



***Reducing Infrastructure costs as one mechanism to address the Housing Crisis***

**AMO  
London, Ontario  
August 22, 2023**

**Our Team would like to acknowledge that we are gathered today on the traditional lands of the Anishinaabek, Haudenosaunee, Lūnaapéewak and Attawandaron .**

**The three Indigenous Nations that are neighbours to London are the Chippewas of the Thames First Nation; Oneida Nation of the Thames; and the Munsee-Delaware Nation who all continue to live as sovereign Nations with individual and unique languages, cultures and customs.**

# Who the team is



- We are a purpose driven national technical builder that is leading change in the Canadian construction industry
- Chandos is Canada's leader in Integrated Project Delivery with over 35 IPD projects in various stages having a total value in excess of \$2 billion



- Leading provider of sustainable water, wastewater, and district energy, as well as electricity and gas distribution solutions
- We develop, finance, construct, own, operate and maintain local utility infrastructure on behalf of small to medium sized communities across North America
- Corix is owned by the British Columbia Investment Management Corp. who are the leading provider of BC public sector investment and pension management services



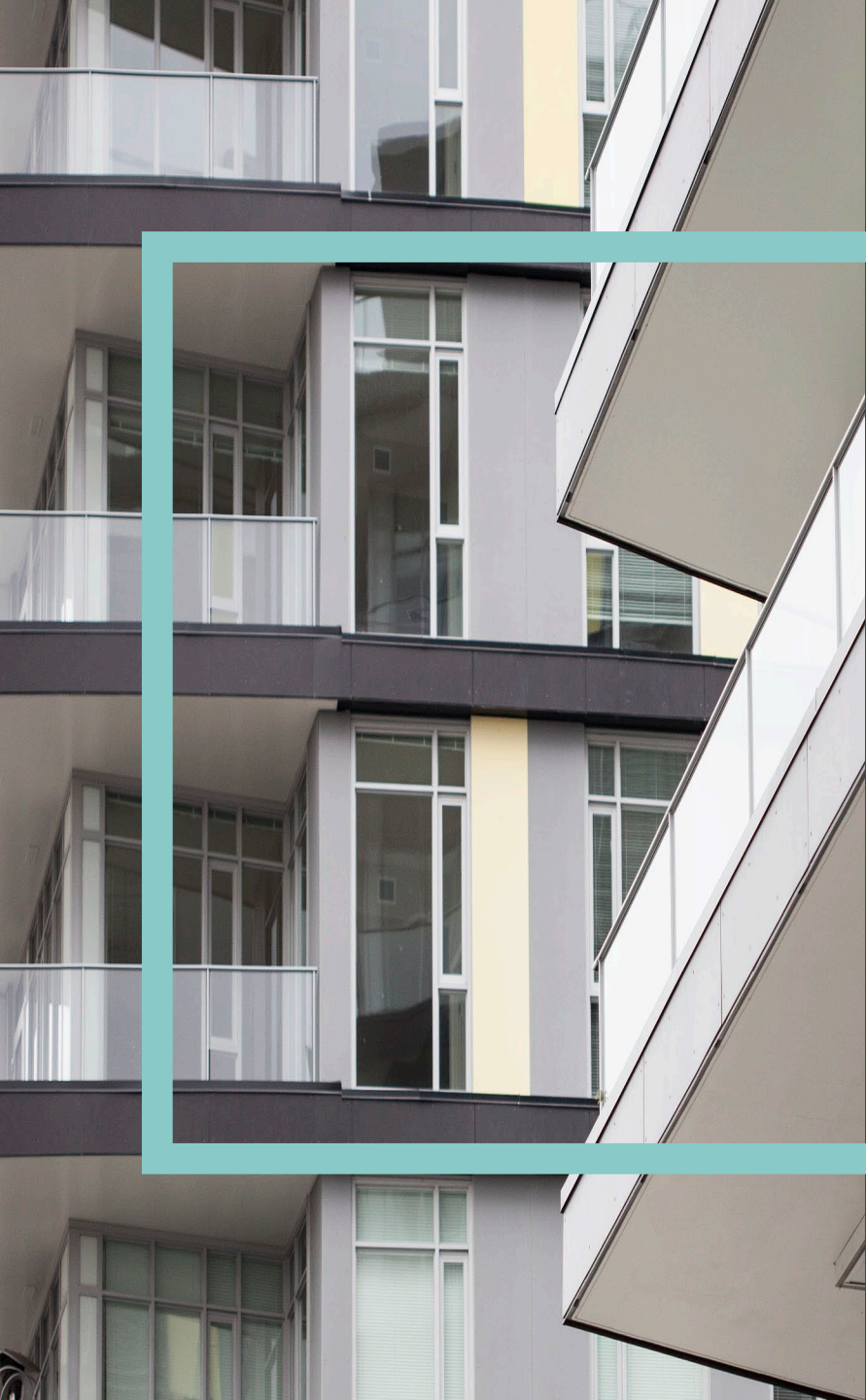
- NAC is a leader in the Canadian Water and Wastewater Treatment markets
- NAC has completed over 134 municipal water and wastewater treatment projects across Canada in the last 30 years
- NAC has completed over \$4.3 Billion in municipal treatment plants, both greenfield and brownfield
- NAC is a 100% employee-owned Canadian company with over 450 tradespeople

# Executive Summary

*Traditional infrastructure financing models rely on standardized development charges to fund essential infrastructure requirements.*

*This model increases the cost of new housing by forcing homeowners to pay for infrastructure costs up-front rather than over its useful life.*

*Participation of the private sector, through innovative low-cost solutions, such as IPD FOM, will facilitate the charging of actual costs for infrastructure which in turn will promote optimal solutions for housing developments.*

A photograph of a modern multi-story building facade with balconies and large windows, partially framed by a teal border.

introduction to integrated project  
delivery (IPD)

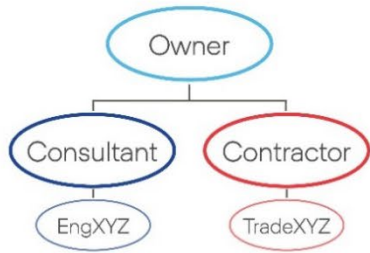
overview | benefits of collaboration  
overview | benefits integrating IPD with  
FOM



# How does industry work right now?

Conventional delivery (dbb, db, cm, P3)

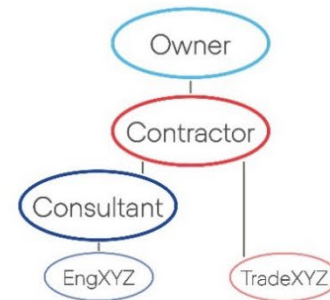
### DESIGN-BID-BUILD (CCDC 2)



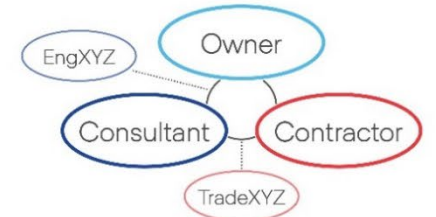
### CONSTRUCTION MANAGEMENT (CCDC 5B)



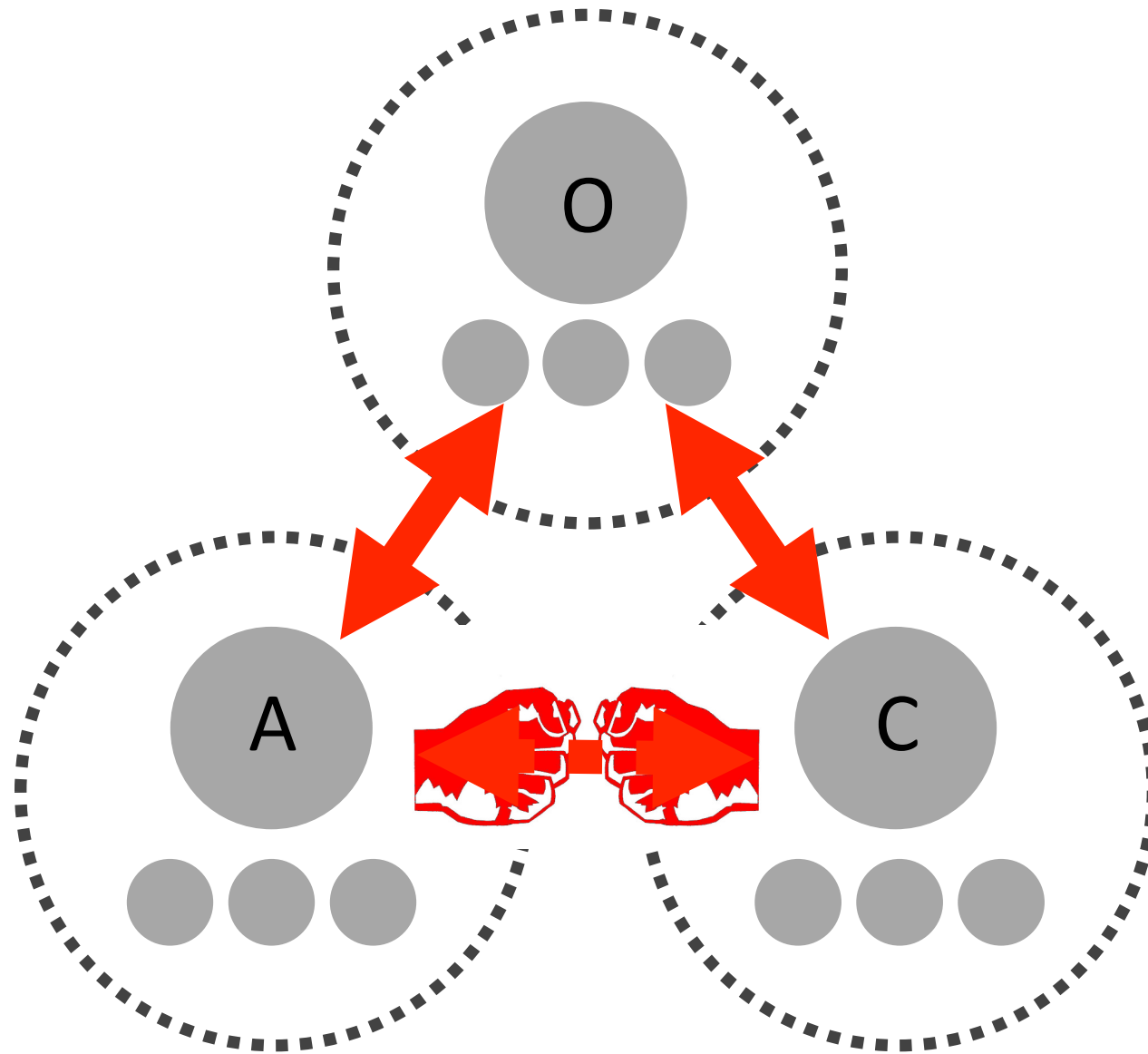
### DESIGN-BUILD (CCDC 14)



### INTEGRATED PROJECT DELIVERY (CCDC 30)



## Contractual Models

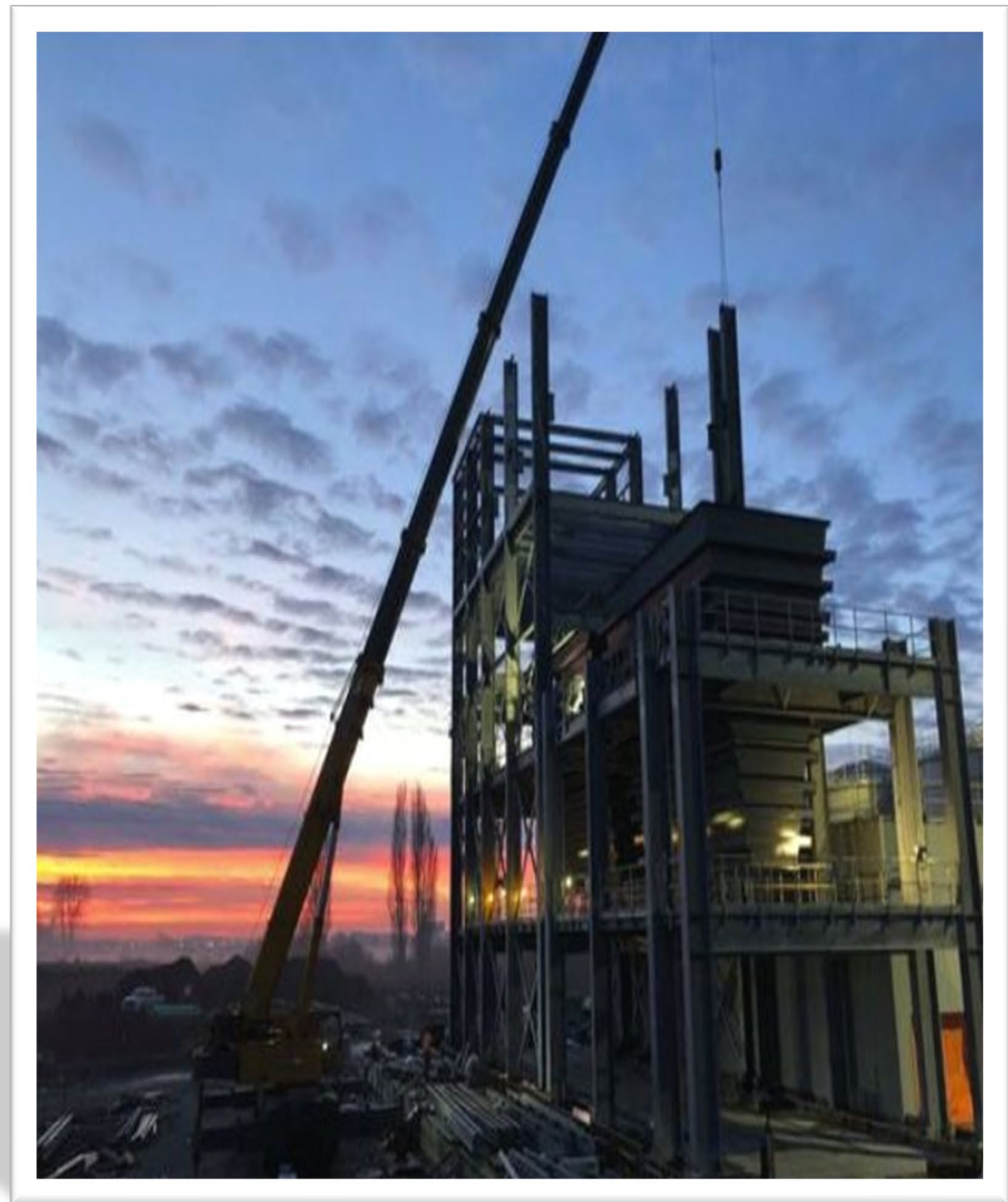




Does current industry state  
set us up to build the most  
sustainable, collaborative,  
innovative, lean infrastructure  
projects?

# IPD in Canada

- ~80 known projects
- ~\$4,100,000,000 total scope
- ~\$1,100,000,000 completed
- ~37 projects completed
- **1 over target cost**



# Municipalities and IPD

- Drayton Valley x2
- City of Lloydminster
- City of Kamloops x 3
- Okanagan Indian Band
- Regional District of North Okanagan
- Township of Spallumcheen
- City of Barrie x4
- Squamish
- BC Housing (Lower Mainland)
- City of Red Deer
- Town of Oakville x3
- City of Edmonton
- Town of Okotoks
- County of Strathcona

# Private Clients and IPD

- Canadian Nuclear Labs
- Oil Country Engineering
- Groupe Nordik Spa's
- Edmonton Public Schools x6
- Red Deer Catholic Schools x4
- First Nation's Technical Institute
- Canadian Canoe Museum
- St. Jerome University
- Humber College
- Ryerson University
- McMaster Research Park
- Greater Edmonton Foundation
- Calgary Zoo

# Types of IPD Projects in the Market

Water/Wastewater Treatment

Reservoirs

Linear Infrastructure

Pump Stations

District Energy

Bridges

Schools, Universities and Colleges

Pools and Rec

Seniors Housing

Fieldhouse Projects

Libraries

Museums

Zoo

Fire Halls

Bus Barn Transit

First Responders Centers

Offices and Warehouses

Community Centers



# Drayton Valley RWPS

## Challenge:

- City given a grant of \$4.2M to complete their RWPS, which was budgeted @ \$8M during pre-design. No redundancy in RW water, critical infrastructure.

## Decision:

- Decided to take a chance on IPD (1<sup>st</sup> municipality in Canada to do so on a water infrastructure project).

## Outcome:

- Project completed \$900k under budget (\$3.2M).
- DV went on to use IPD for their aquatic centre



# Lloydminster WWTF

## Challenge:

- City given a grant of \$81.5M to complete their required upgrades and a strict deadline of Dec 31, 2023 from AEP/Sask with significant fines for breach.

## Decision:

- Decided to use IPD to achieve what was considered to be unrealistic timelines (construct a \$81M facility from zero design to commissioning start in 3 years).

## Outcome:

- Project has entered Phase 2 commissioning in July 2023 (Phase 1 seeding complete).
- Tracking \$1M under budget
- Ahead of schedule (Jan 2020 – Sept 2023)



# Cultus Lake WWTP

## Challenge:

- Shovel ready design estimated at \$16M. Grant funding available ~\$11M

## Decision:

- Decided to use IPD to optimize the design and validate the project to allow it to proceed without having to try for more funding.

## Outcome:

- Project was validated and unanimously approved by Council. Mobilization July 2023.



# South Kamloops Water System Upgrades

## Challenge:

- 5 smaller projects bundled together (\$18-22M) in various parts of the City.

## Decision:

- Decided to use IPD to optimize the design of multiple locations & areas within the water system.

## Outcome:

- During validation it was determined that 3 of the 5 projects were not required and would have been detrimental to the water system. Proceeded with 2 projects @ ~\$13M.





# Malahat Nation IPDFOM

## Challenge:

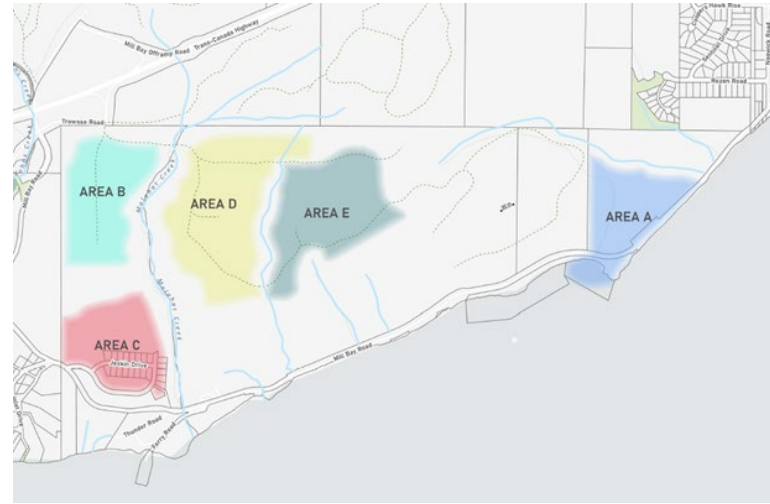
- Community & Future Development Need.

## Decision:

- Decided to use IPDFOM to determine viability of development build out and optimize the phasing to suit capital requirements.

## Outcome:

- During validation CIB and ISC were engaged for funding support. Phasing Strategy (5 phases) with modular treatment was determined to be required to make capital investment work.



# sakaw terrace

- 158 Units (70 Lodge, 88 Apt.) 140,500 SF
- Mixed market; affordable and subsidized
- \$39.6 Million including FFE
- **Opened 2 months ahead of schedule**
- **\$967,000 under budget**



# Sustainability Lesson Learned

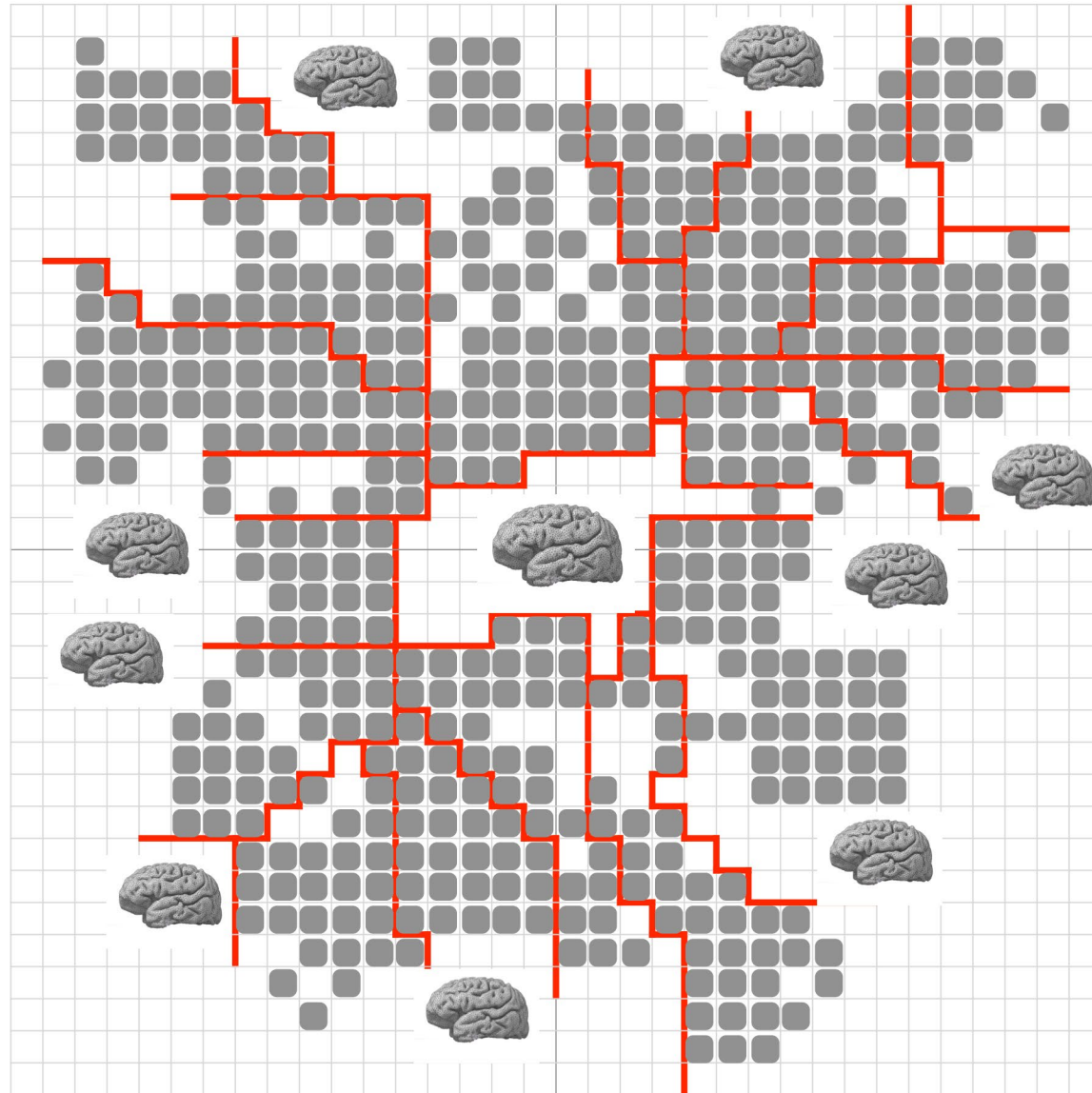
IPD Schools

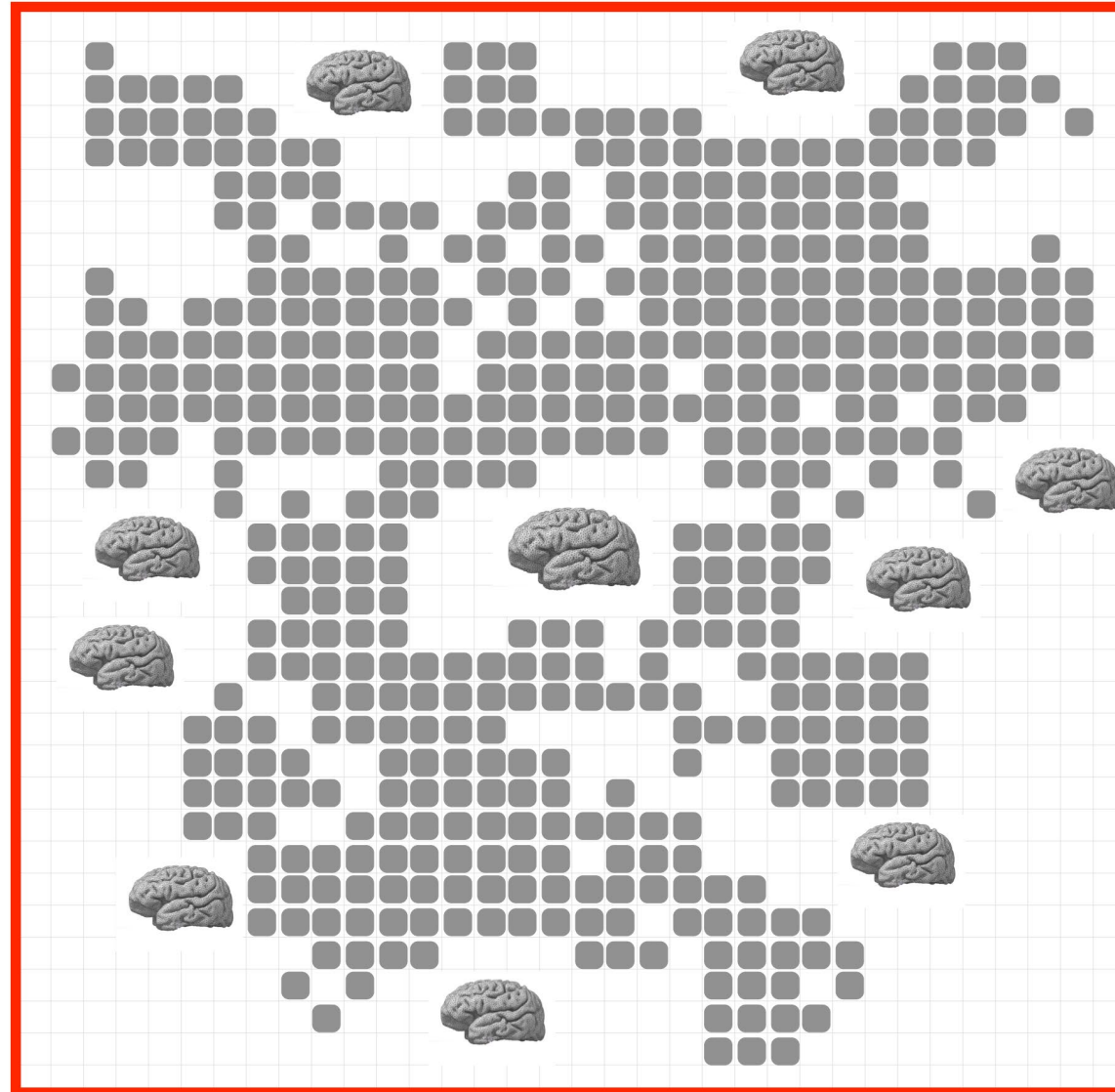
Project #	Project	IPD/Non	Gross Building Area (m2)	Total Waste (Kg)	Waste Generated (KG/m2)				
3319	Garth Worthington School	IPD	7,974.00	243,057.00	30.48				
3023	St Josephs	IPD	12,300.00	640,000.00	52.03				
3055	St. Gregory The Great	IPD	4,180.00	212,700.00	50.89				
3089	GEF Sakaw Terrace	IPD	13,006.00	582,660.00	44.8				
3335	Ecole Les Cypres	Non	2,365.00	285,310.00	120.64				
3247	IRMA	Non	3,350.00	310,960.00	92.82				
3322	Evergreen	Non	2,904.00	166,180.00	57.22				
3098	Martindale Elementary	Non	4,087.00	230,616.00	56.43				
3249	Revera Scenic Grand	Non	18,952.00	1,005,090.00	53.03				
3205	Botanica Phase 2	Non	31,869.00	1,024,830.00	32.16				

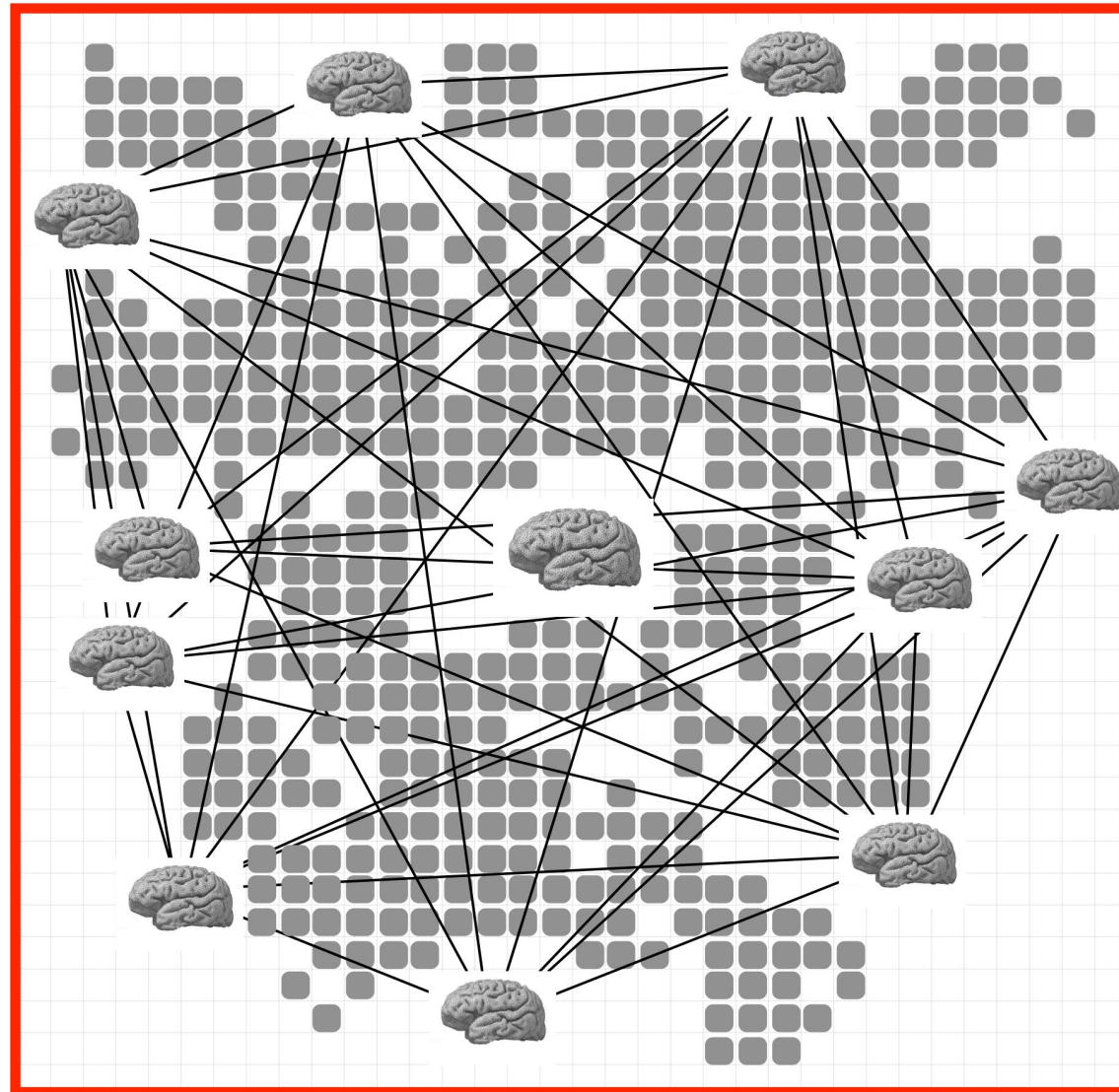
non-IPD Schools

IPD:	44.81 kg/m2
Non IPD:	68.44 kg/m2

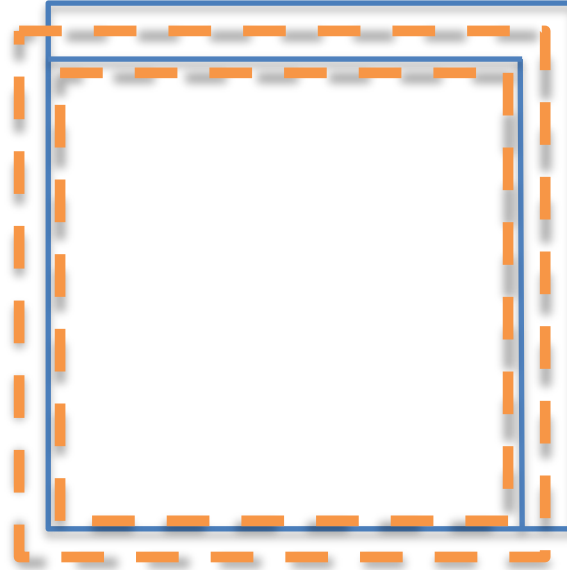
what is ipd?







# example managing supply chain



glass / windows



single structural model (usually 2)

# Contractual Principles

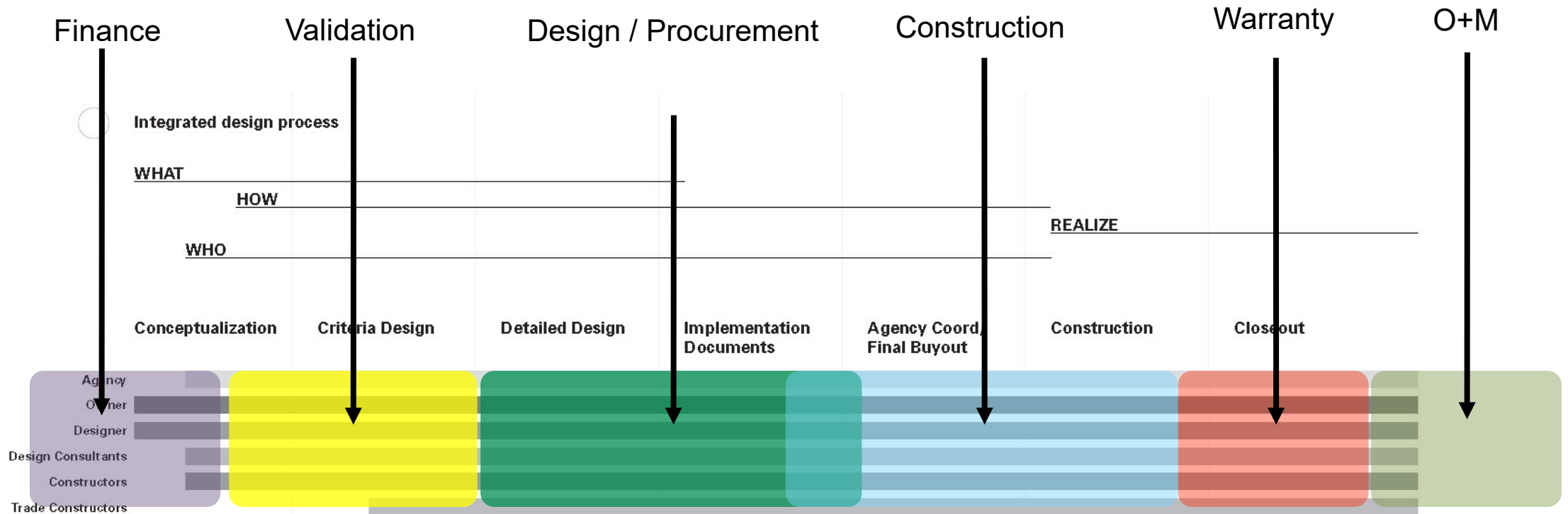
Key Participants Bound Together as Equals  
Shared Financial Risk and Reward Based on Project Outcome  
Liability Waivers Between Key Participants  
Fiscal Transparency Between Key Participants  
Early Involvement of Key Participants  
Intensified Design  
Jointly Developed Project Target Criteria  
Collaborative Decision Making

## IPD FOM

Inclusion of Finance and O&M ensures long-term focus for risks and rewards,  
capturing the key benefit of a P3



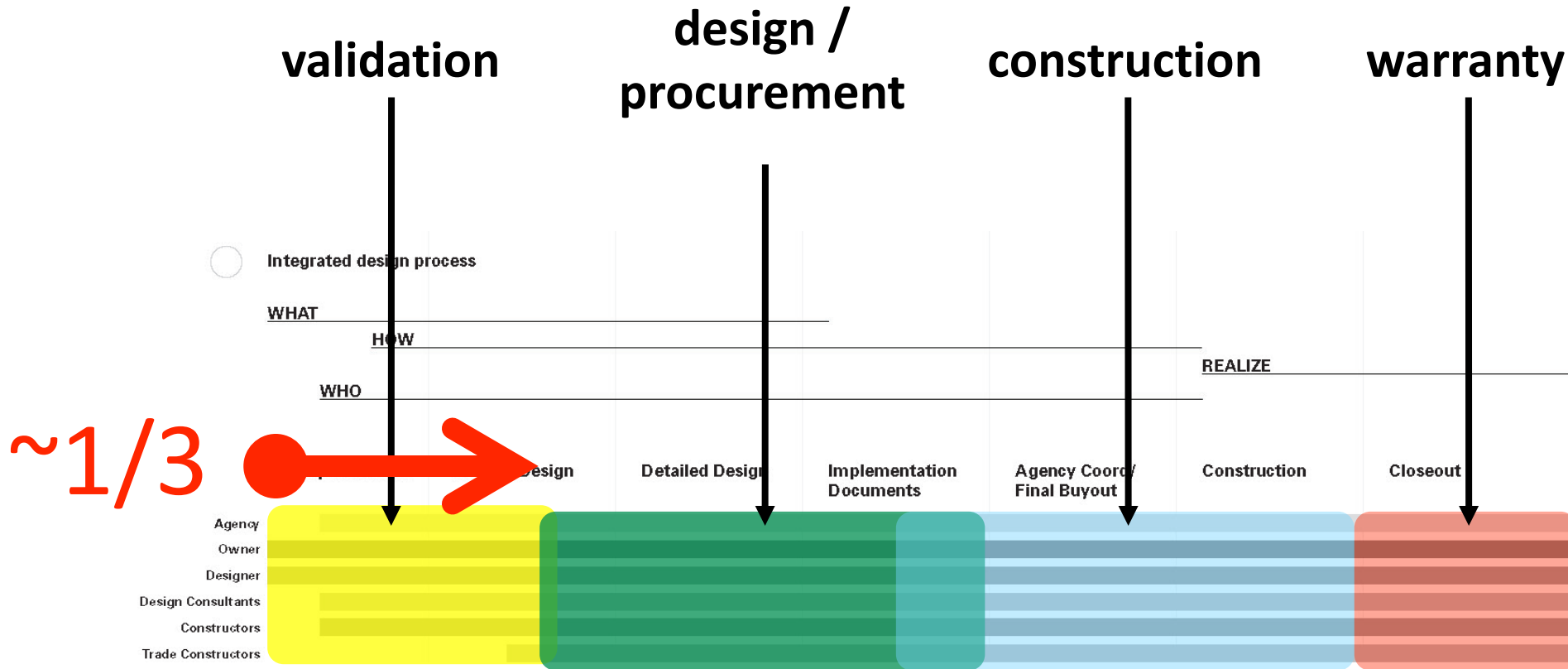
# IPD phases with FOM



# Validation Question

Can we build this infrastructure,  
that does these things,  
in this much time, for this user rate / cost?

# target value design



# Effort to get to Contractual Cost Certainty

~DBB 5-15%



~DB 1-6%



validation

design /  
procurement

construction

warranty



Integrated design process

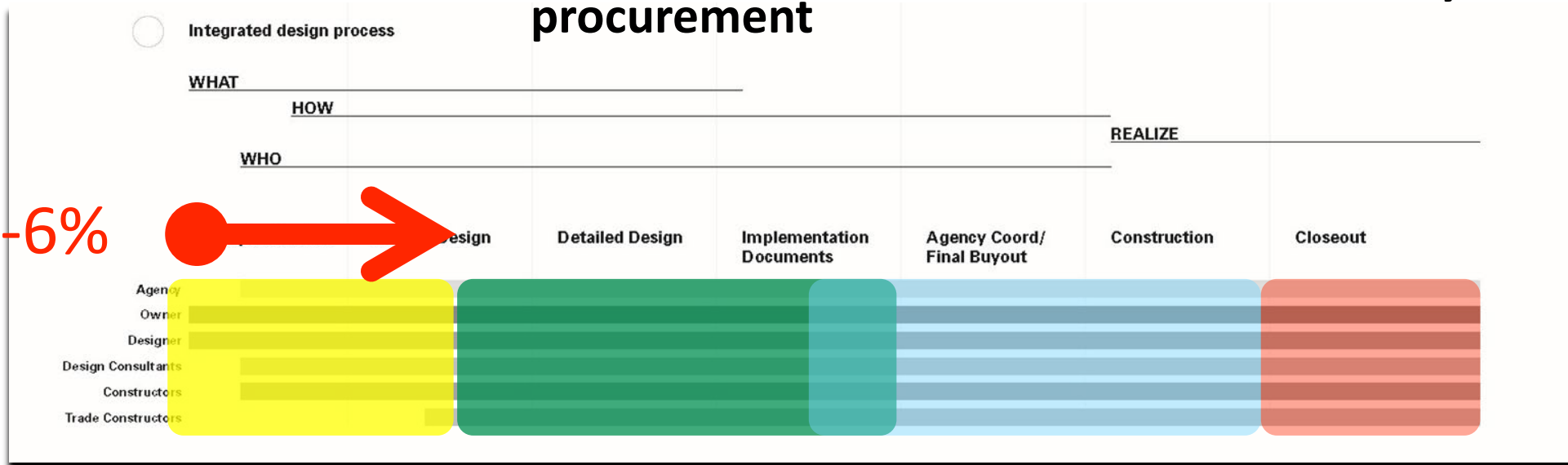
WHAT

HOW

WHO

REALIZE

~IPD 1-6%



what's different during design /  
before beginning construction?



what's different  
ipd is about  
**understanding the  
ramifications of design  
decisions at the time the  
decisions are made**

what's different

re-think deliverables,  
information, outcomes,  
answers and decisions

File Home Insert Formulas Data Review View Help Tell me what you want to do Open in Desktop App

Undo Clipboard Font Alignment Number Tables Cells Editing

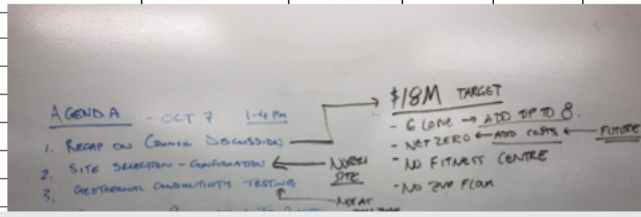
Calibri 11 Bold Italic Underline Paragraph Font Color Background Color

Wrap Text Merge & Center Center % \$ \$0.00 \$0.00

Conditional Formatting Format as Table Cell Styles Insert Delete Format

AutoSum Filter Find & Select Clear Sort & Filter

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U		
1	<b>DM-4</b>			<b>Further Action Required</b>		<b>Costs</b>	<b>Individual Responsible</b>	<b>Complete Y* if Yes</b>	<b>Due Date</b>	<b>Email sent</b>	<b>Values Alignment</b>											
2	Geothermal Design & Installation			PMT Votes:							Project values will be used to guide the team in decision making. Use this matrix on any major decision document that grades the decision on its affect (red,yellow,green) on the overall project values. Where there is a conflict between values, the document should discuss how the conflict will be resolved. If a decision doesn't affect a value, the team should question the necessity of the action.											
3	<b>Opportunity / Option</b>			Annette Driessen			*Yes							POS	NEU	NEG	N/A					
4	The use of geothermal heating to provide a heat source to the building so that building operational costs over the life-span of the building are reduced.			Troy Smith			*Yes															
5				David Owen			*Yes															
6				Arshia Ahmed			*Yes															
7				Michael Henderson			*Yes															
8																						
9																						
10																						
11				<b>*votes were to not pursue this option</b>																		
12																						
13	<b>Opportunity Analysis</b>																					
14	Within the initial couple of weeks of the validation phase starting it was identified that geothermal is a potential method that could be used to reduce energy and ultimately reduce the operational costs of the building. After establishing pricing from two trades to carry out geothermal conductivity testing on the proposed site (both ~\$20k) and applying a ROM of ~\$2M for the complete installation the PMT decided not to pursue it. This decision was made after the Town of Drayton Valley and Brazeau County council's reduced the initial expected cost budget from \$22M to \$18.5M.																					
15																						
16																						
17																						
18																						
19																						
20						~\$2,000,000.00																
21				<b>Implementation Actions Required (After Approval)</b>		<b>Costs</b>	<b>Individual Res</b>	<b>Complete ^</b>	<b>Due Date</b>	<b>Email sent</b>												
22																						
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target value design/delivery

design to detailed estimate vs  
estimating detailed design

# definition

Target Value Design is a management practice that drives design to deliver customer values and develops design within project constraints.

Glenn Ballard  
Research Director, UC Berkeley Project Production System Laboratory (P2SL)  
P2SL Principal Researcher, Target Value Design  
Co-founder, Lean Construction Institute  
Co-developer of the Last Planner® System

# definition

## Target Value Design Process

The process of establishing early financial targets for the project, and then designing to an associated detailed estimate rather than estimating a detailed design. Iterative in nature.

# definition

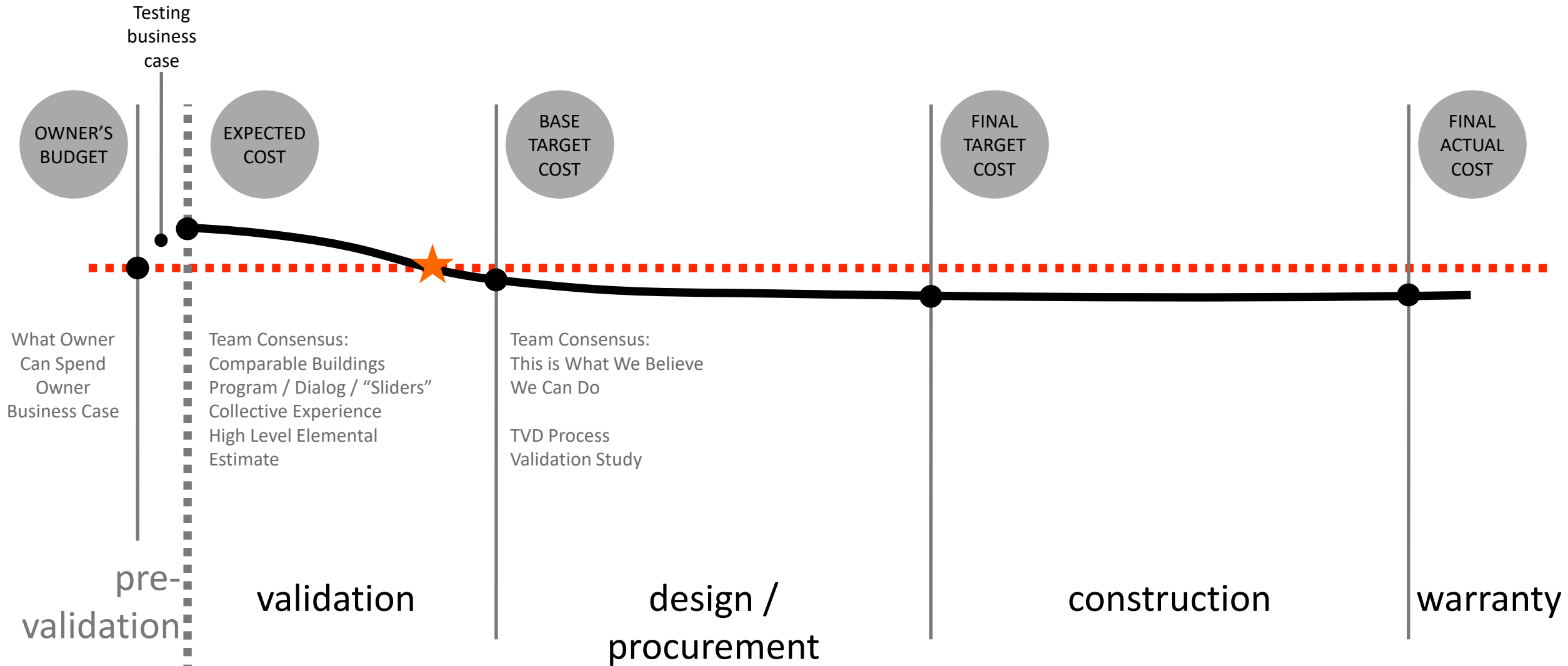
“Real value is not the low bid on a higher cost design.  
It’s achieving the lowest true cost on the right design.”

*ERIC LAMB*  
*DPR Management Committee*

the deal

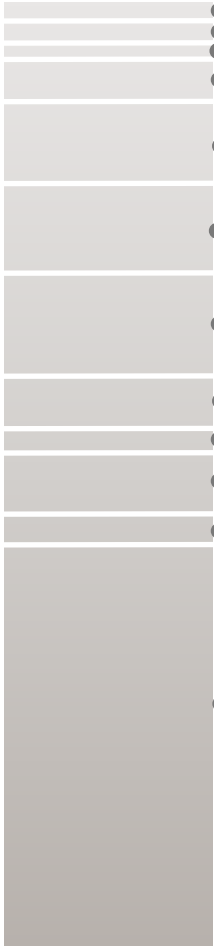


# ipd: the numbers



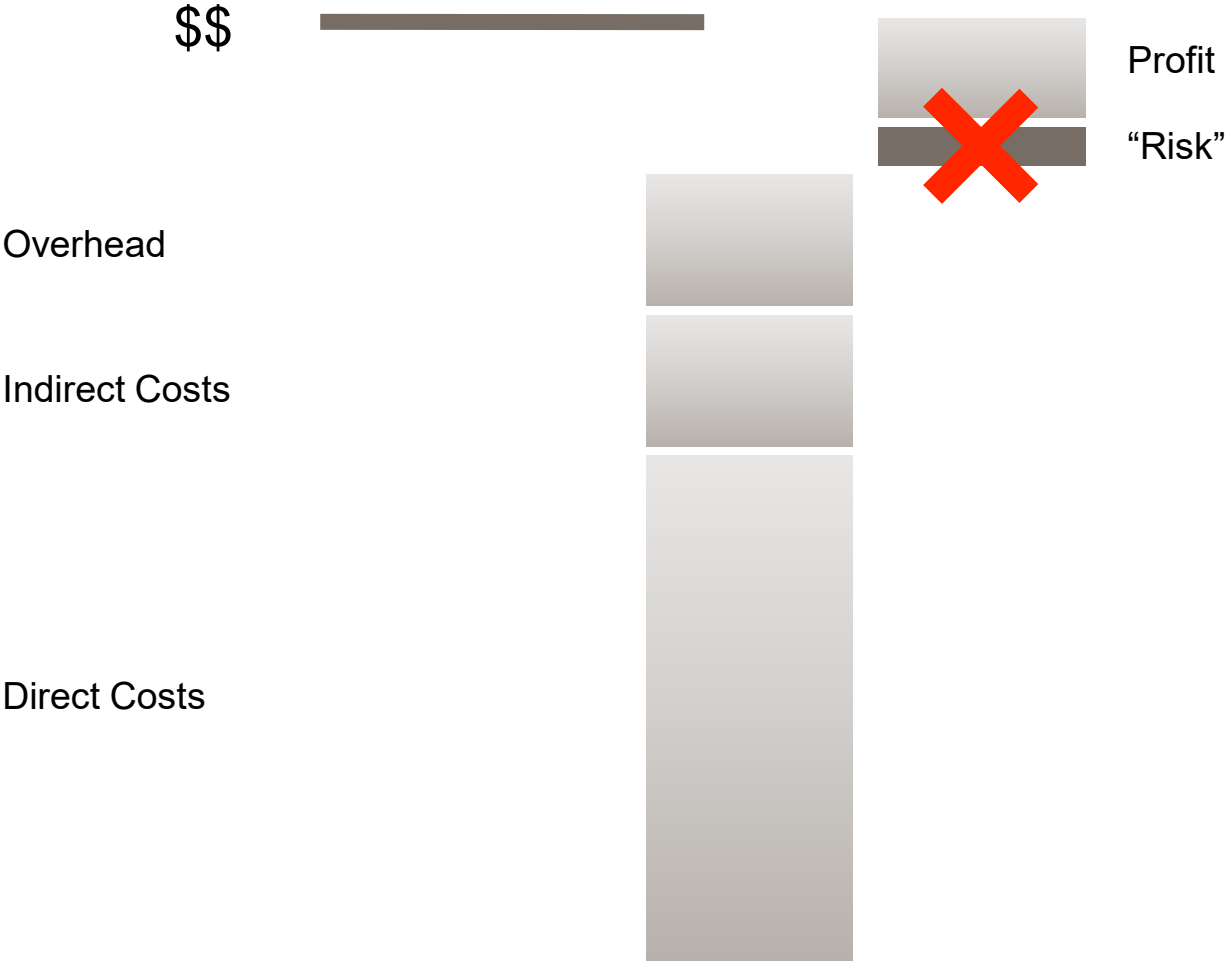
# How Costs Work

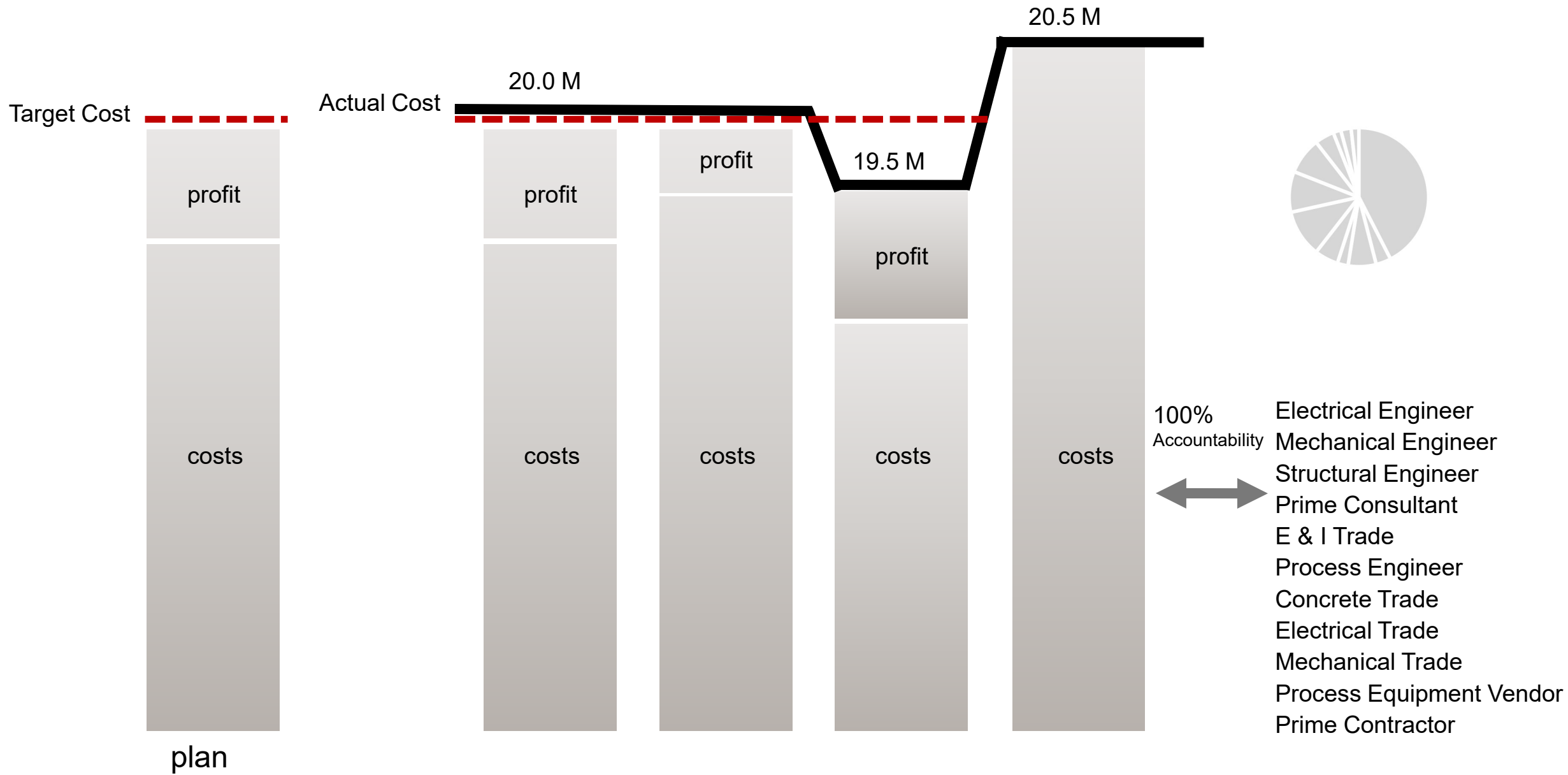
\$\$



- Electrical Engineer
- Mechanical Engineer
- Structural Engineer
- Prime Consultant
- E & I Trade
- Process Engineer
- Concrete Trade
- Electrical Trade
- Mechanical Trade
- Process Equipment Vendor
- Prime Contractor

# How Costs Work





# financial summary

- The owner only ever pays the **true cost** of construction.
- The IPD team collectively places a certain amount of \$\$ into the profit pool at risk.
- The team collectively manages the risk register and risk amount to control project contingency.

one team  
common purpose  
effective communications  
commercial alignment

The contractual and cultural foundations of IPD, more than any other model, drive best for project thinking and behavior

# Finance O+M



# Eliminate Inter-Generational Subsidies for Infrastructure

- Infrastructure costs for most utilities (e.g. gas, electricity) are recovered retroactively over the useful life of the assets.
  - Conversely the cost of water and wastewater infrastructure is typically recovered up-front through Development Charges.
  - **Those charges must then be recovered from purchasers, increasing the cost of developed land and adding to housing affordability challenges**
- If fees are then added to rates to build capital reserves for the repair and replacement of the water and wastewater systems, the affordability problem is compounded.
  - **Creates an Inter-Generational Subsidy in which the first users are paying for the system twice but only using it once.**

# Access to Capital and Financial Flexibility

- Corix financing provides additional flexibility to address specific challenges
  - By utilizing on-balance sheet financing, Corix is able to amortize infrastructure assets over their useful lives rather than over the term of the debt utilized to finance them.
  - Corix is able to “levelize” rates for greenfield developments and rapidly growing regions by incurring losses in the early years and recovering those losses as connections increase.
  - Corix can be reactive to R&R capital requirements – no need to raise user rates to build inefficient capital reserves
- Corix participation does not preclude access to grants and lower cost funding

Rate Requirements - Growing Community



# Rate Certainty and Fairness

- There are established regulatory principles that govern the manner in which User Rates are set for monopoly essential service providers
  - Known as “Rate Base” Regulation, these principles are also used in setting rates for natural gas and electricity providers in regulated jurisdictions
- For unregulated utilities, the amount that the Utility is entitled to receive (the Revenue Requirement) is calculated in accordance with regulatory parameters established by the relevant regulator for water and energy utilities that are subject to regulation.
  - All subjective variables will be defined up-front in the Franchise Agreement that grants the Utility the rights to provide water and/or wastewater services in your communities.
- Franchise agreements can provide the local government with some input and autonomy over rate design and structure

# Corix and BCI

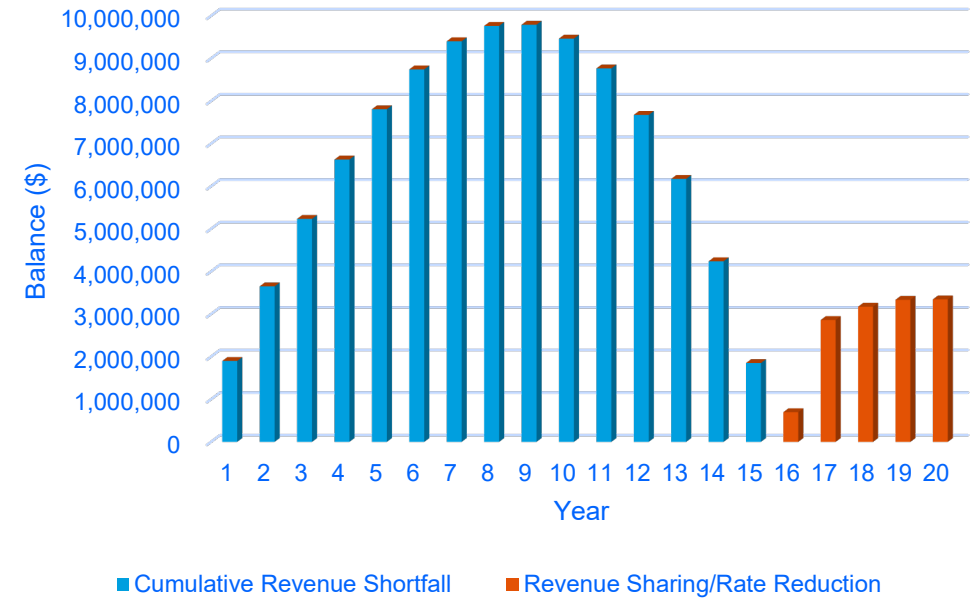
- Corix is 100% owned by BC Investment Management Corporation
  - Leading provider of BC Public Sector pension management
- Why is Corix's financial position and ownership important?
  - Most private water and wastewater utilities are typically not well capitalized, and lack ability to quickly and easily raise substantial funds
  - With private sector utilities some rate payers may be concerned over the degree to which the pursuit of profits may conflict with the best interests of the customer base
- Corix is governed by a public-style Board, with representatives from BCI, Corix and external independent Directors



# Flexible Partnership Options

- Corix is open to a number of different partnership structures, depending upon the needs of the Community and the unique circumstances of each project
- Corix has experience with a number of different partnership structures covering a wide range of options, including:
  - Corix ownership in perpetuity
  - Fixed-term franchise agreements
  - For water utilities in municipal boundaries, Concession agreements in which the Local Government retains legal ownership of the infrastructure must be utilized
- Corix will own the assets, but not the land
- Local governments will have the option to either extend agreements or repurchase the assets, as desired
  - Franchise fees represent a potential revenue source for the community once initial losses are recovered

Rate Levelizing & Revenue Sharing





Please see any of our team members today and tomorrow for questions & discussion