Construction on Tribal Lands

NTICC - 2022

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- Discussion
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Background

- Arviso Construction – Project Manager
- B.S. in Construction Management, 2008 - ASU
- M.S. in Construction Management, 2016 - ASU
- PhD in Construction Management, 2022 - ASU
- 14 Years Experience – Commercial Construction
- Construction In Indian Country – Vice President
- The Blossom Shop - Owner

Introduction

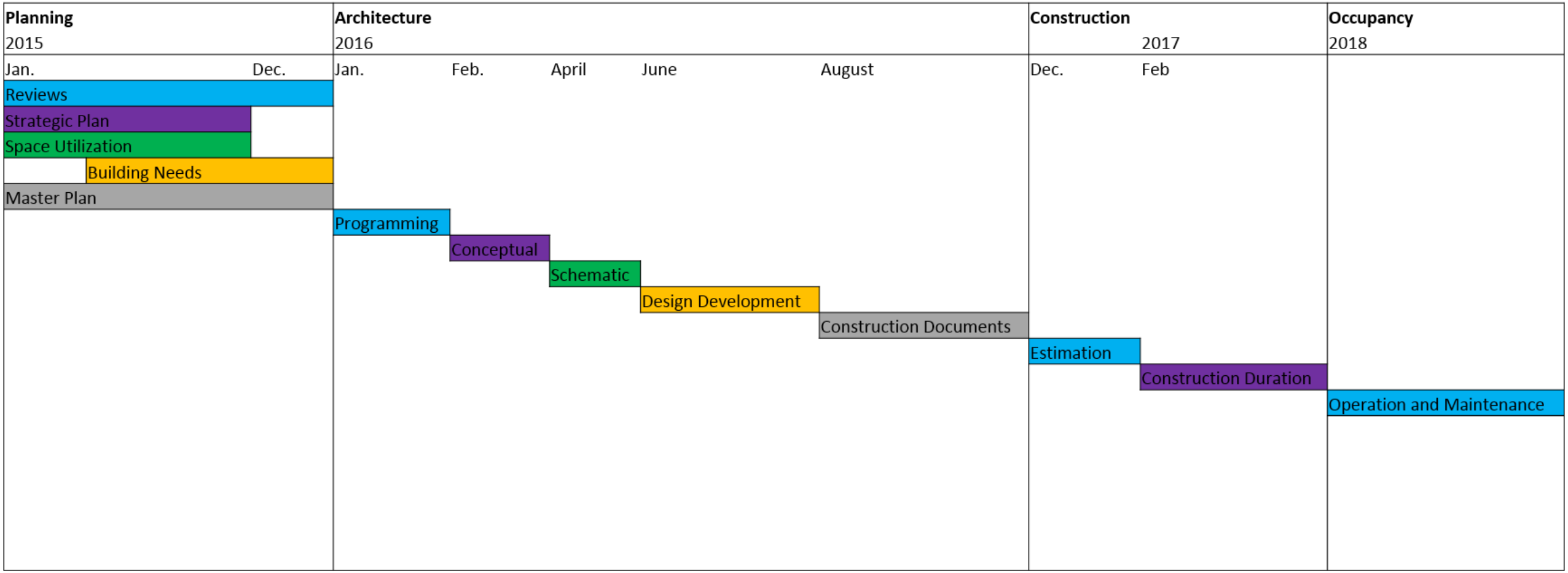
- Tribes are **Sovereign**
- Cultural/Traditional Protocols
- Unique Legal & Cultural Aspects
- Increasing Complexity – Innovative Ideas

“Sovereignty is a nation’s power to self-govern, to determine its own way of life, and to live that life – to whatever extent possible – free from interference” (Cobb, A.,2005)

Introduction

- Tribes are Sovereign
- Cultural/Traditional Protocols
- Unique Legal & Cultural Aspects
- Increasing Complexity – Innovative Ideas

Construction Timeline



Unique Features

Research - Interviews

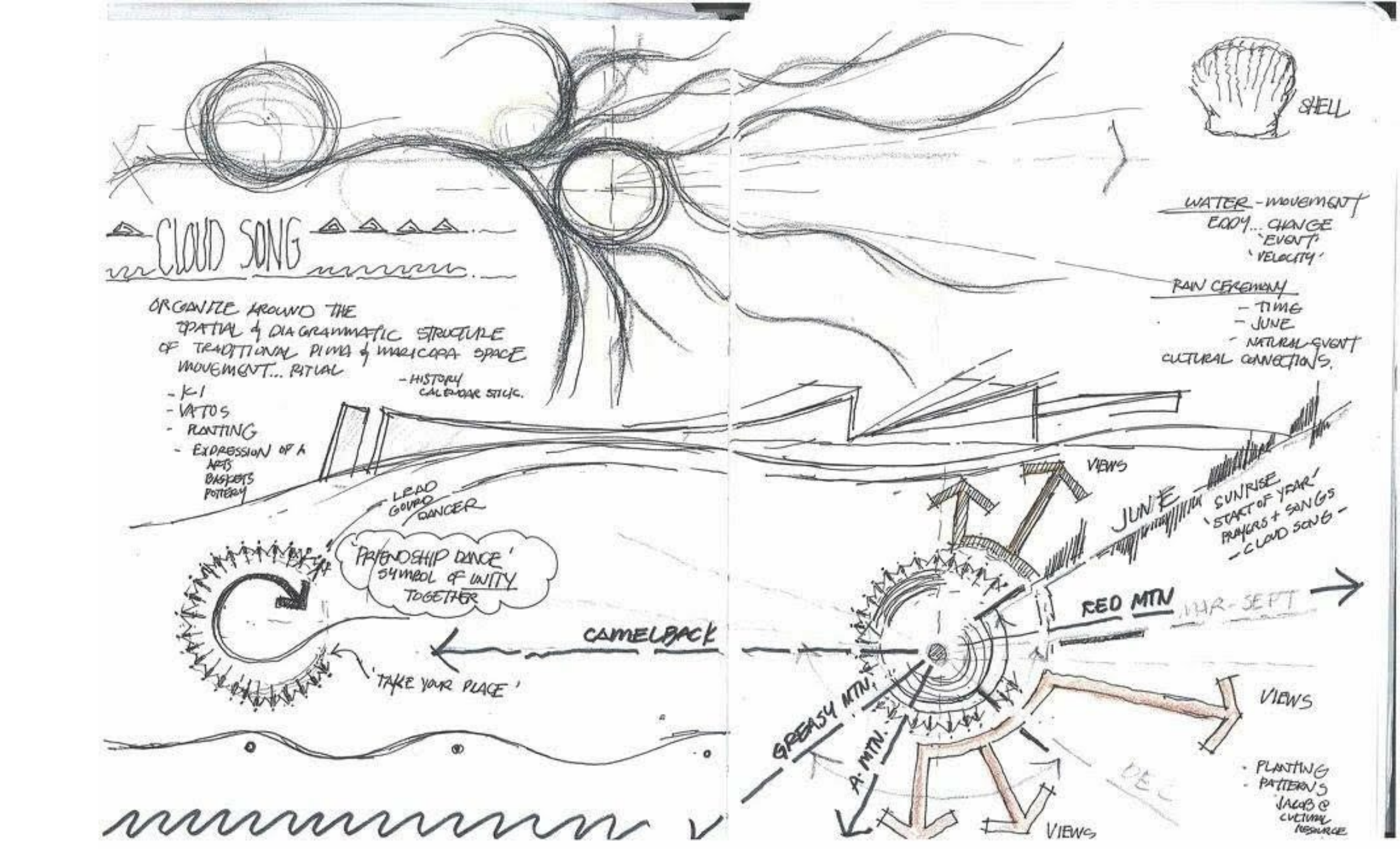
- 22 Industry Professionals
  - Owner's Representative
  - Master Planner
  - Architect
  - Contractor
- Interview 20-40 minutes (11 questions)
  - *"Identify the ten most unique factors, when working with Indigenous Communities"*
- Core Themes
- Results – 10 most unique features which appear to be biggest challenges

	Features	Owner's Rep	Planners	Architect	Contractors	Total # of Responses
1.	Historical & Cultural Understanding	3	2	8	7	20
2.	Best Practices, Approach, & Process	3	1	6	6	16
3.	Regulations, Building Codes, & Regulatory Framework	4	2	3	6	15
4.	Decision Making	1	2	5	3	11
5.	Capacity Building	2	--	4	5	11
6.	Infrastructure	2	--	4	4	10
7.	Contextual Response	2	1	3	4	10
8.	Legal	3	1	1	4	10
9.	Financial/Economic Development	3	1	2	2	8
10	Scheduling	1	--	1	1	3

Historical & Cultural Understanding

- Understanding:
  - Federal recognition as sovereign entities
  - Traditional ways of life/Culture

- Why is this a Challenge?
  - Trust Development
  - Epistemology – Every Tribe is different
  - Language
  - Cultural Vision
  - Personality
  - Design


CLOUD SONG
ORGANIZE AROUND THE SPATIAL & DIAGRAMMATIC STRUCTURE OF TRADITIONAL PIMA & MARICOPA SPACE
MOVEMENT... RITUAL
- HISTORY CALENDAR STICK.
- KI
- VATOS
- PLANTING
- EXPRESSION OF A
ARTS
BASKETS
POTTERY
LEAD GOURD DANCER
'FRIENDSHIP DANCE' SYMBOL OF UNITY TOGETHER
'TAKE YOUR PLACE'
CAMELBACK
SHELL
WATER - MOVEMENT
EDDY... CHANGE
'EVENT'
'VELOCITY'
RAIN CEREMONY
- TIME
- JUNE
- NATURAL EVENT
CULTURAL CONNECTIONS.
VIEWS
JUNE
'SUNRISE
'START OF YEAR'
PRAYERS + SONGS
- CLOUD SONG -
RED MTN
MAR - SEPT
GREASY MTN.
A. MTN.
VIEWS
VIEWS
- PLANTING
- PATTERNS
JACOB @ CULTURAL RESOURCE


DISTRICT 2 ELDER CENTER

Best Practices, Approach, & Process

- Means and Methods
  - Tailored Approach
- Why is this a Challenge?
  - Unique Needs
  - Requires Listening
  - Community-based
  - Longer Process

Regulations, Building Codes, & Regulatory Framework

- Standards and ordinances governed by the authority having jurisdiction, which includes tribal, state, and federal.
  - Tribal Entities (BIA, IHS, Tribal Utility Authority, Highway Department)

- Why is this a Challenge?
  - Multiple Jurisdictions
  - Preference Laws
  - Red Tape

Decision Making

- Stakeholders
- Process of Making Decisions

- Why is this a Challenge?
  - Change in Leadership
  - Bureaucracy
  - Qualifications
  - Long Process

Capacity Building

- Resources
  - Skills
  - Knowledge
  - Education
  - Qualifications
- Why is this a Challenge?
  - Lack of Understanding Construction
  - Qualified Local Workforce
  - Qualified Subcontractors

Now that we know these challenges, how can we address them?

Discussion

Promote communication between all parties involved in a culturally-responsive way.

Deliver a project that meets the tribe’s needs.

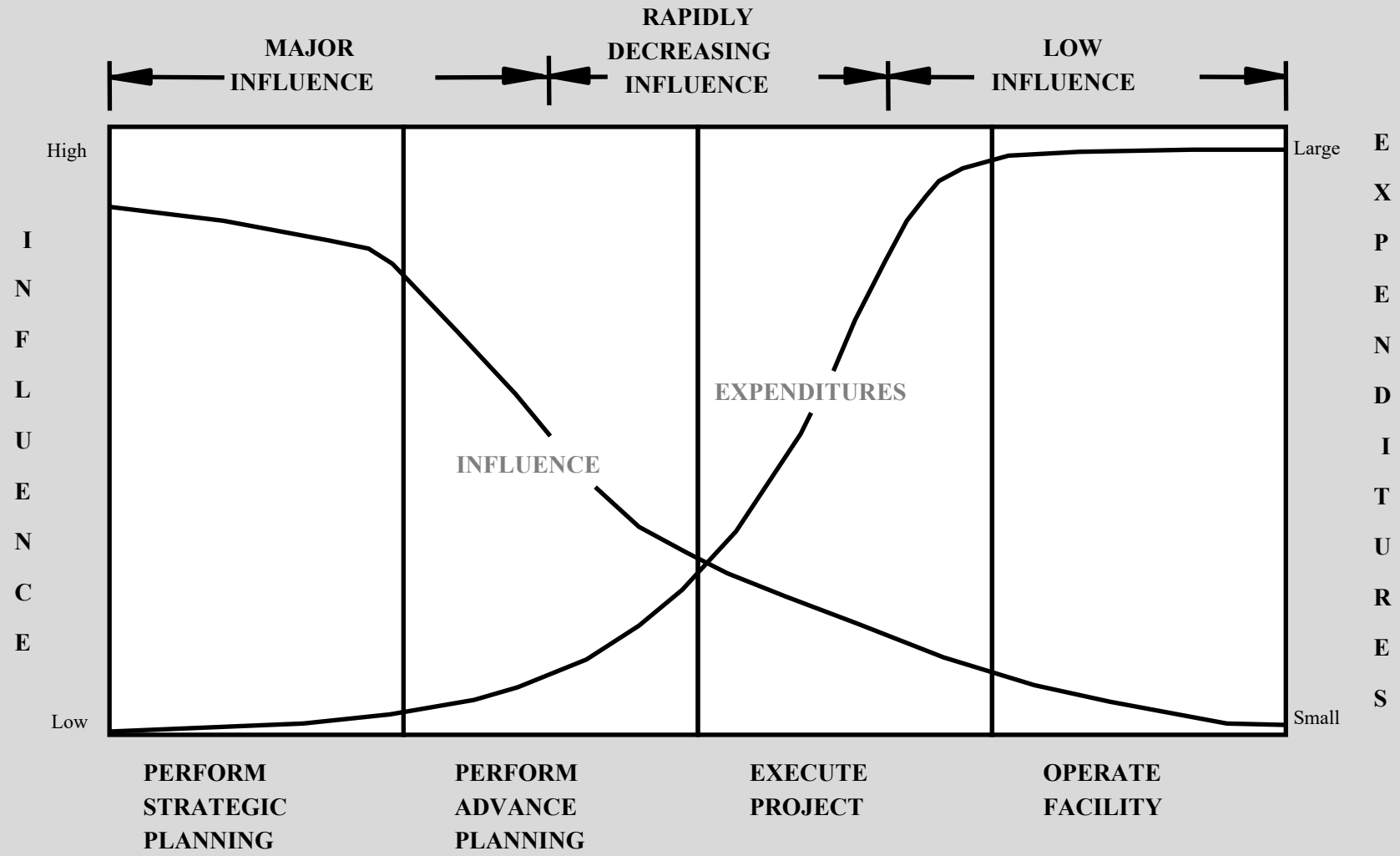
Educate all parties about the standard and non-standard processes.

Goal: Successful Project!

Success is looked at in terms of Cost, Schedule, and Operating Performance

The greatest ability to influence cost is in advance (Pre-Project) Planning

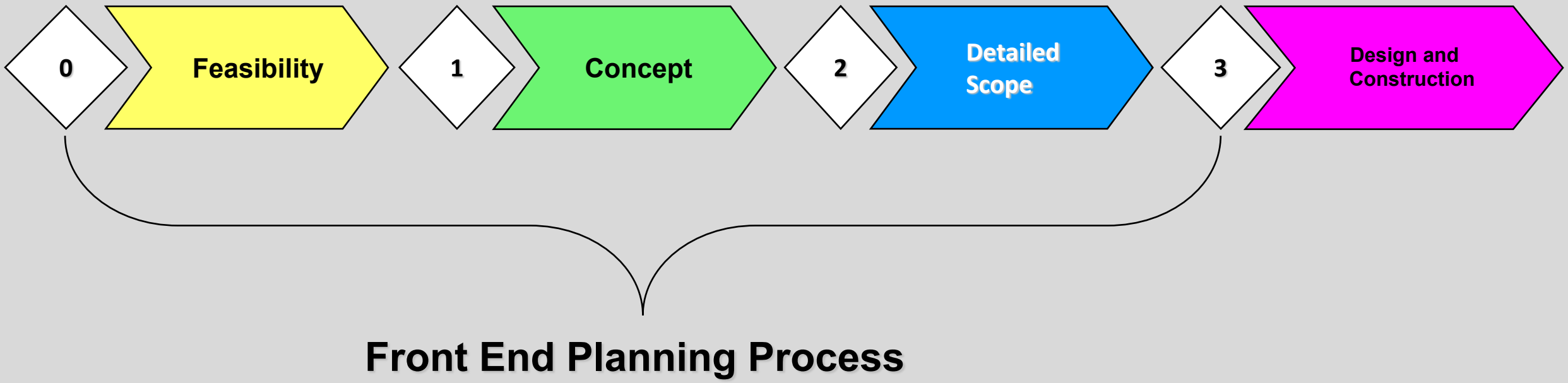
Influence and Expenditures Curve



Pre-Project Planning

- The process that occurs after a project idea has been established and before the project reaches the detailed design and construction phase.
- Construction Industry Institute (CII) defines pre-project planning as the process of developing sufficient strategic information with which owners can address risk and decide to commit resources to maximize the chance for a successful project.
- Owner-Driven

Front End Planning



Project Definition Rating Index

PDRI – The Definition

An Acronym	Project Definition Rating Index
An Index	Score along a continuum representing the level of scope definition
A Risk Management Tool	Identifies and measures risks related to project scope definition

Tools have been developed by CII and widely used for industrial, building, and infrastructure projects during front end planning phase: Project Definition Rating Index (PDRI)

Objective:

- Greater advance planning efforts = greater project success
  - Lower cost variance
  - Less schedule slippage
  - Fewer change orders

Construction Industry Institute (CII)

- CII, based at The University of Texas at Austin, is a consortium of more than 140 leading owner, engineering-contractor, and supplier firms from both the public and private arenas.
- These organizations have joined together to enhance the business effectiveness and sustainability of the capital facility life cycle through CII research, related initiatives, and industry alliances.

PDRI – Tool Format

The crucial elements included in a scope o projects.

Composition:

- 3 sections
- 11 Categories
- 64 Elements

Section I: Basis of Project Decision

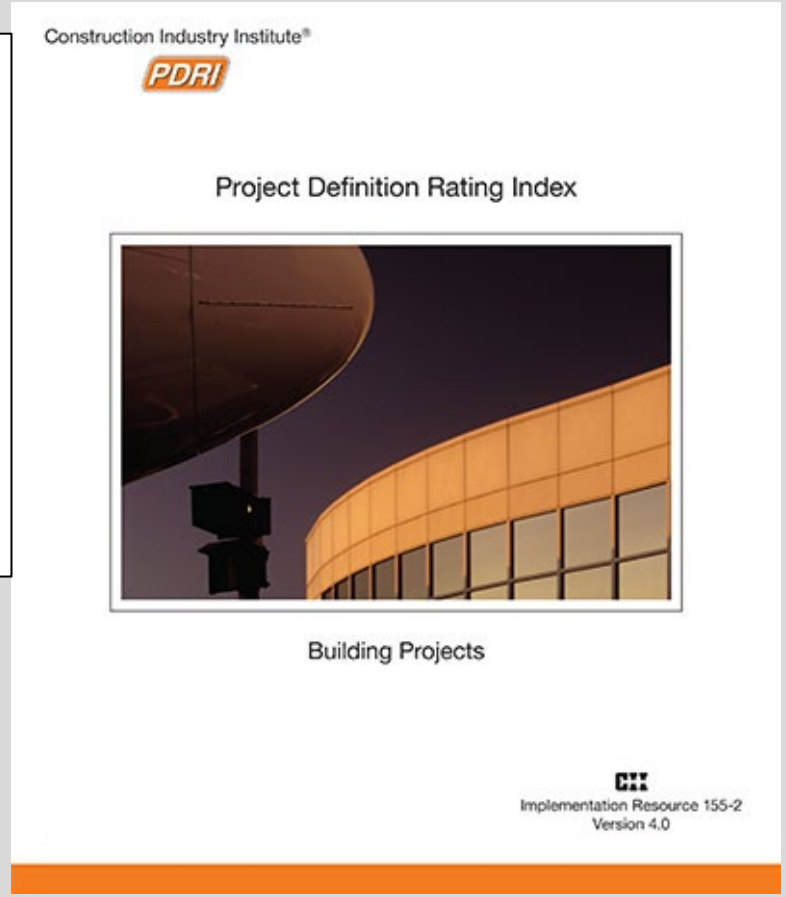
- Performing the “Right Project”

Section II: Basis of Design

- Scoping the “Right Things (Product)”

Section III: Execution Approach

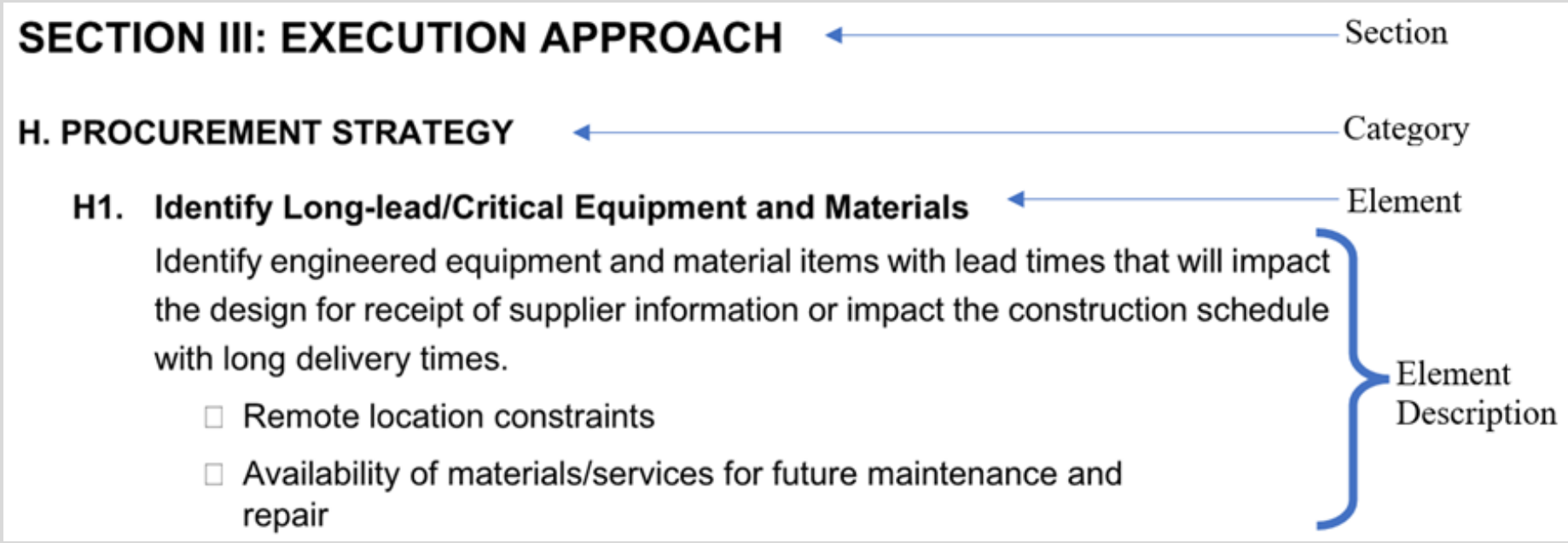
- Setting the stage for a successful “Execution Approach”



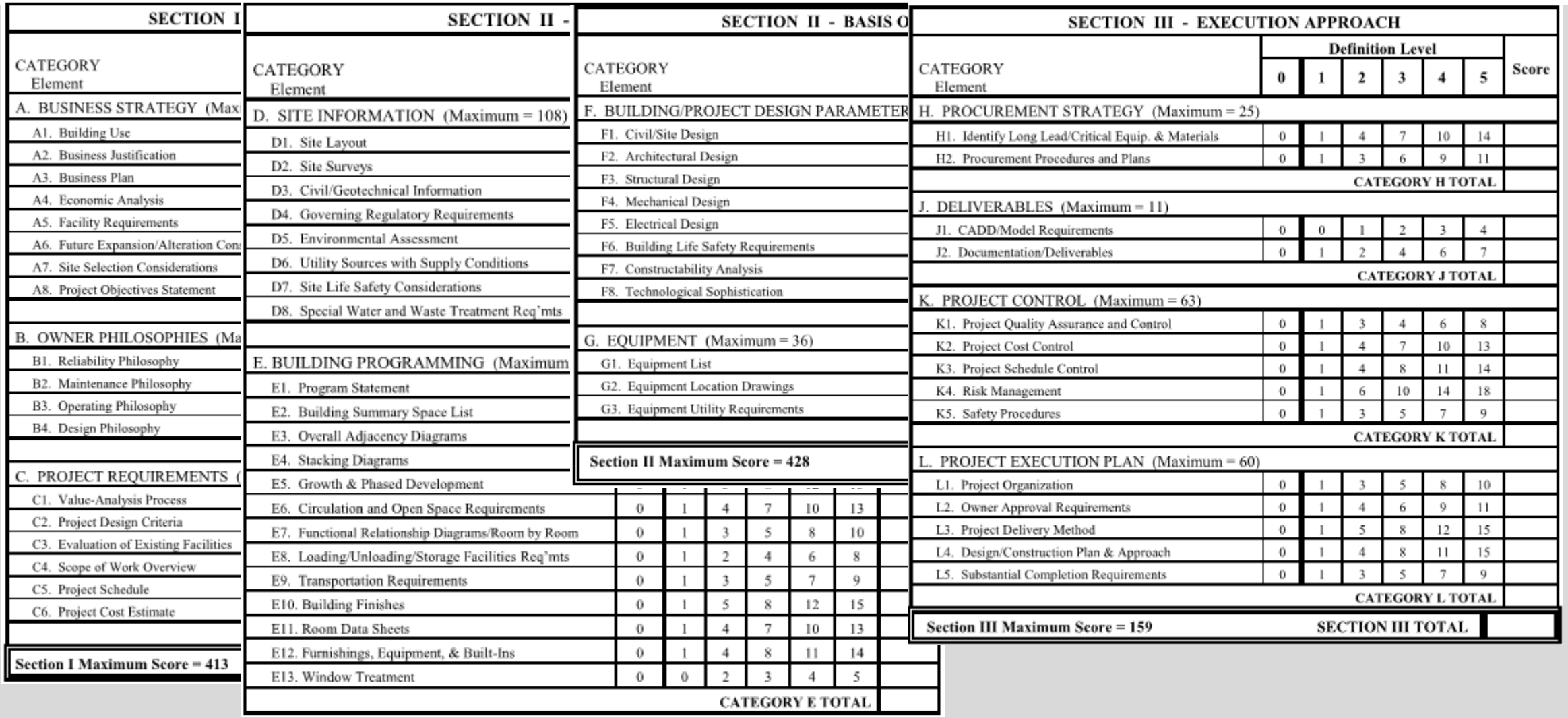
42 pages of detailed element descriptions

Rate each of the 64 elements to obtain a project score of up to 1000 points - - the lower the better.

PDRI – Building Projects: Structure



Weighted Score Sheet



SECTION I

CATEGORY / Element
A. BUSINESS STRATEGY (Max
A1. Building Use
A2. Business Justification
A3. Business Plan
A4. Economic Analysis
A5. Facility Requirements
A6. Future Expansion/Alteration Cons
A7. Site Selection Considerations
A8. Project Objectives Statement
B. OWNER PHILOSOPHIES (Ma
B1. Reliability Philosophy
B2. Maintenance Philosophy
B3. Operating Philosophy
B4. Design Philosophy
C. PROJECT REQUIREMENTS (
C1. Value-Analysis Process
C2. Project Design Criteria
C3. Evaluation of Existing Facilities
C4. Scope of Work Overview
C5. Project Schedule
C6. Project Cost Estimate

Section I Maximum Score = 413

SECTION II -

CATEGORY / Element
D. SITE INFORMATION (Maximum = 108)
D1. Site Layout
D2. Site Surveys
D3. Civil/Geotechnical Information
D4. Governing Regulatory Requirements
D5. Environmental Assessment
D6. Utility Sources with Supply Conditions
D7. Site Life Safety Considerations
D8. Special Water and Waste Treatment Req'mts
E. BUILDING PROGRAMMING (Maximum
E1. Program Statement
E2. Building Summary Space List
E3. Overall Adjacency Diagrams
E4. Stacking Diagrams
E5. Growth & Phased Development

E6. Circulation and Open Space Requirements	0	1	4	7	10	13
E7. Functional Relationship Diagrams/Room by Room	0	1	3	5	8	10
E8. Loading/Unloading/Storage Facilities Req'mts	0	1	2	4	6	8
E9. Transportation Requirements	0	1	3	5	7	9
E10. Building Finishes	0	1	5	8	12	15
E11. Room Data Sheets	0	1	4	7	10	13
E12. Furnishings, Equipment, & Built-Ins	0	1	4	8	11	14
E13. Window Treatment	0	0	2	3	4	5
CATEGORY E TOTAL						

SECTION II - BASIS O

CATEGORY / Element
F. BUILDING/PROJECT DESIGN PARAMETER
F1. Civil/Site Design
F2. Architectural Design
F3. Structural Design
F4. Mechanical Design
F5. Electrical Design
F6. Building Life Safety Requirements
F7. Constructability Analysis
F8. Technological Sophistication
G. EQUIPMENT (Maximum = 36)
G1. Equipment List
G2. Equipment Location Drawings
G3. Equipment Utility Requirements

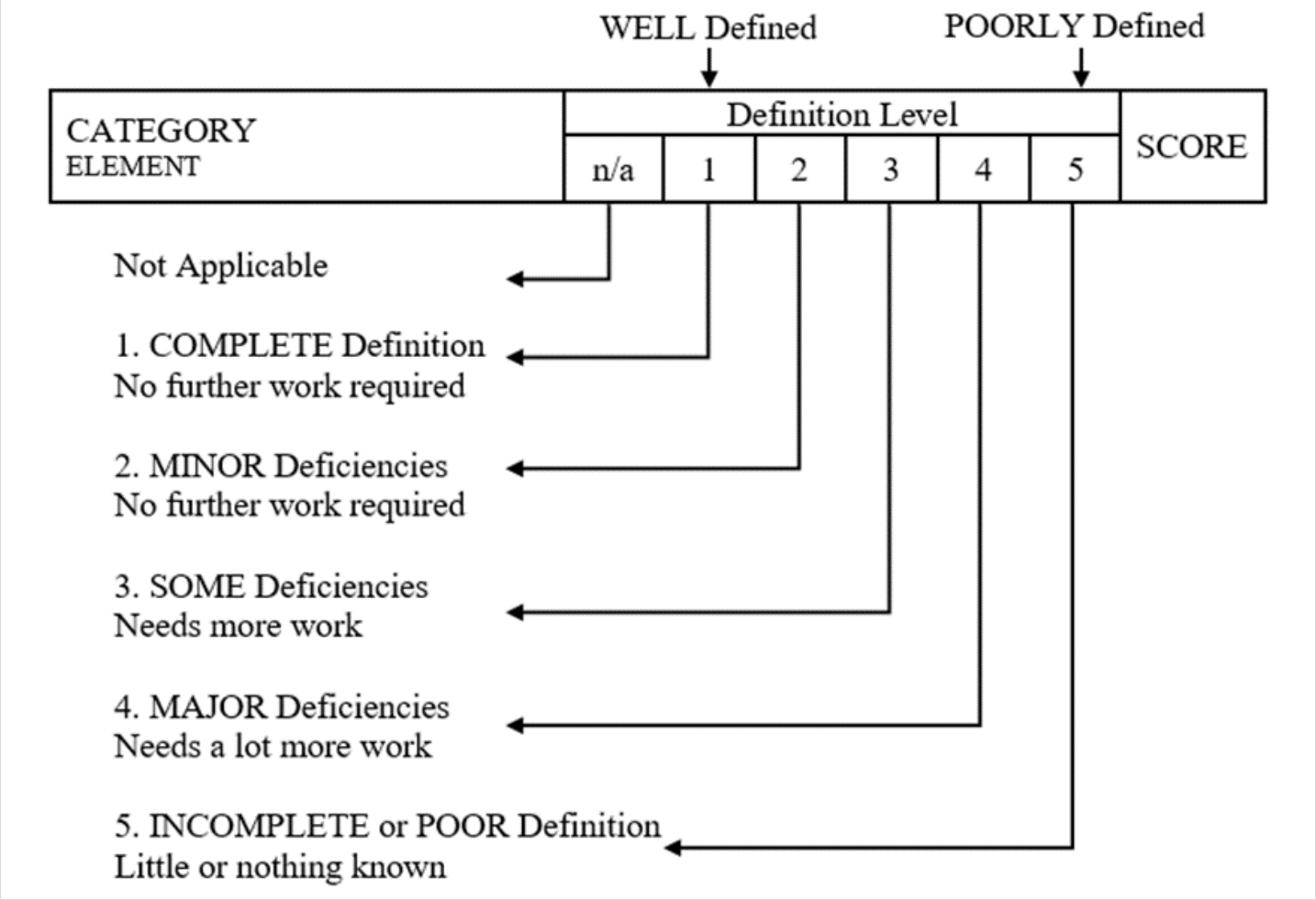
Section II Maximum Score = 428

SECTION III - EXECUTION APPROACH

CATEGORY / Element	Definition Level 0	1	2	3	4	5	Score
H. PROCUREMENT STRATEGY (Maximum = 25)							
H1. Identify Long Lead/Critical Equip. & Materials	0	1	4	7	10	14	
H2. Procurement Procedures and Plans	0	1	3	6	9	11	
CATEGORY H TOTAL							
J. DELIVERABLES (Maximum = 11)							
J1. CADD/Model Requirements	0	0	1	2	3	4	
J2. Documentation/Deliverables	0	1	2	4	6	7	
CATEGORY J TOTAL							
K. PROJECT CONTROL (Maximum = 63)							
K1. Project Quality Assurance and Control	0	1	3	4	6	8	
K2. Project Cost Control	0	1	4	7	10	13	
K3. Project Schedule Control	0	1	4	8	11	14	
K4. Risk Management	0	1	6	10	14	18	
K5. Safety Procedures	0	1	3	5	7	9	
CATEGORY K TOTAL							
L. PROJECT EXECUTION PLAN (Maximum = 60)							
L1. Project Organization	0	1	3	5	8	10	
L2. Owner Approval Requirements	0	1	4	6	9	11	
L3. Project Delivery Method	0	1	5	8	12	15	
L4. Design/Construction Plan & Approach	0	1	4	8	11	15	
L5. Substantial Completion Requirements	0	1	3	5	7	9	
CATEGORY L TOTAL							

Section III Maximum Score = 159 **SECTION III TOTAL**

PDRI Definition Levels



SECTION I – BASIS OF PROJECT DECISION

CATEGORY Element	Definition Level 0	1	2	3	4	5	Score
A. BUSINESS STRATEGY							
A1. Building Use		✓					
A2. Business Justification			✓				
A3. Business Plan			✓				
A4. Economic Analysis				✓			
A5. Facility Requirements		✓					
A6. Future Expansion/Alteration Considerations						✓	
A7. Site Selection Considerations				✓			
A8. Project Objectives Statement			✓				
B. OWNER PHILOSOPHIES							
B1. Reliability Philosophy		✓					
B2. Maintenance Philosophy			✓				
B3. Operating Philosophy			✓				
B4. Design Philosophy				✓			
C. PROJECT REQUIREMENTS							
C1. Value-Analysis Process		✓					
C2. Project Design Criteria			✓				
C3. Evaluation of Existing Facilities						✓	
C4. Scope of Work Overview				✓			
C5. Project Schedule						✓	
C6. Project Cost Estimate						✓	

Section	Description	PDRI 3 Score	Min Score	Max Score	Def[1] (%)
I	BASIS OF PROJECT DECISION	73	24	413	87%
II	BASIS OF DESIGN	196	31	405	56%
III	EXECUTION APPROACH	91	13	158	46%
	Total	**360**	**68**	**976**	**68%**

PDRI TOTAL MAXIMUM SCORE = 1000

Normalized Score: 369

Category	Description	PDRI 3 Score	Min Score	Max Score	Def[1] (%)
A	BUSINESS STRAGEGY	11	11	214	100%
B	OWNER PHILOSOPHIES	4	4	68	100%
C	PROJECT REQUIREMENTS	58	9	131	60%
D	SITE INFORMATION	48	8	98	56%
E	BUILDING PROGRAMMING	34	11	149	83%
F	BUILDING/PROJECT DESIGN PARAMETERS	83	9	122	35%
G	EQUIPMENT	31	3	36	15%
H	PROCUREMENT STRATEGY	13	2	25	52%
J	DELIVERABLES	2	1	11	90%
K	PROJECT CONTROLS	37	5	62	44%
L	PROJECT EXECUTION PLAN	39	5	60	38%
Total		**360**	**68**	**976**	**68%**

Top Elements	Description	PDRI 3 Score	Min Score	Max Score	Def[1] (%)
A.1	Building Use Requirement	1	1	44	100%
A.5	Facility Requirements	2	2	31	100%
A.7	Site Selection Considerations	1	1	28	100%
A.2	Business Justification	1	1	27	100%
C.6	Project Cost Estimate	8	2	27	76%
A.3	Business Plan	2	2	26	100%
C.2	Project Design Criteria	13	1	24	48%
C.3	Evaluation of Existing Facilities	7	2	24	77%
A.6	Future Expansion/Alteration Considerations	1	1	22	100%
F.2	Architectural Design	12	1	22	48%
Total		**48**	**14**	**275**	**87%**

PDRI 3 - Low Definition Items

		Low Definition Items:	16	185		56
Section	Element	Element Description	Level	Score	Comments	A
I	C.1	Value-Analysis Process	Level 5	19	To be considered further in design.	
II	D.3	Civil/Geotechnical Information	Level 5	19	Need a geotech for this specific site. BIA wil also need geotech. Hopi tribe has a geotech report from 2000.	
II	E.13	Window Treatment	Level 5	5	Has not been discussed.	
II	F.1	Civil/Site Design	Level 5	14	Waiting on geo tech and topo. There will be a generator. Verify clearances. Power to be underground.	
II	F.3	Structural Design	Level 4	14	Metal Building will be used. Specifications to be provided. General	
II	F.4	Mechanical Design	Level 4	15	Basis of Design is based on a pre-engineered metal building. Ground units desired.	
II	F.5	Electrical Design	Level 4	12	Basis of design is based on a pre-engineered metal buiding. Also to be coordinated with APS. Lightning protection?	
II	F.6	Building Life Safety Requirements	Level 4	8	Verify with codes, will be further defined in design.	
II	F.8	Technological Sophistication	Level 4	7	Tribe not sure of video conferencing. To coordinate with HTI. Fiber Optic. no server room.	
II	G.1	Equipment List	Level 4	12	A list has been provided to IDSA for owner provided equipment for interior. List of equipment in bay area needs to be identified.	
II	G.2	Equipment Location Drawings	Level 4	8	IDSA to coordinate with owner.	
II	G.3	Equipment Utility Requirements	Level 5	11	NA	
III	K.1	Project Quality Assurance and Control	Level 4	6	3rd party inspectors to be identified. No ISO requirements. Arviso will implement their quality control. Identify owner paid special inspections.	
III	K.3	Project Schedule Control	Level 4	11	Project Completion goal - April 2019. No expiration date for funding.	
III	L.4	Design/Construction Plan and Approach	Level 5	15	To be further define with design and construction.	
III	L.5	Substantial Completion Requirements	Level 5	9	**Final Inspections - who from the tribe will need to sign off. Risk Managment. CO - IDSA to provide. Owner to verify. (3rd party inspector)	
Total			**16**	**185**		**56**

PDRI – Tailored for our tribal communities

PDRI – Tribal Building Projects

The crucial elements that need to be included in a scope definition for building projects.

Composition:

- 3 sections
- 11 Categories
- 67 Elements

48 pages of detailed element descriptions

I. BASIS OF PROJECT DECISION

A. Project Development Strategy
- A1. Building Use/Function Requirements
- A2. Project Business Justification
- A3. Project Business Plan
- A4. Economic Analysis
- A5. Facility Requirements
- A6. Future Expansion/Alteration Considerations
- A7. Site Selection Considerations
- A8. Project Objectives Statement

B. Owner/Tribal Principles
- B1. Cultural Values
- B2. Reliability Principles
- B3. Maintenance Principles
- B4. Operating Principles
- B5. Design Principles

C. Project Requirements
- C1. Value-Analysis Process
- C2. Project Design Criteria
- C3. Evaluation of Existing Facilities
- C4. Scope of Work Overview
- C5. Project Schedule
- C6. Project Cost Estimate

II. BASIS OF DESIGN

D. Site Information
- D1. Site Layout
- D2. Site Surveys
- D3. Civil/Geotechnical Information
- D4. Governing Regulatory Requirements
- D5. Environmental Assessment
- D6. Utility Sources with Supply Conditions
- D7. Site Life Safety Considerations
- D8. Special Water and Waste Treatment Requirements`

E. Building Programming
- E1. Program Statement
- E2. Building Summary Space List
- E3. Overall Adjacency Diagrams
- E4. Stacking Diagrams
- E5. Growth & Phased Development
- E6. Circulation and Open Space Requirements
- E7. Functional Relationship Diagrams/Room by Room
- E8. Loading/Unloading/Storage Facilities Requirements
- E9. Transportation Requirements
- E10. Building Finishes
- E11. Room Data Sheets
- E12. Furnishings, Equipment, & Built-Ins
- E13. Window Treatment

F. Building/Project Design Parameters
- F1. Culture
- F2. Civil/Site Design
- F3. Architectural Design
- F4. Structural Design
- F5. Mechanical Design
- F6. Plumbing Design
- F7. Electrical Design
- F8. Building Life Safety Requirements
- F9. Constructability Analysis
- F10. Technological Sophistication

G. Equipment
- G1. Equipment List
- G2. Equipment Location Drawings
- G3. Equipment Utility Requirements

III. EXECUTION APPROACH

H. Procurement Strategy
- H1. Identify Long Lead/Critical Equip. & Materials
- H2. Procurement Procedures and Plans

I. Deliverables
- I1. Construction Technology
- I2. Documentation/Deliverables

J. Project Control
- J1. Project Quality Assurance and Control
- J2. Project Cost Control
- J3. Project Schedule Control
- J4. Risk Management
- J5. Safety Procedures

K. Project Execution Plan
- K1. Project Organization
- K2. Tribe/Tribal Entity Approval Requirements
- K3. Project Delivery Method
- K4. Design/Construction Plan & Approach
- K5. Substantial Completion Requirements

PDRI – Tribal Building Projects
Added Culture Element Descriptions

B. OWNER/TRIBAL PRINCIPLES

B1. Cultural Values

The building should be programmed/designed to incorporate the culture of the tribe to the greatest extent when practical to meet the tribes request and with the intention that it will be in use for many generations. (Ex: Are their cultural implications on how you view the need for a community center or senior living center?) The project team should acknowledge items such as:

- ☐ Location (i.e., Significance of Four Directions)
- ☐ Environmental impact (i.e., Artifacts remains)
- ☐ Tribal values (Specific to Tribe, protocols)
- ☐ History (Specific to Tribe)
- ☐ Journey/story (i.e., Cultural Representation)
- ☐ Community involvement (elders, children)
- ☐ Consultation with Cultural Advisor/Elder
- ☐ Seven generations philosophy
- ☐ Name (Tribal Language)
- ☐ Other

PDRI – Tribal Building Projects

- Added Language for tribal requirements, protocols and collaboration
- Ex: Tribal Utility Authority, Tribal Entity's such as transportation, archaeological protocols (cultural, EPA)
- Emphasis on Funding and Finance

D3. Civil/Geotechnical Information

The civil/geotechnical site evaluation provides a basis for foundation, structural, and hydrological design. Evaluations of the proposed site should include items such as:

- ☐ Up to date soils report
- ☐ Depth to bedrock
- ☐ General site description (e.g., terrain, soils type, existing structures, spoil removal, areas of hazardous waste)
- ☐ Expansive or collapse potential of soils
- ☐ Fault line locations
- ☐ Spoil area for excess soil (i.e., location of on-site area or offsite instructions)
- ☐ Seismic requirements
- ☐ Water table elevation
- ☐ Flood plain analysis
- ☐ Soil percolation rate and conductivity
- ☐ Ground water flow rates and directions
- ☐ Need for soil treatment or replacement
- ☐ Overexcavation and fill (Location of nearby borrow pit)
- ☐ Overexcavation and fill (archaeological artifacts/protocols)
- ☐ Description of foundation design options
- ☐ Allowable bearing capacities
- ☐ Pier/pile capacities
- ☐ Paving design options
- ☐ Overall site analysis
- ☐ Nearby facilities with foundation/soil issues
- ☐ Tribal utility authority requirements
- ☐ Tribal utility authority division (construction/engineering)
- ☐ Requirements of other tribal entity's (ex: transportation)
- ☐ Other

** Additional items to consider for Renovation projects **

- ☐ Vibration control/ monitoring associated with existing facilities & infrastructure
- ☐ Capacity of existing foundations for new loading criteria

Preliminar Sheet

	Definition Level						Definition Level				
	1	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
A1.	1	8	14	20	26	E9.	1	3	6	8	10
A2.	1	6	10	15	20	E10.	1	5	8	12	16
A3.	1	6	11	16	21	E11.	1	3	5	7	9
A4.	1	5	8	12	15	E12.	1	4	7	10	13
A5.	1	6	11	15	20	E13.	1	3	5	7	10
A6.	1	4	7	10	13	**E Totals**	**13**	**46**	**81**	**113**	**148**
A7.	1	6	10	15	19	F1.	1	5	9	14	18
A8.	1	5	9	13	17	F2.	1	6	11	16	20
A Totals	**8**	**46**	**80**	**116**	**151**	F3.	1	6	11	15	20
B1.	1	5	9	13	17	F4.	1	6	10	15	19
B2.	2	6	10	14	18	F5.	1	5	9	13	16
B3.	1	4	6	9	12	F6.	1	5	9	13	17
B4.	1	5	8	12	15	F7.	1	5	10	14	18
B5.	1	3	6	8	11	F8.	1	5	8	12	16
B Totals	**6**	**23**	**39**	**56**	**73**	F9.	1	4	8	11	14
C1.	1	5	9	12	16	F10.	1	4	6	9	12
C2.	2	6	11	16	21	**F Totals**	**10**	**51**	**91**	**132**	**170**
C3.	1	6	10	15	19	G1.	1	4	8	11	14
C4.	1	4	9	13	16	G2.	1	5	8	11	15
C5.	1	4	10	14	19	G3.	1	5	9	13	16
C6.	2	7	12	17	22	**G Totals**	**3**	**14**	**25**	**35**	**45**
C Totals	**8**	**34**	**61**	**87**	**113**	**Sec II Totals**	**34**	**150**	**264**	**377**	**489**
Sec I Totals	**22**	**103**	**180**	**259**	**337**	H1.	1	5	8	12	15
D1.	1	6	10	14	19	H2.	1	4	7	10	13
D2.	1	5	8	12	16	**H Totals**	**2**	**9**	**15**	**22**	**28**
D3.	1	5	9	12	16	I1.	1	3	5	8	10
D4.	1	5	9	13	16	I2.	1	2	4	5	7
D5.	1	4	7	11	14	**I Totals**	**2**	**5**	**9**	**13**	**17**
D6.	1	6	10	15	19	J1.	1	4	7	11	14
D7.	1	4	7	10	13	J2.	1	5	8	12	16
D8.	1	4	7	10	13	J3.	1	5	8	12	15
D Totals	**8**	**39**	**67**	**97**	**126**	J4.	1	4	7	10	12
E1.	1	4	7	9	12	J5.	1	4	6	9	12
E2.	1	4	8	11	15	**J Totals**	**5**	**22**	**36**	**54**	**69**
E3.	1	3	5	7	9	K1.	1	3	5	7	9
E4.	1	3	6	8	10	K2.	1	3	6	8	10
E5.	1	4	6	9	11	K3.	1	5	9	13	17
E6.	1	4	6	9	12	K4.	1	4	7	9	12
E7.	1	3	6	8	11	K5.	1	4	7	9	12
E8.	1	3	6	8	10	**K Totals**	**5**	**19**	**34**	**46**	**60**
						Sec III Totals	**14**	**55**	**94**	**135**	**174**
						PDRI Totals	**70**	**308**	**538**	**771**	**1000**

QUESTIONS?

NTICC - 2022

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