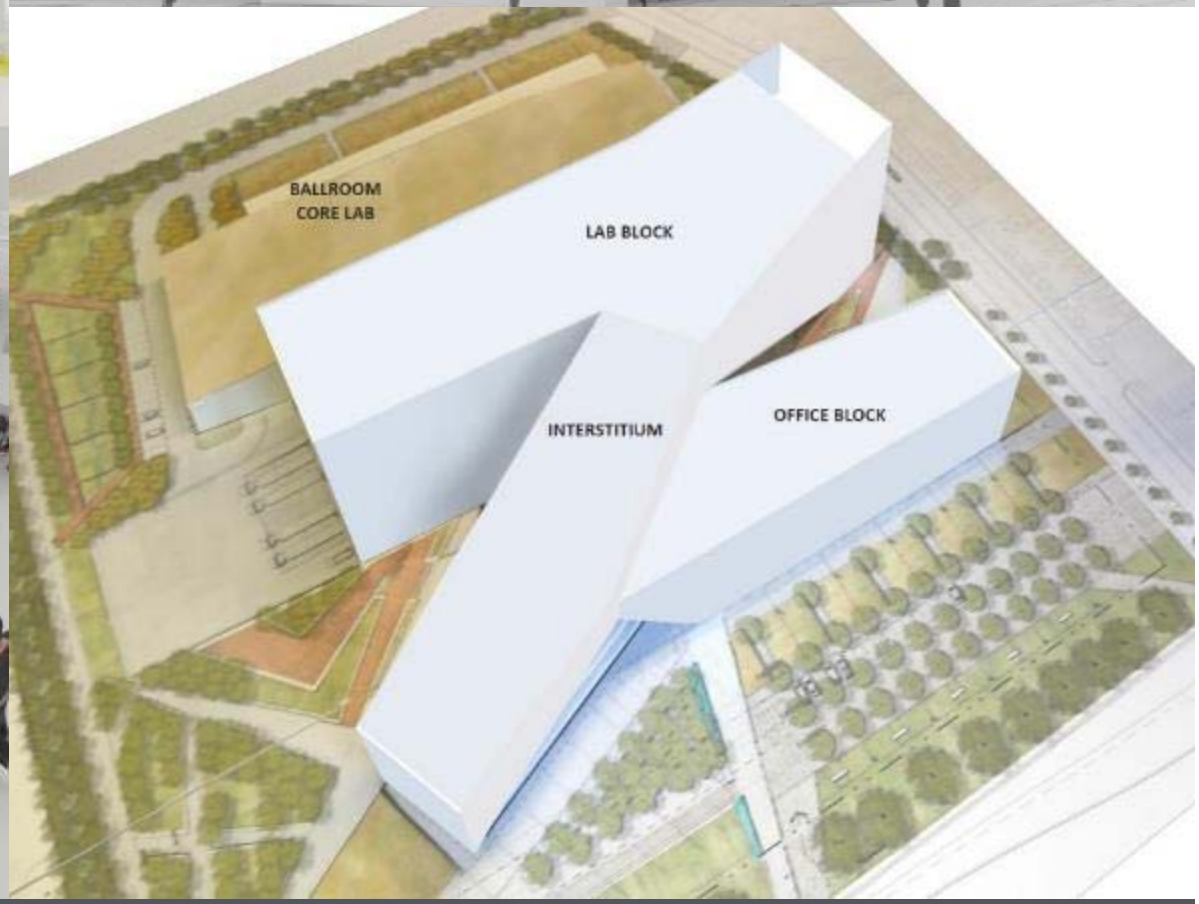
Approach & Specific Strategies

Often, projects focused on assessment of alternatives will involve two or more of these documents.

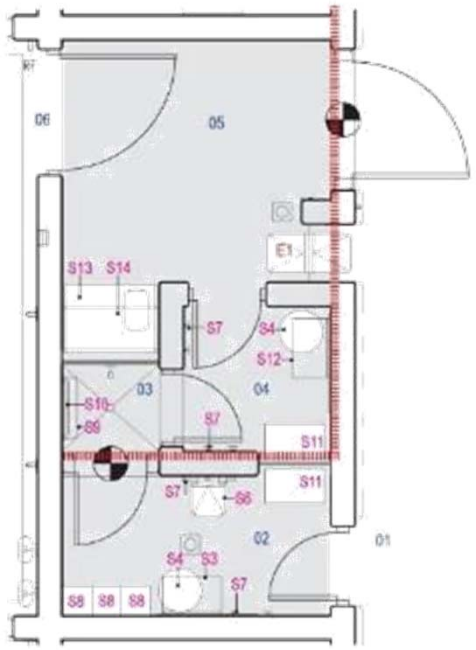
- Feasibility Assessment
- Building Condition Analysis
- Fundraising Document
- Master Plan
- Life Cycle Cost Analysis
- Risk Analysis Report
- Functional Programming Report
- Phasing Implementation Plan
- Options Analysis Report

LCW
HIpHW


PETRONAS REL
Total Electricity Consumption
39,887
Carbon
Laptops

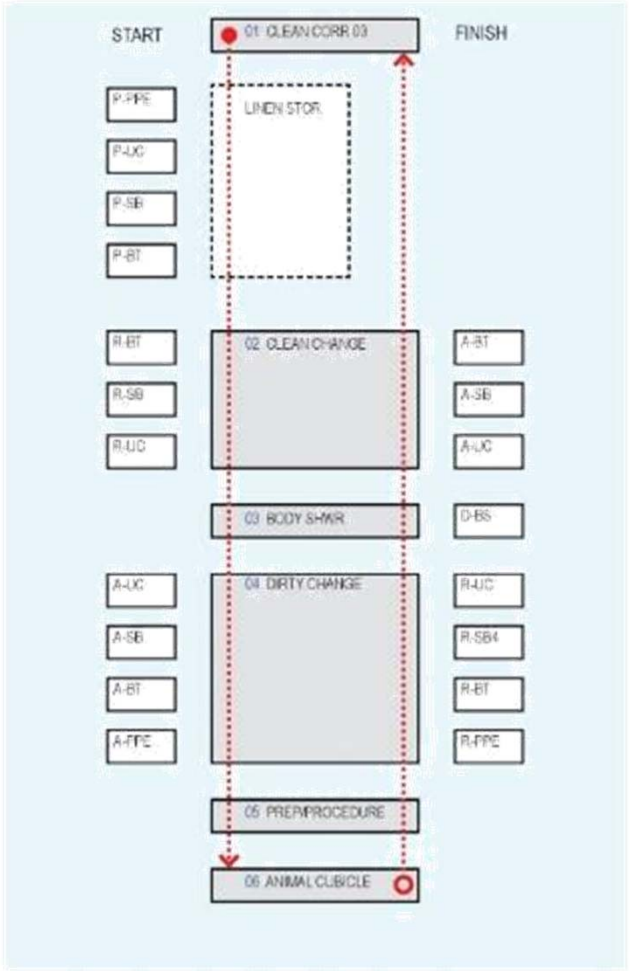

BALLROOM
CORE LAB
LAB BLOCK
INTERSTITIUM
OFFICE BLOCK

Protocol Mapping



KEY

01	CLEAN CORRIDOR	S6	FLIP DOWN SEAT
02	CLEAN CHANGE RM.	S7	WALL HOOKS
03	SHOWER RM.	S8	LOCKERS (3 TEIR)
04	DIRTY CHANGE RM.	S9	EPOXY SHELF
05	PREP/PROCEDURE RM.	S10	GRAB BAR
06	ANIMAL CUBICLE	S11	SS WIRE BOOT SHELF
E1	DUNK TANK	S12	PPE STORAGE
S3	CLEAN LINEN STORAGE	S13	SS BENCH/INTEGRAL SS SINK
S4	DIRTY LINEN HAMPER	S14	SS UPPER CABINET WITH DOORS
S5	SS SINK/VANITY		CONTAINMENT BARRIER



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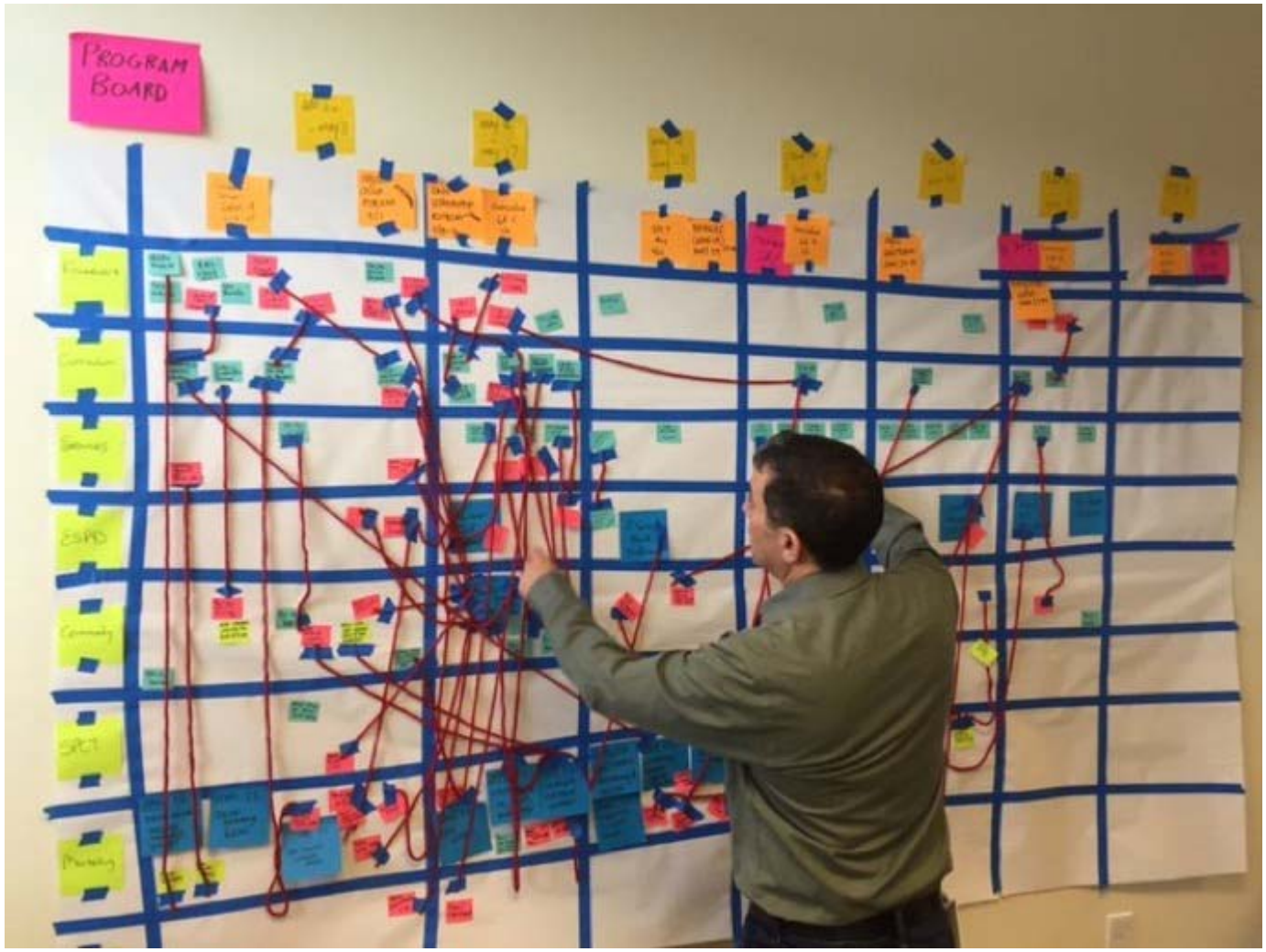
Early Design Phase

- Meeting Minutes
- Decision Logs
- Site Evaluations (Environmental)
- Functional Programs
- Regulatory Analysis
- Outline Specifications
- Relationship Diagrams
- Commissioning Process Plans
- Cost Estimates

Late Design Phase / Construction

- Detailed Drawing Review
- Construction Specifications
- Full Building Schematics
- As Built Documentation
- Record Drawings
- Commissioning Reports
- Measurement & Verification Studies



Requirements & Planning For:

Material Handling

Waste Stream Management

Sample Storage

Sample Flows

Media Preparation

Glasswash Procedures

Security & Biosecurity

Safety & Biosafety

Centralized or Decentralized?

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*SOME TECH - ENGINEERED SYSTEMS

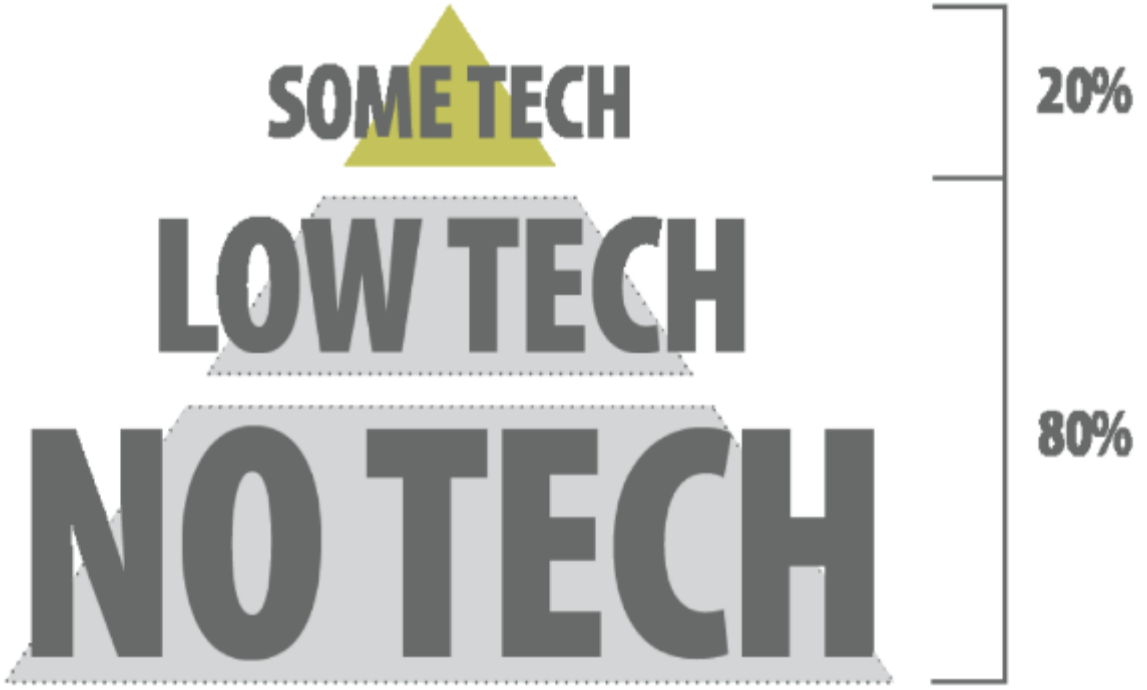
- Heating and Cooling Equipment
- Lighting Equipment

LOW TECH - PASSIVE SYSTEMS

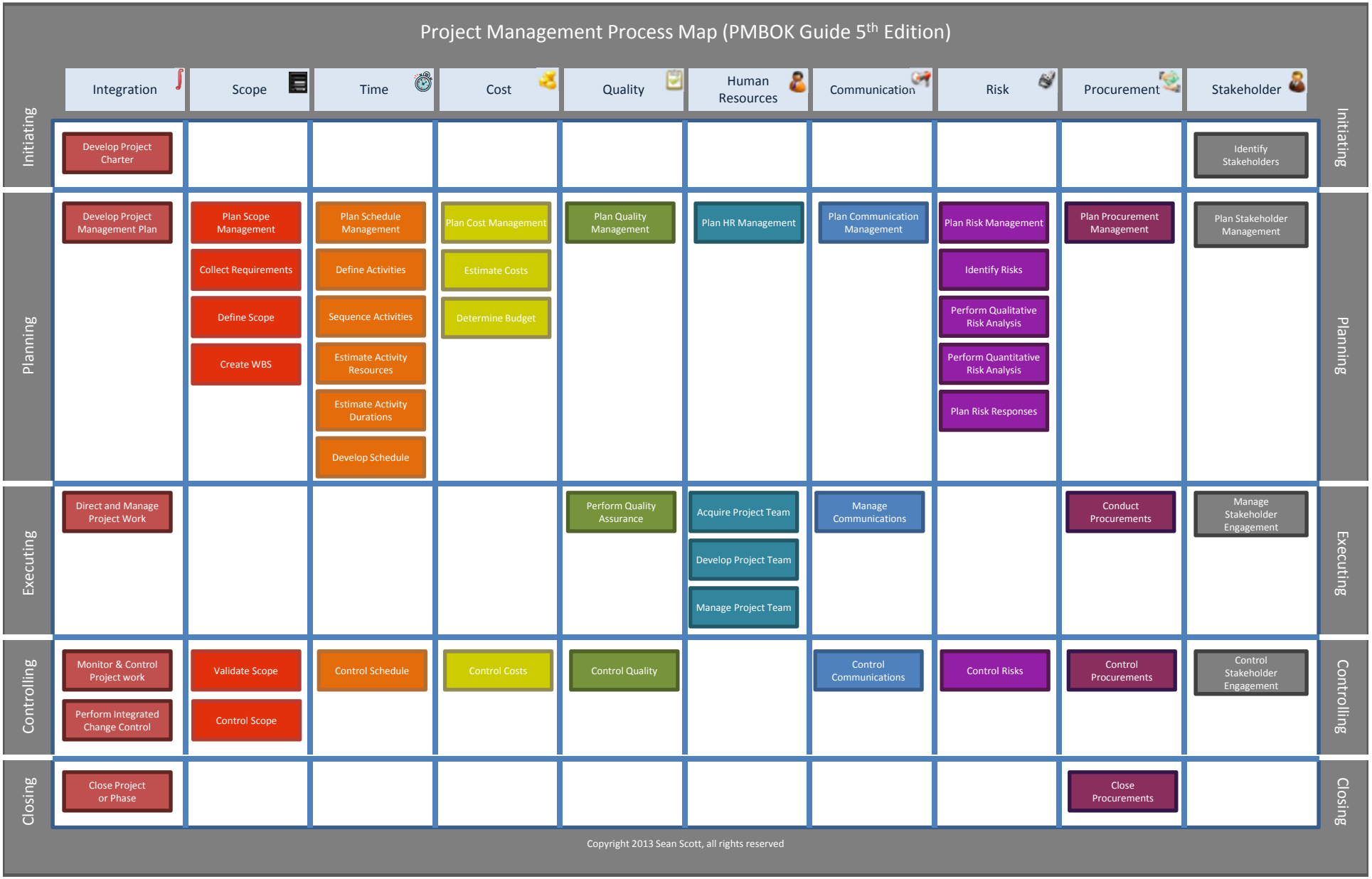
- If you need energy, maximize what is available; wind and sunlight
- Building Orientation

NO TECH - LOAD AVOIDANCE

- Minimize Mechanical Engineering
- Minimize Electrical Engineering



Project Management Process Map (PMBOK Guide 5th Edition)



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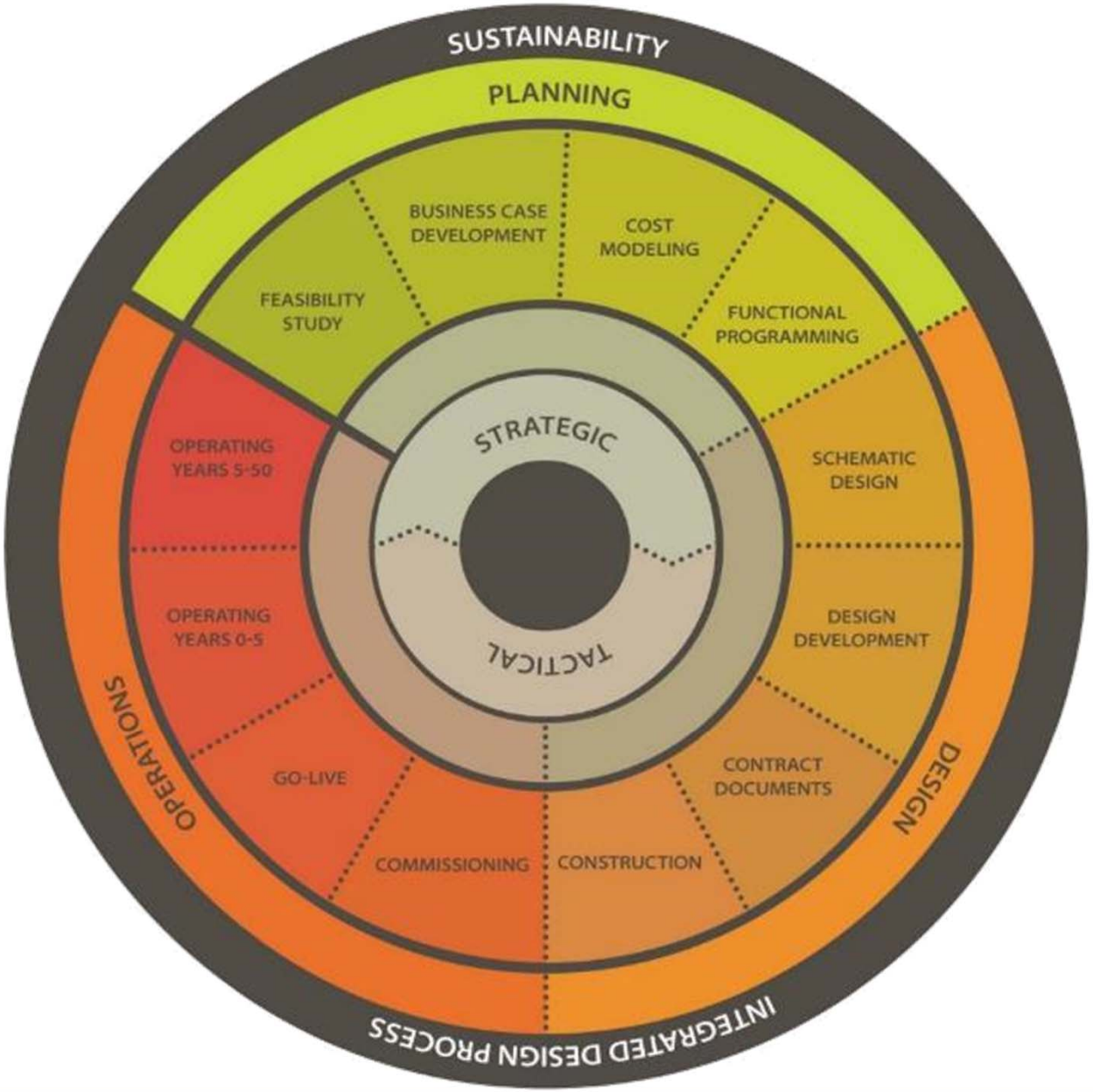

SUSTAINABILITY
PLANNING
BUSINESS CASE DEVELOPMENT
COST MODELING
FEASIBILITY STUDY
FUNCTIONAL PROGRAMMING
STRATEGIC
SCHEMATIC DESIGN
OPERATING YEARS 5-50
OPERATING YEARS 0-5
DESIGN DEVELOPMENT
TACTICAL
GO-LIVE
CONTRACT DOCUMENTS
COMMISSIONING
CONSTRUCTION
OPERATIONS
DESIGN
INTEGRATED DESIGN PROCESS

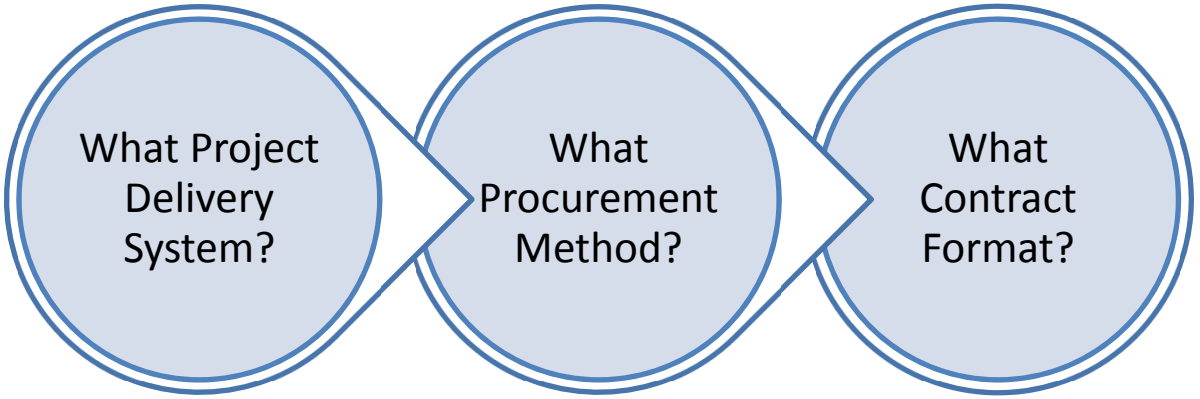
Construction Phase Communication Considerations

Project delivery models and construction phase communication techniques which will ensure alignment between project stakeholders and increase the likelihood of meeting project targets.

- Don’t Forget About the End Users!
- Contractor and Consultant Look-Ahead Schedules
- Shop Drawing Scheduling
- Regular Site Walk Throughs
- Move Management / Decanting for Complex Projects
- Laboratory Equipment Initialization & Validation (Site Acceptance Testing)
- Commissioning & Re-Commissioning
- Operations & Maintenance Manuals

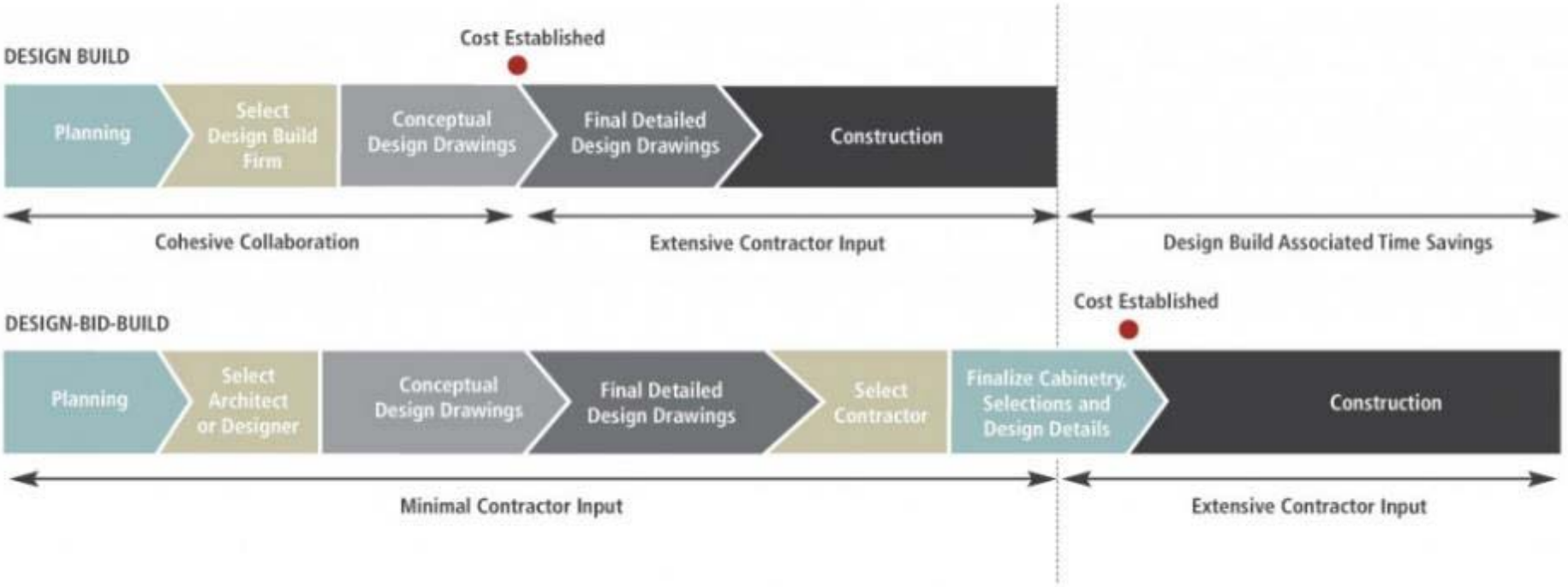
Construction Phase Communication Considerations

Construction Phase Communication Considerations

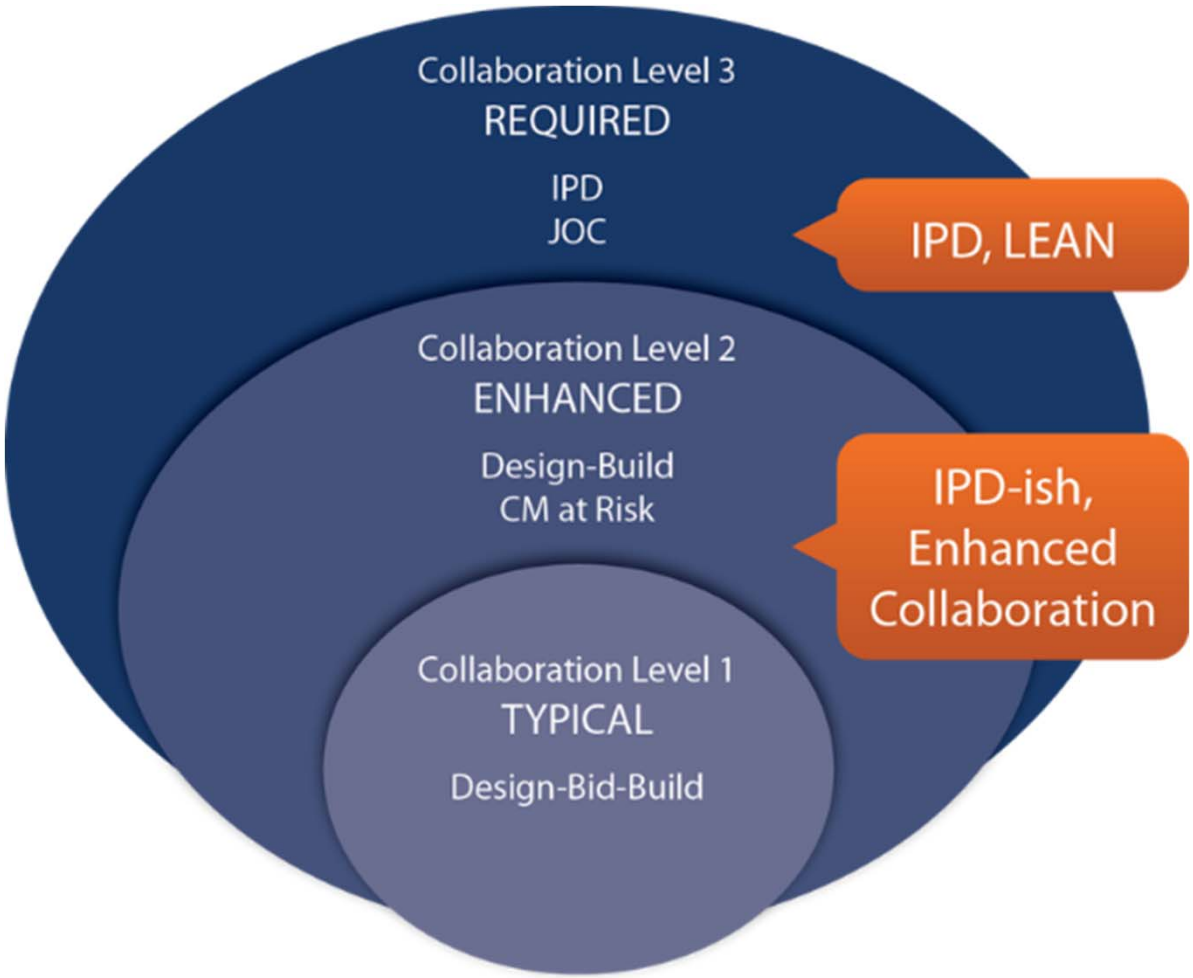


Project Delivery Systems	Procurement Methods	Contract Formats
• Construction Management at Risk (CMR) also known as CM/GC • Design-Bid-Build (DBB) • Design-Build (DB)	• Best Value (BVS) • Low Bid • Negotiated • Qualifications-Based • Sole Source (or Direct Select)	• Cost Plus Fee • Guaranteed Maximum Price (GMP) • Lump Sum (or Fixed Fee) • Target Price • Unit Price

Construction Phase Communication Considerations



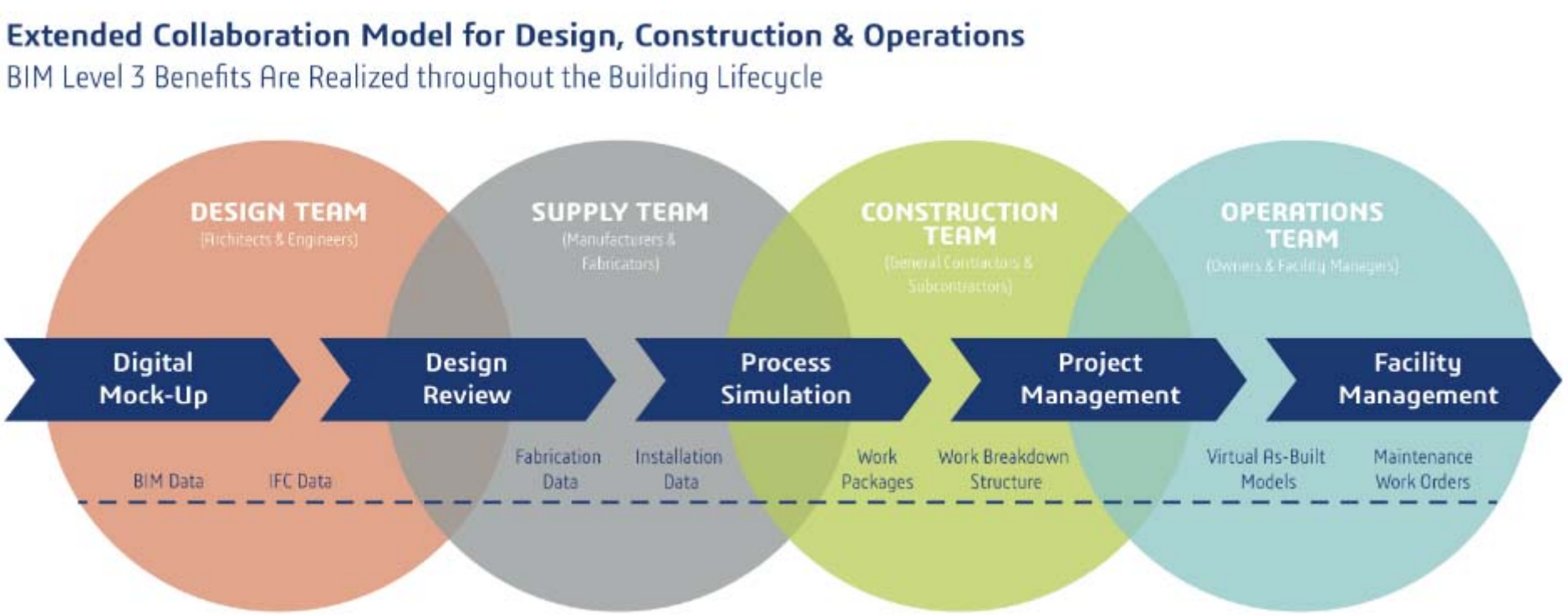
Construction Phase Communication Considerations



Efficient project delivery methods such as Integrated Project Delivery – IPD for major new construction, and Job Order Contracting – JOC for renovation, repair, sustainability, and minor new construction, among others, are proven and have been practiced effectively for decades.

Both construction delivery methods drive collaboration and transparency (the two keys to productivity improvement), leverage well defined best management practices and processes, and have supporting technology is readily available.

Construction Phase Communication Considerations



Summary

1. Communication Planning is Key. Consider Separate Meeting Streams for Management, Consultant, Technical/Biosafety/FM
2. Early and Continued Involvement of Senior Decision Makers
3. Work Backwards from Regulatory Requirements to Ensure Compliance
4. Adoption of Low Tech and High Tech Solutions in Project Delivery
5. Exploration of Alternative Construction Delivery Models


The simple act of paying positive attention to people has a great deal to do with productivity.
Tom Peters
quotefancy

Thank You

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