Module 1

Introduction to CM/GC

U.S. Department of Transportation
Federal Highway Administration

innovation ingenuity invention imagination
Every Day Counts

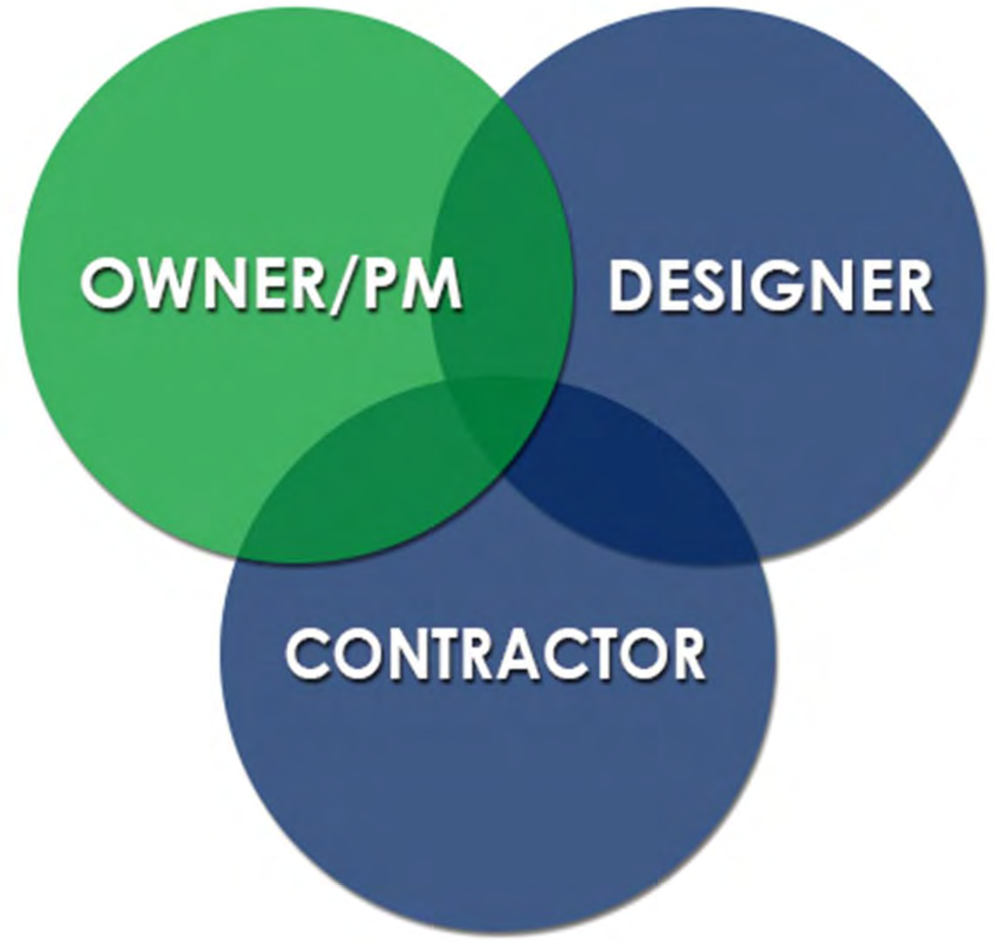
Construction Manager/ General Contractor (CM/GC)

Construction Manager/ General Contractor

Introduction

1.3: Delivery Method Overview

CM/GC Collaboration

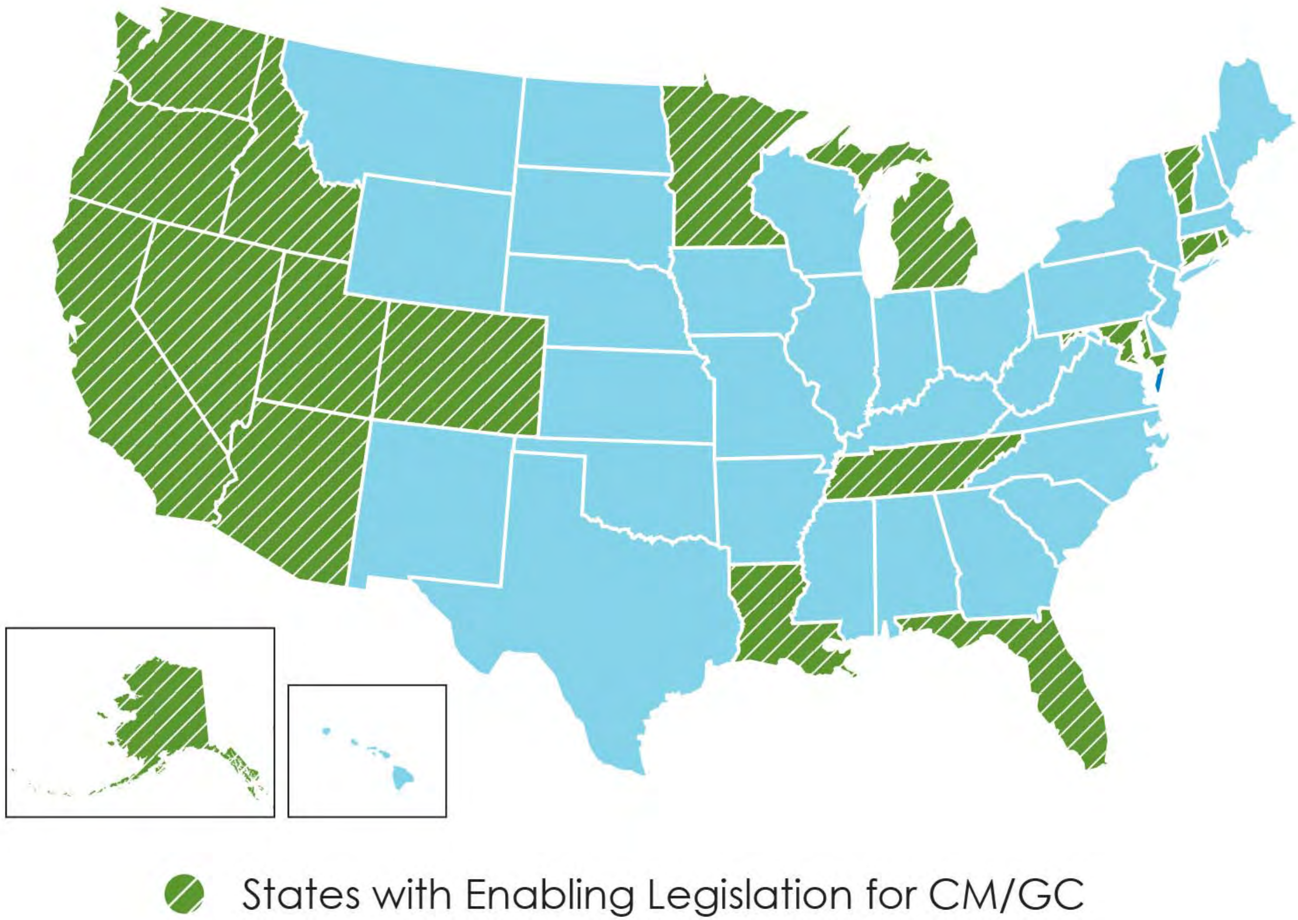


Construction Manager/ General Contractor

State of the Practice

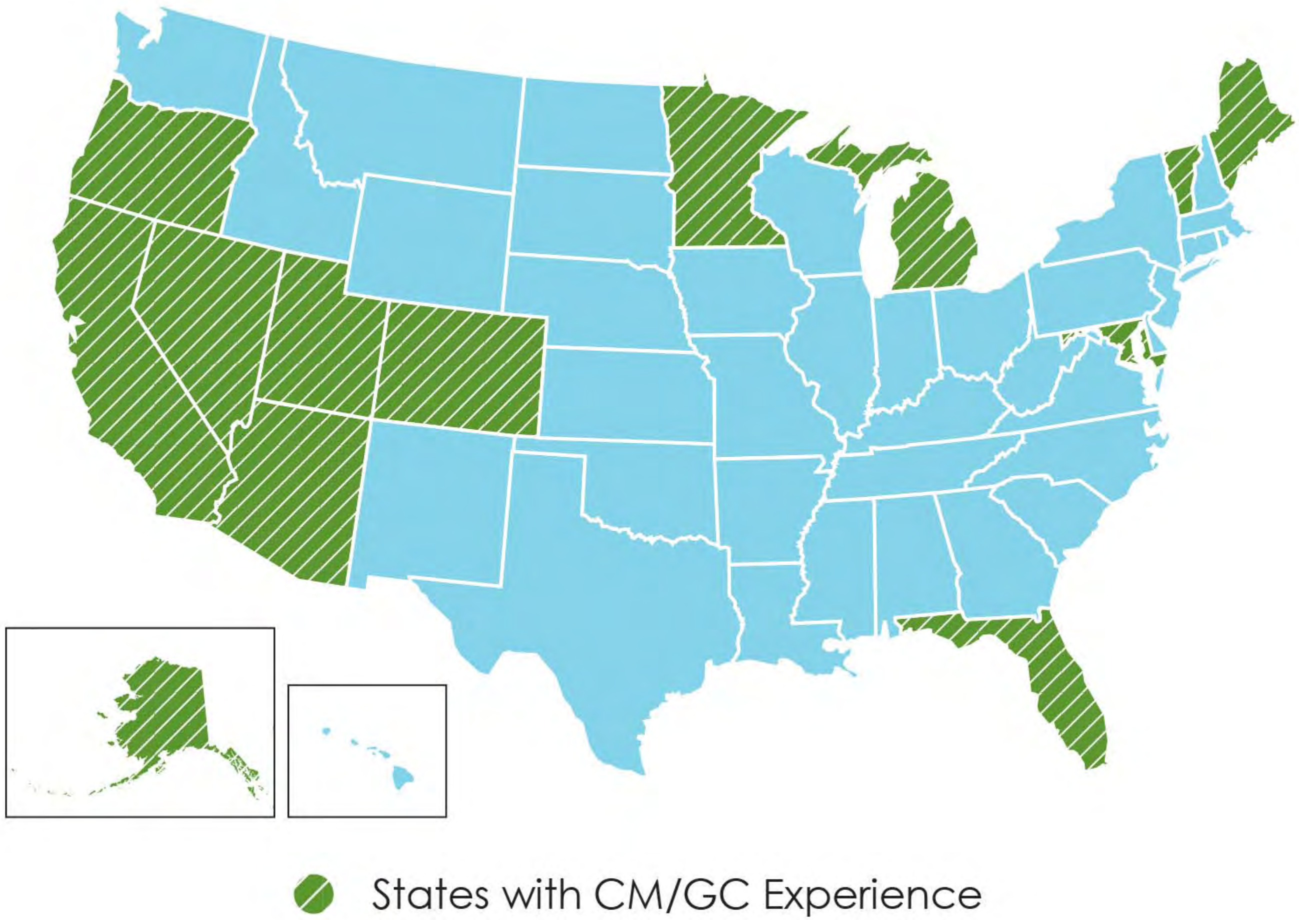
1.2: State of the Practice

States with Legislative Authority to use CM/GC



1.2: State of the Practice

States with CM/GC Experience



1.2: State of the Practice

Why DOT's use CM/GC?

- Inherent project risk
- Opportunities for innovation
- Need for specialized qualifications
- Benefits from early procurement
- Limited or fixed budget

1.2: State of the Practice

Owner Benefits

- Opportunities for innovation
- Risk reduction & allocation
- Improved cost control
- Improved design quality
- Schedule optimization
- Collaboration

Construction Manager/ General Contractor

Delivery Method Overview

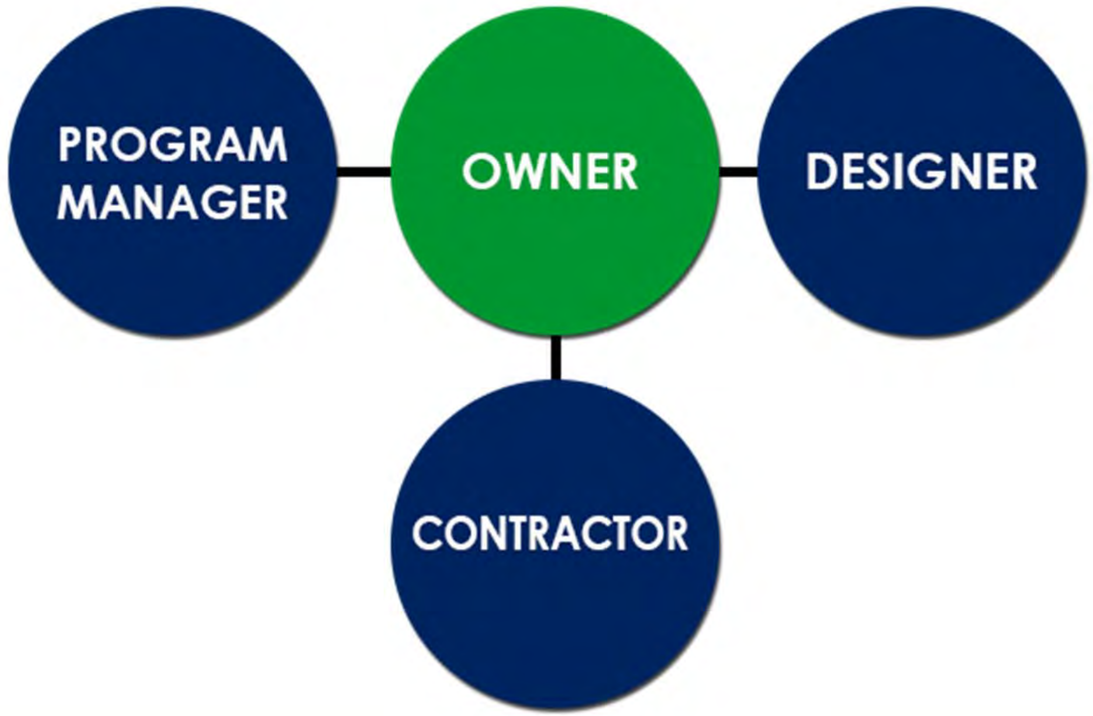
1.3: Delivery Method Overview

What is CM/GC?

Contract with Designer

Two-Phase Contract with Contractor:

- Phase I: Construction Management
- Phase II: General Contracting



1.3: Delivery Method Overview

What is CM/GC? – *Two-Phase Contracting*

PRE-CONSTRUCTION	CONSTRUCTION
Construction Manager	General Contractor
Preconstruction Services	**Construction Services**

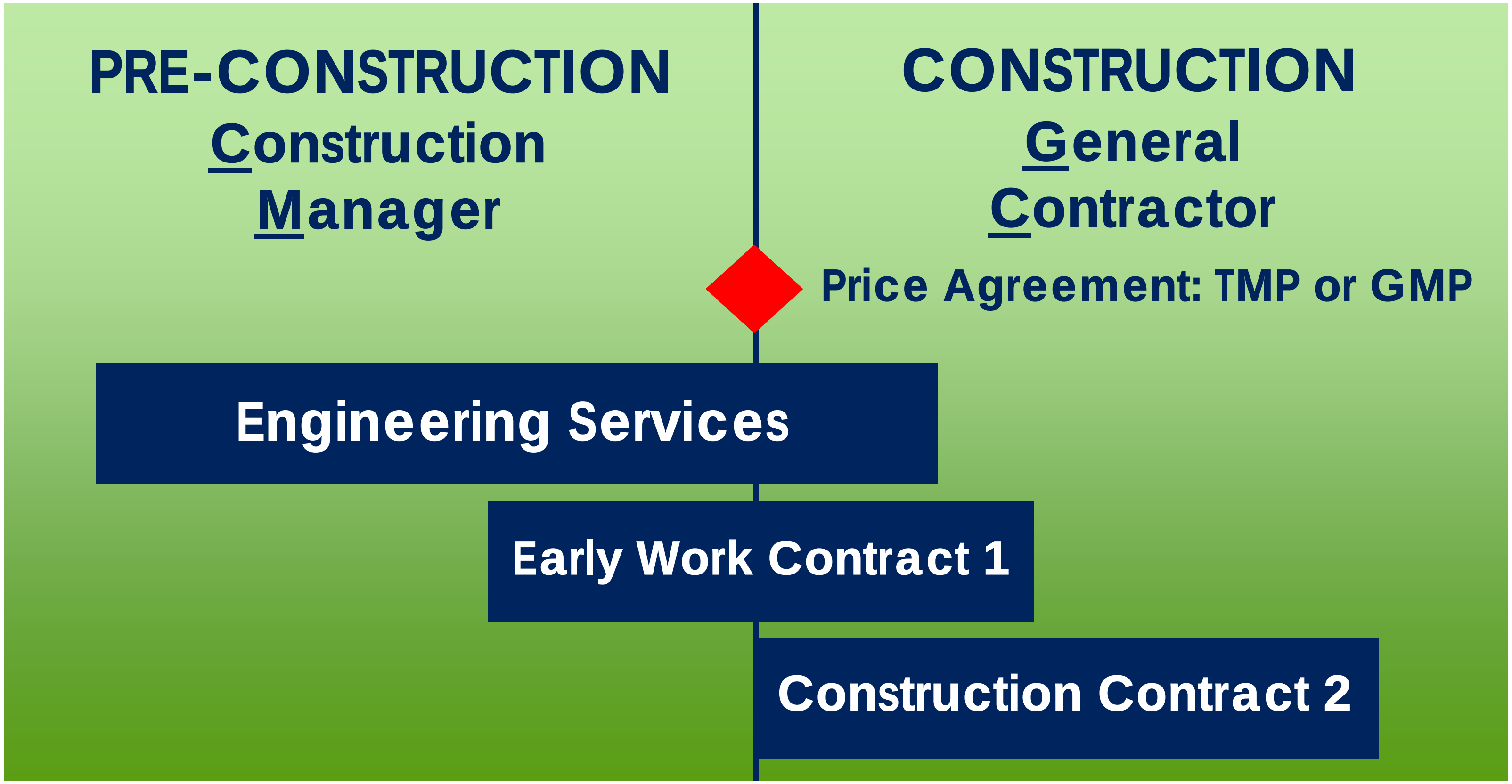
Preconstruction Services:

- *Develop cost model*
- *Constructability Review*
- *Early Schedule Development*
- *Early Material Procurement*
- *Construction Planning*
- *ROW Acquisition*
- *Solve Third Party Issues*

Price Agreement: TMP or GMP

1.3: Delivery Method Overview

What is CM/GC? – *Two-Phase Contracting*



1.3: Delivery Method Overview

Project Team Selection

- **Program Manager & Designer:**
  Qualifications Based Selection

- **Construction Manager:**
  1. Qualifications Based Selection
  2. Best Value Selection
     - Technical score
     - Price

1.3: Delivery Method Overview

Independent Cost Estimator (ICE)

Qualification of ICE

- Contractor experienced in developing cost based estimates
- No conflict of interest
- Qualifications based selection

Role of ICE

- Participate during the design
- Provide project costs
- Assist the DOT in negotiations
- Validate fair price

1.3: Delivery Method Overview

Phase 1: Design

Once we have selected CM/GC and Designer:

Provide constructability Feedback

Identity and mitigate risks

Develop a cost model

*Periodically submit Opinions of Probable Construction Cost (OPCC)

Bid on project

1.3: Delivery Method Overview

CM/GC “Bid” Process

Owner asks CM/GC to submit final Construction Cost:

Two estimates:

1. Designer-furnished Engineers Estimate
2. Independent Cost Estimate (ICE)

Two Possible Outcomes:

1. Owner gets fair price – Proceed with build
2. Owner doesn’t get fair price

Construction Manager/ General Contractor

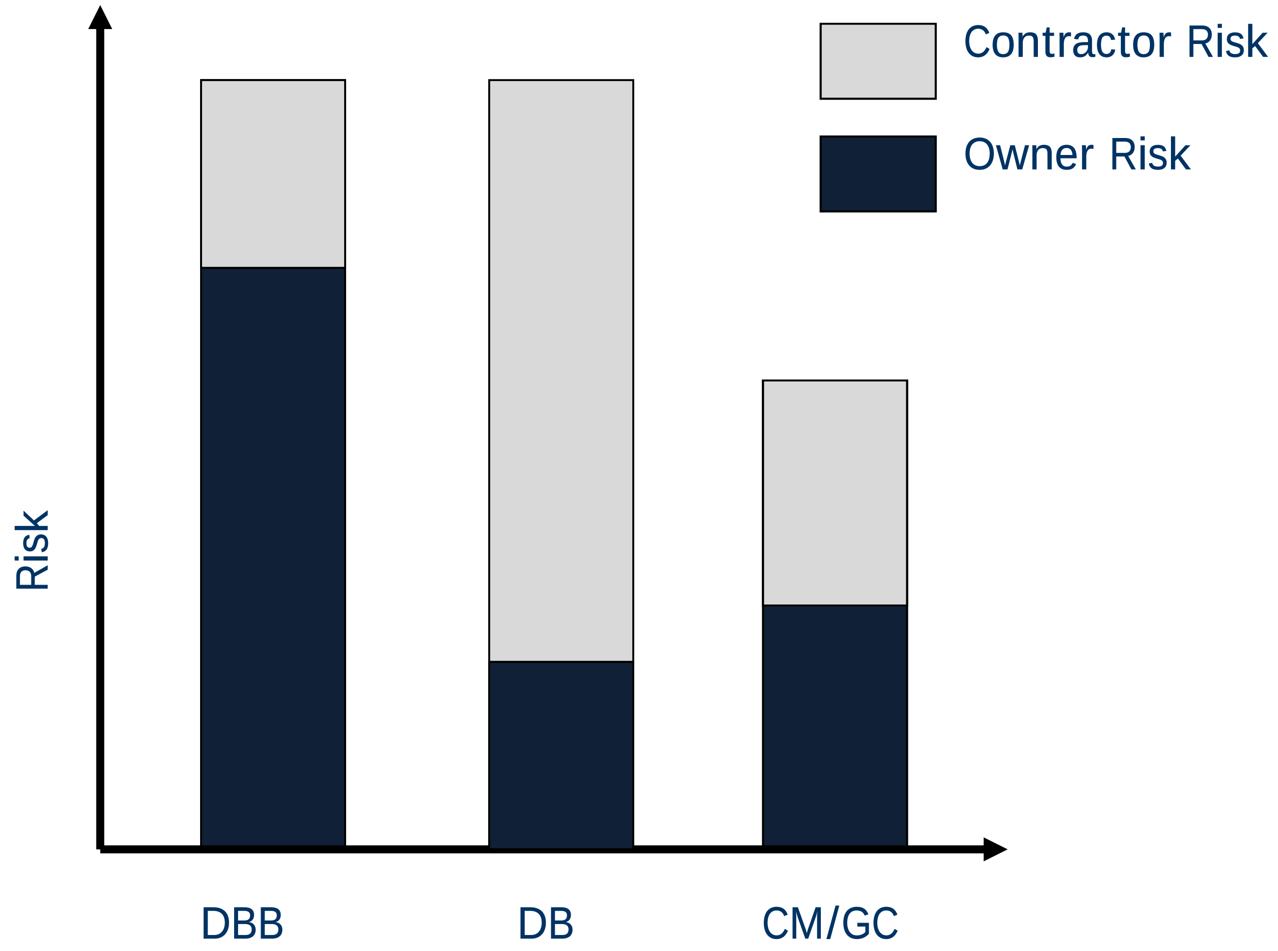
Delivery Method Comparison

1.4: Delivery Method Comparisons

Project Traits	Design-Bid Build	CM/GC	Design Build
Risk Management	✘	✓	✘
Innovation	✘	✓	✓
Constructability	✘	✓	✓
Owner Control	✓	✓	✘
Competitive Pricing	✓	✘	✓
Price Certainty	✘	✓	✓
Schedule Optimization	✘	✓	✓

1.4: Delivery Method Comparisons

Risk Assessment



Construction Manager/ General Contractor

Conclusion

Keys to Success:

1. Have **a solid business case** for implementing a CM/GC program.

2. Contractor selection process must be **transparent to local industry**.

3. Public owner and contractor industry must have a **mature partnering environment.**

4. **Dedicated** staff and **a champion** dedicated to CM/GC deployment.

5. Pilot CM/GC **deployment on smaller less complex** projects.

Thank You!

Cost & Benefits Associated with CM/GC

John Haynes, FHWA Research and Innovation Program Manager





every day counts
An Innovation Partnership with States

U.S. Department of Transportation
Federal Highway Administration

Objectives

- Describe the State-of-Practice
- Provide an Empirical Analysis of Performance
- Give an Agency Perspective on the Results

Federal Highway Research Study

U.S. Department of Transportation
Federal Highway Administration

Two-Year Investigation into ACM Performance

University of Colorado Boulder

KU THE UNIVERSITY OF KANSAS

HILL

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Research Study

Document Benefits, Costs and Risks Associated with Alternative Contracting Methods

Disseminate Lessons Learned

- Conferences
- FHWA TechBriefs
- Webinars

Data Collection Approach

Brief history of DB and CM/GC in Federal highways

1987	1990	2002	2011	2012
FDOT Introduces D-B Program	FHWA Allows D-B under SEP-14	FHWA Issues Final DB Rule	FHWA Every Day Counts CM/GC	MAP 21 Authorizes CM/GC

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Data Collection Approach

Goals

- Collect the largest highway project delivery database
- Collect diverse sample of <u>completed</u> projects

  - Geographic
  - Project type
  - Project size
  - Project complexity

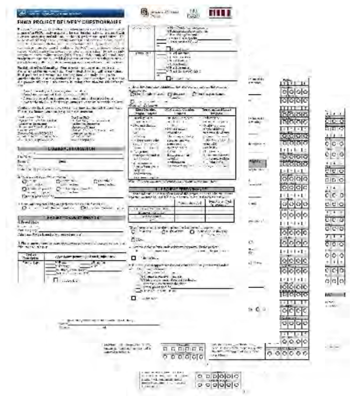
✓ Seek statistically significant results

Data Collection Approach

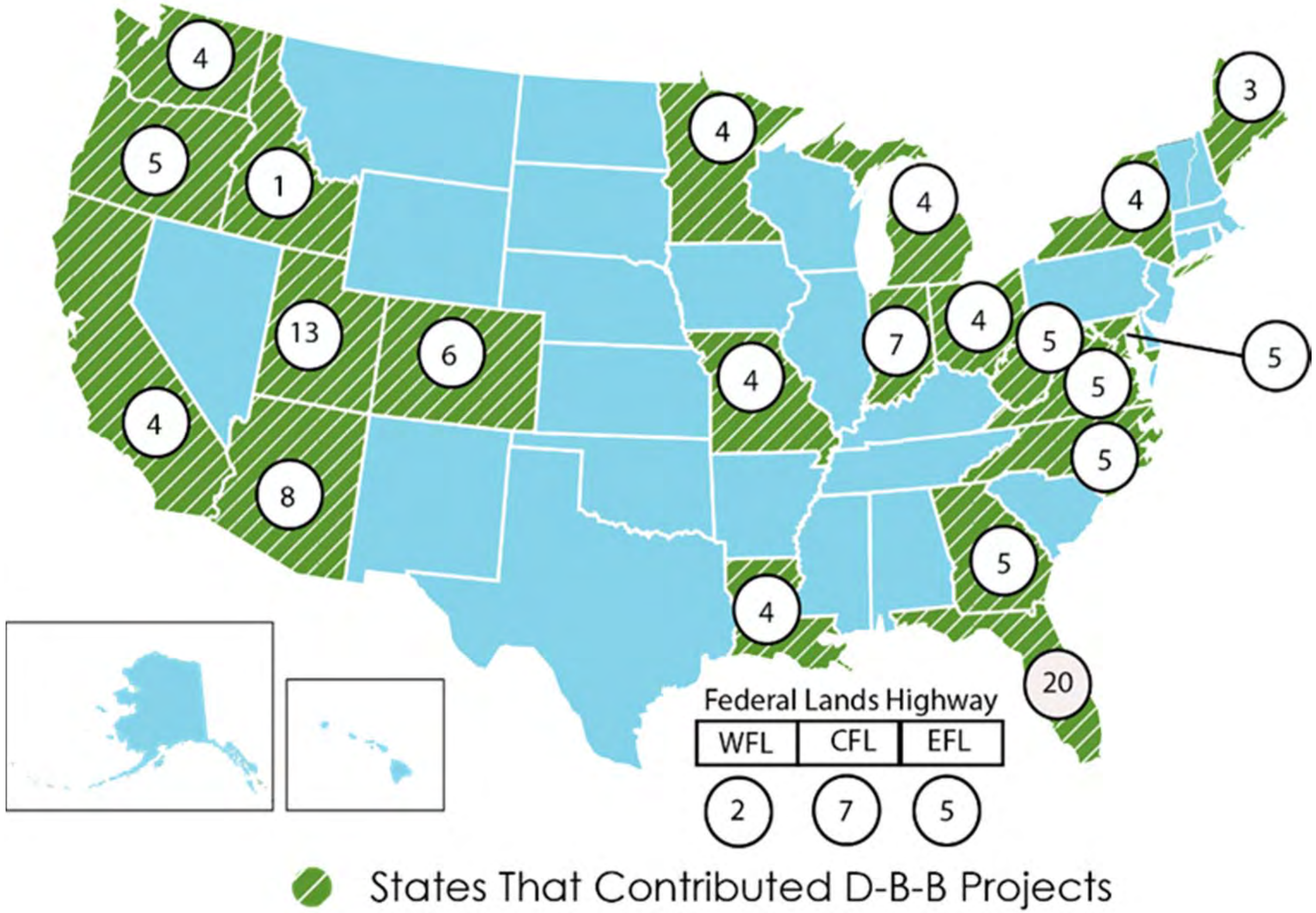
Two-step data collection approach

1. Contract cost and time from contracting databases
2. Additional project characteristics from project managers

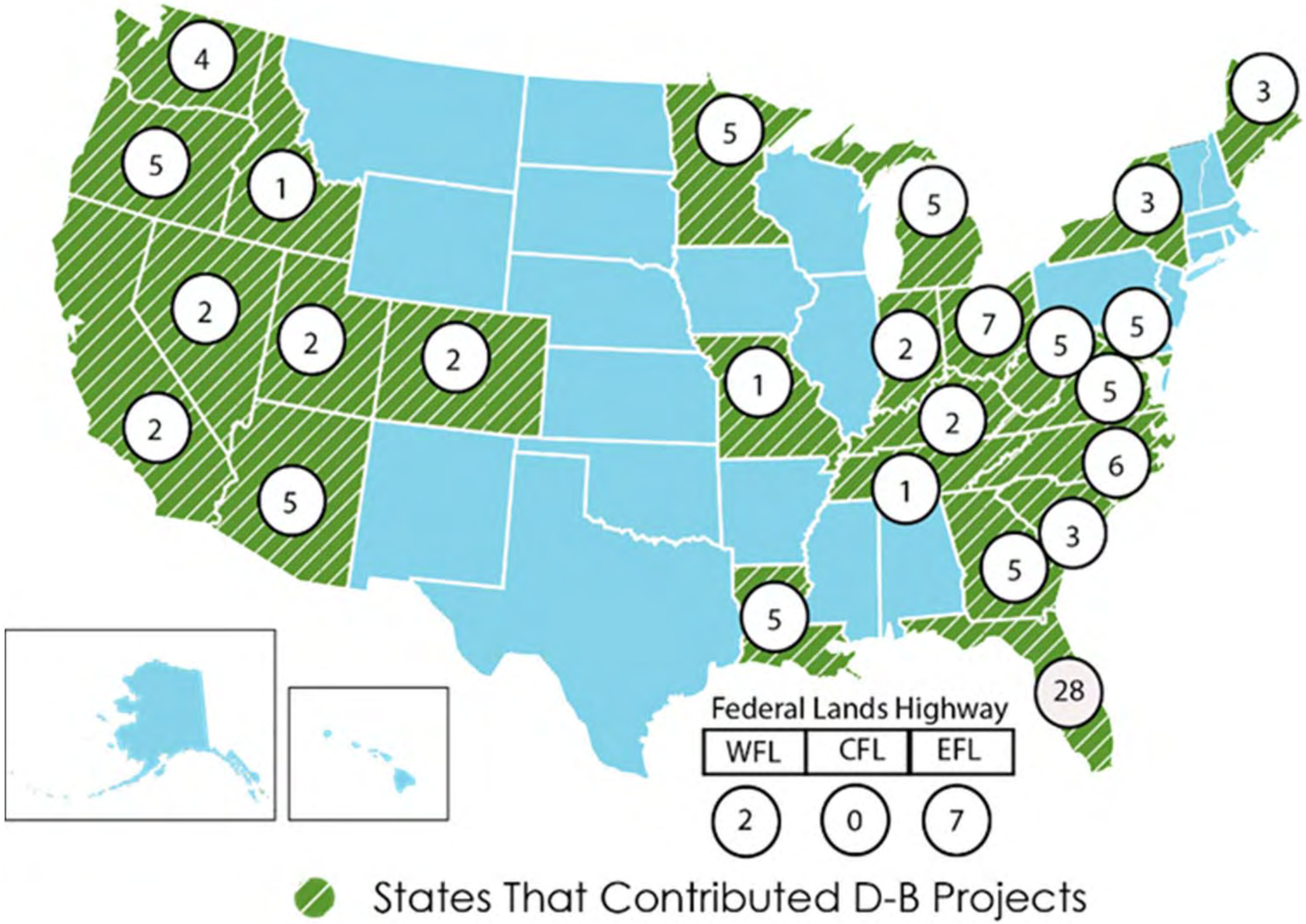
Follow-up calls for data validation



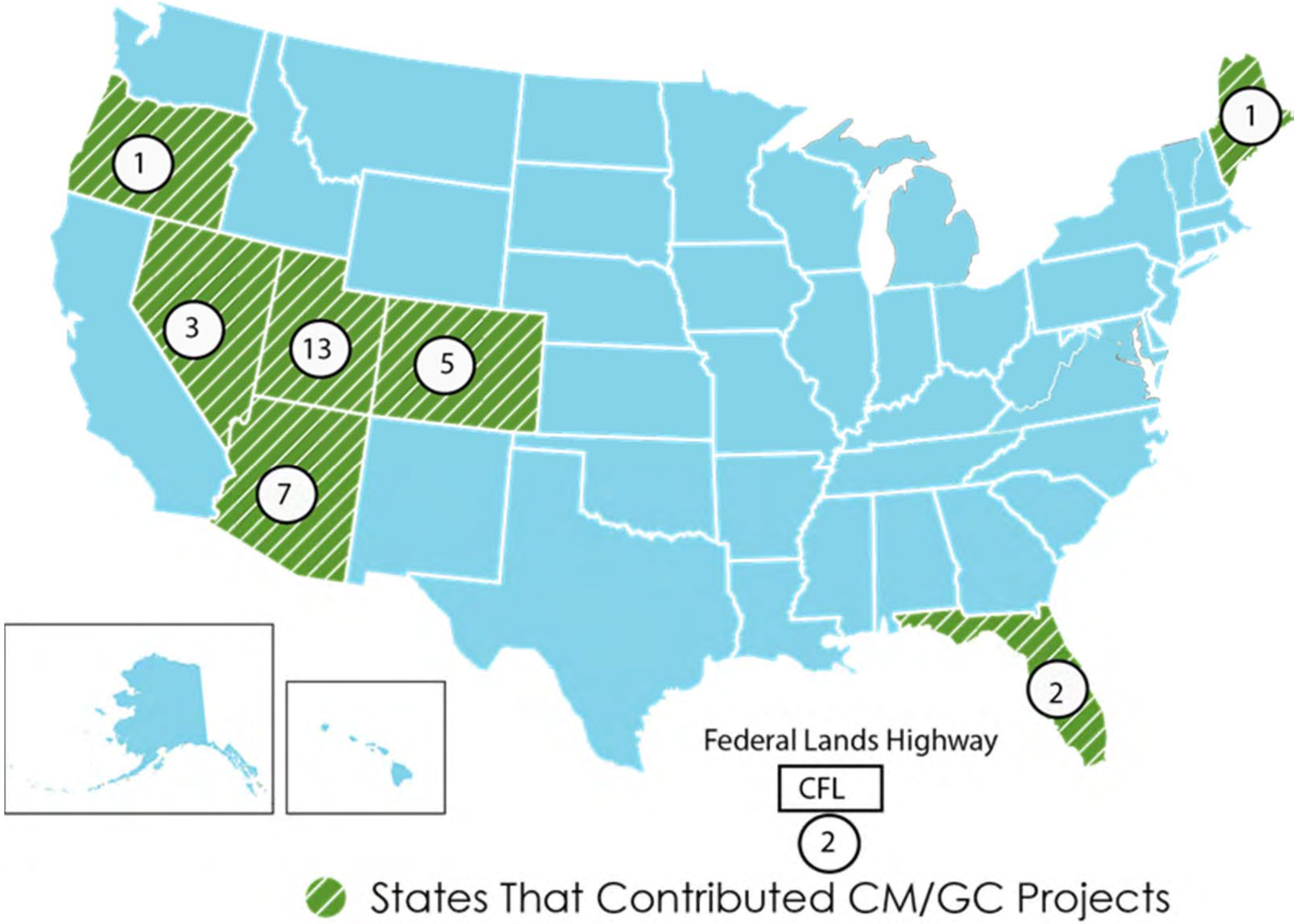
Data Collection Overview - DBB



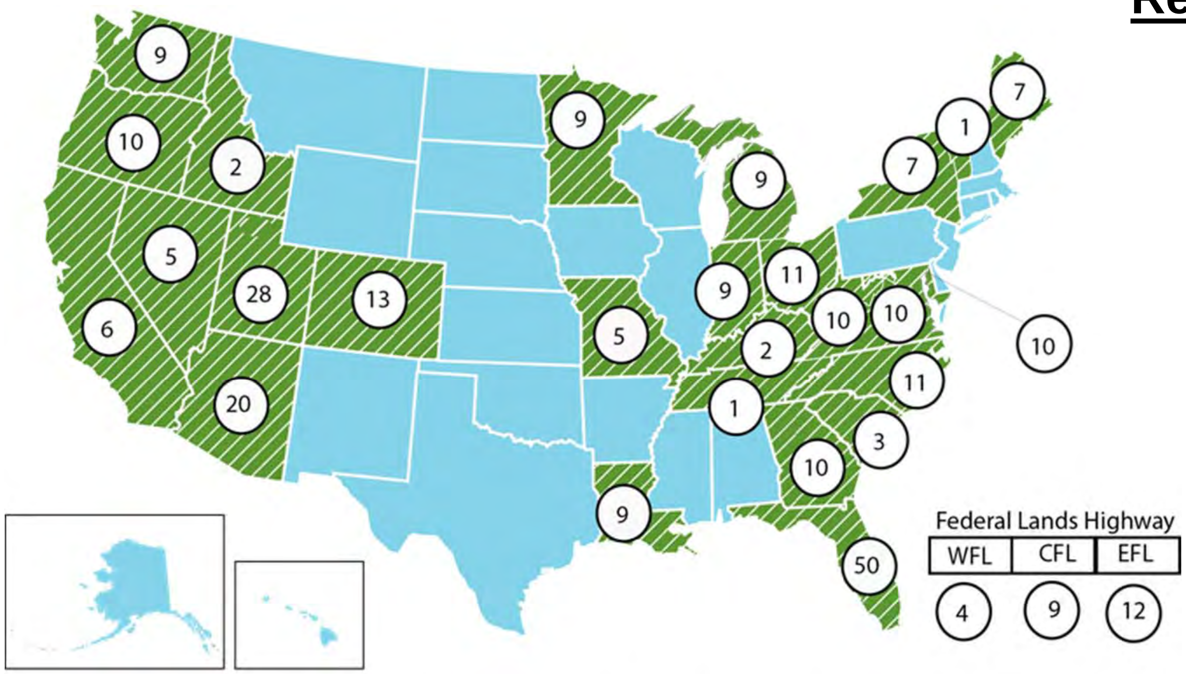
Data Collection Overview – D-B



Data Collection Overview – CM/GC



Data Collection Overview



States That Contributed: D-B-B, CM/GC & D-B Projects

Research Data Collection

291 projects

- 134 D-B-B projects
- 34 CM/GC projects
- 39 D-B/LB projects
- 84 D-B/BV projects

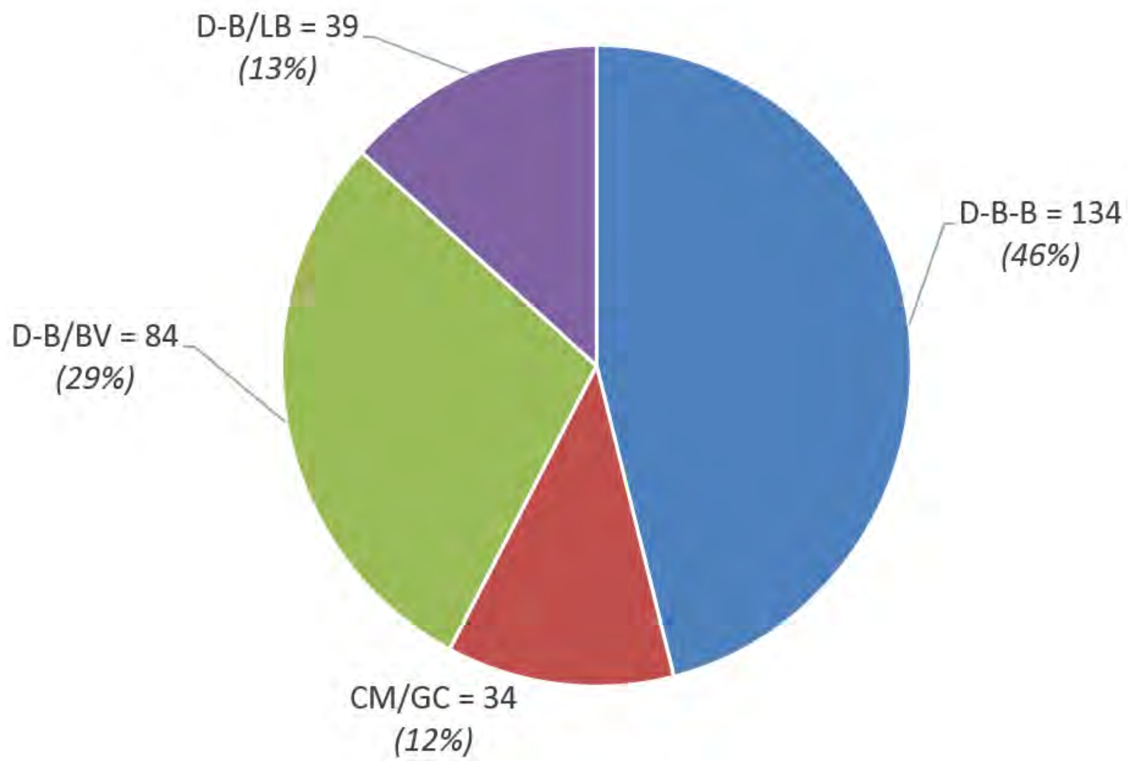
28 agencies

- Completed 2004-2015

Data Population Characteristics

- Project Delivery Methods
- Procurement Methods
- Payment Methods
- Average Project Cost and Duration

Project Delivery Methods



Project Procurement Procedures

Procurement Procedure	D-B-B (n=134)	CM/GC (n=34)	D-B/LB (n=39)	D-B/BV (n=84)
Low Bid	80%	0%	100%	0%
Best Value	14%	47%	0%	100%
Qualification-Based	1%	41%	0%	0%

**Total of each column may not sum to 100% because of unclassified procurement procedures by respondents.*

Contract Payment Methods

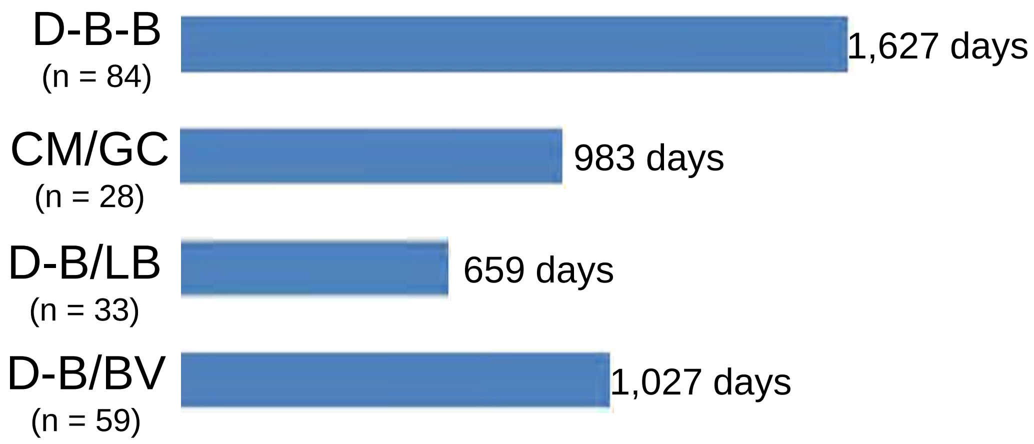
Payment Method	D-B-B (n = 134)	CM/GC (n = 34)	D-B/LB (n = 39)	D-B/BV (n = 77)
Lump sum	2%	3%	85%	91%
Unit price	93%	38%	5%	0%
GMP	0%	56%	0%	4%

**Total of each column may not sum to 100% because of unclassified payment procedures by respondents.*

Average Project Award Cost

Contracting Method	Mean Cost ($k)	Median Cost ($k)	Max Cost ($k)
D-B-B (n=134)	20,287	12,438	252,052
CM/GC (n=34)	36,328	19,167	235,936
D-B/LB (n=39)	10,646	4,384	68,826
D-B/BV (n=77)	43,364	22,128	357,760
All Projects (n=284)	26,908	13,920	357,760

Average Project Duration



Average Award Cost *(repeated)*

Contracting Method	Mean Award Cost ($k)
D-B-B (n=134)	20,287
CM/GC (n=34)	36,328
D-B/LB (n=39)	10,646
D-B/BV (n=77)	43,364

Summary of Major Results

Alternative Contracting Methods

- Apply to a variety of project sizes and complexities
- Greatly expedite timing of award
- Significantly increase project intensity
- Have no significant impact on cost growth

Average Project Award Cost

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Applications for Small Projects

Project Delivery Type	Mean Cost ($k)	< $20M	< $10M
D-B-B (n=134)	20,287	63%	39%
CM/GC (n=34)	36,328	47%	29%
D-B/LB (n=39)	10,646	82%	70%
D-B/BV (n=77)	43,364	38%	27%
Total	26,908	59%	38%

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Applications for Small Projects

Project Delivery Type	Mean Cost ($k)	< $20M	< $10M
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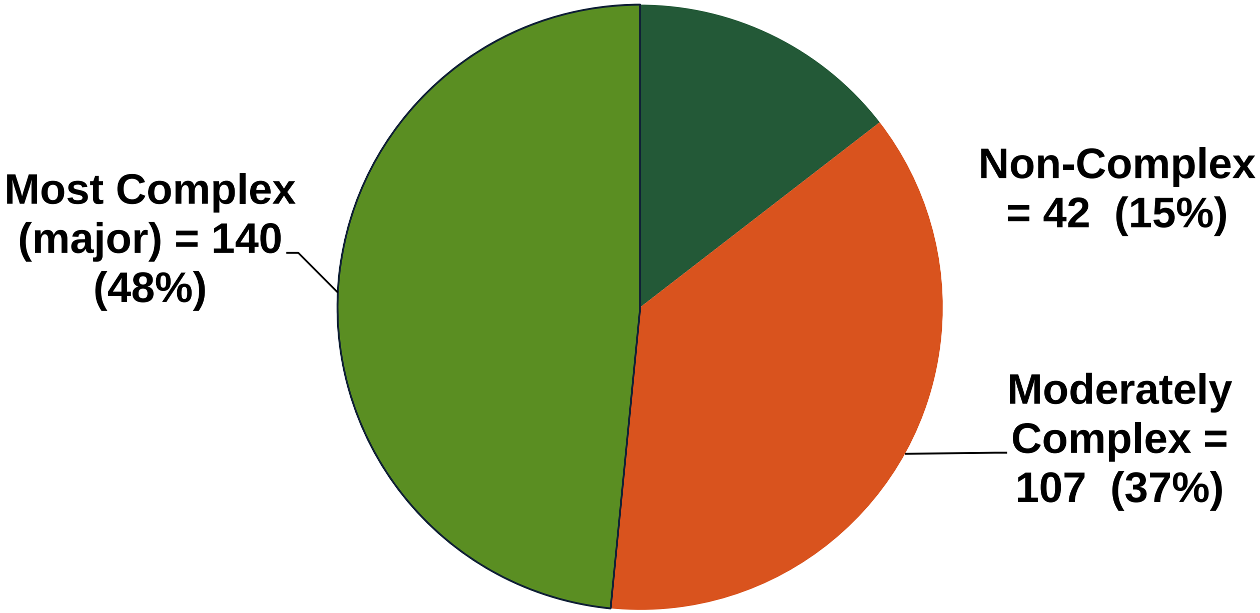
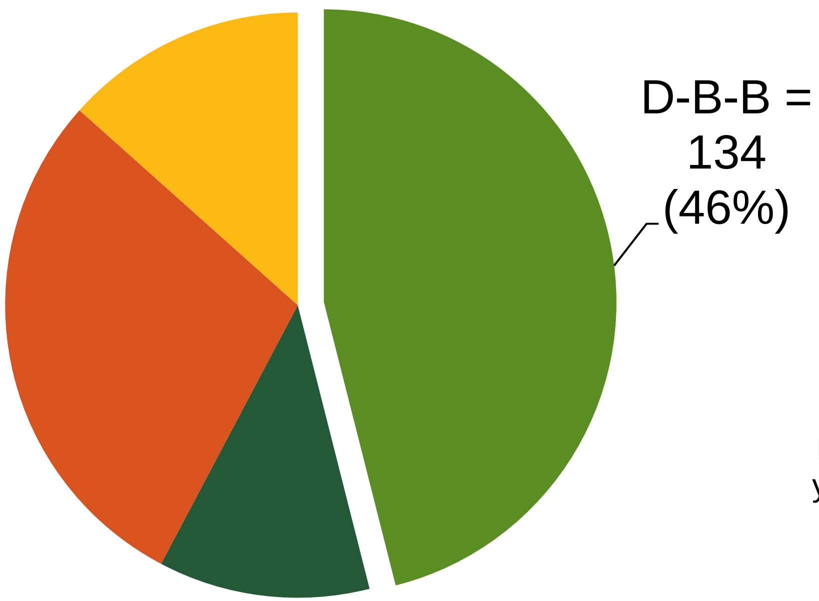
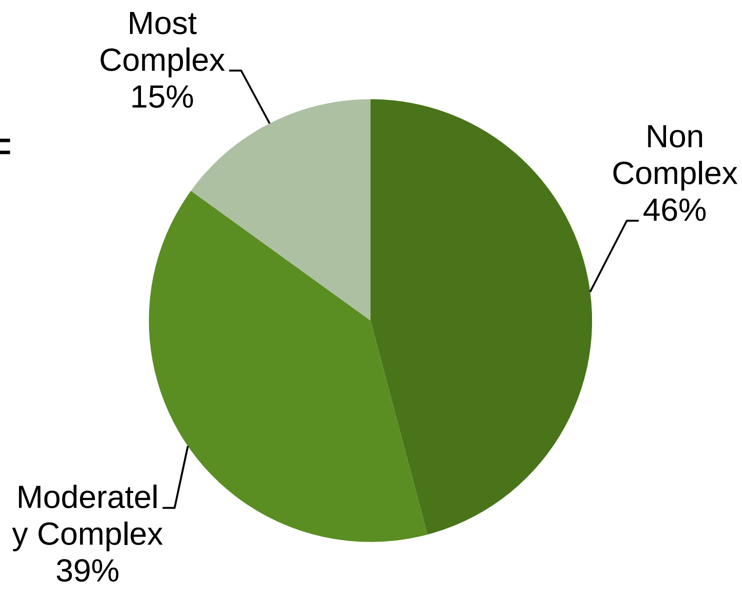
Project Complexity

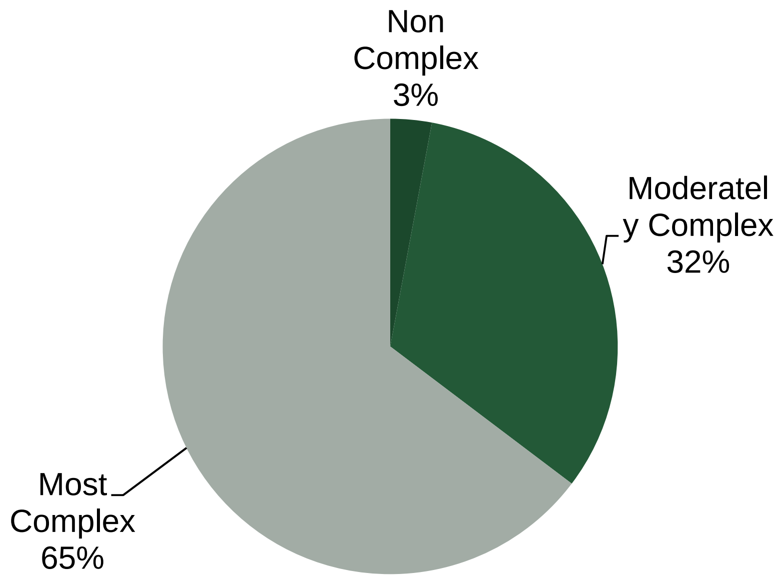


D-B-B Project Complexity

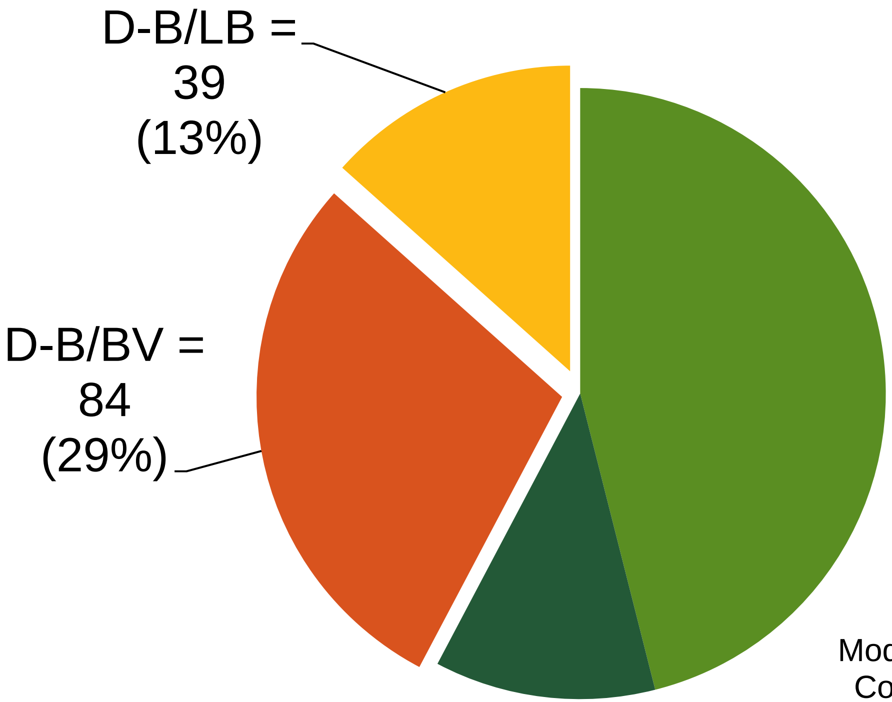


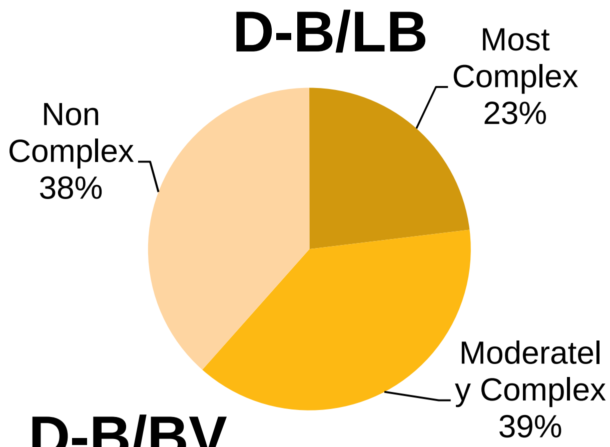


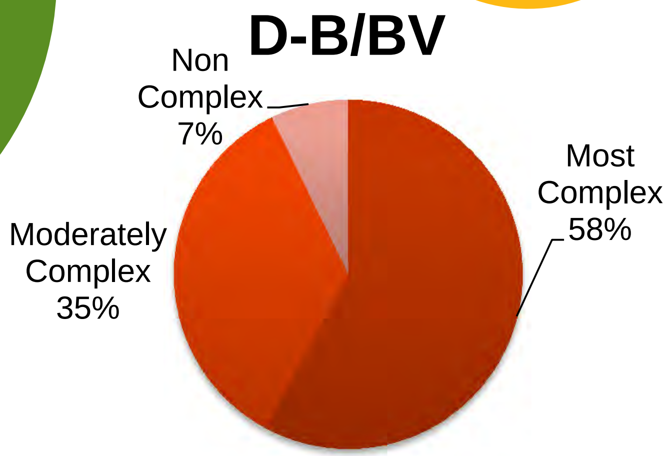
CM/GC Project Complexity



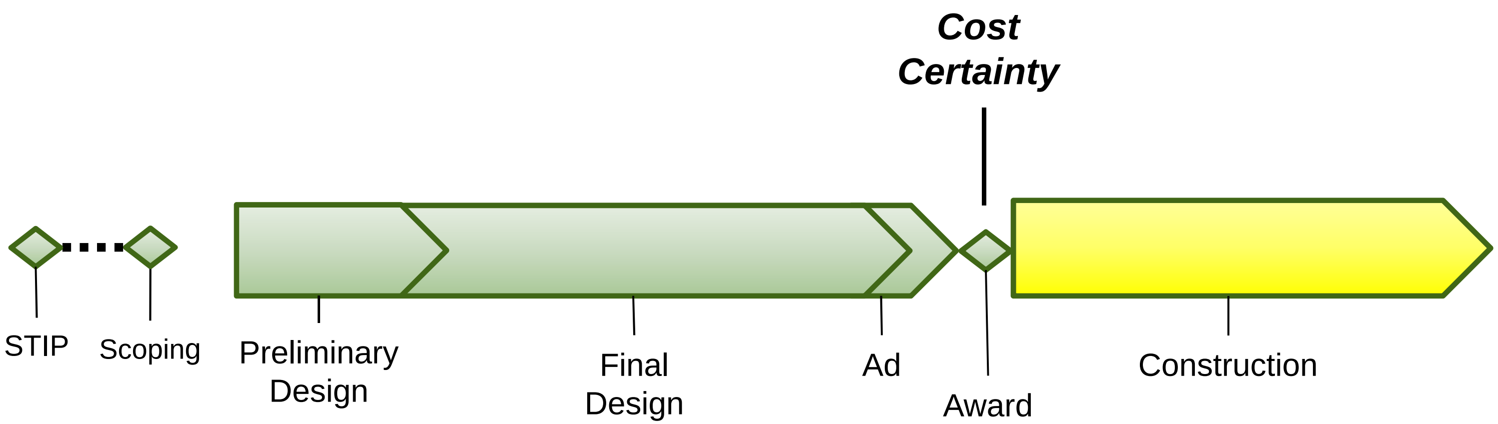
D-B Project Complexity



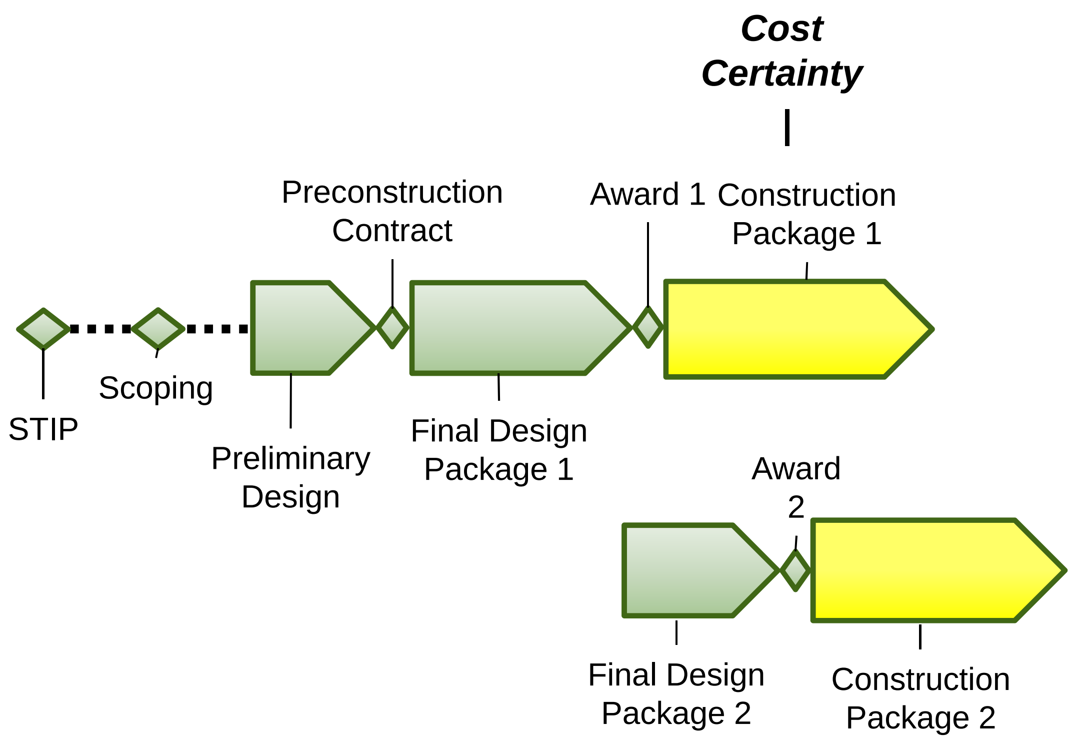




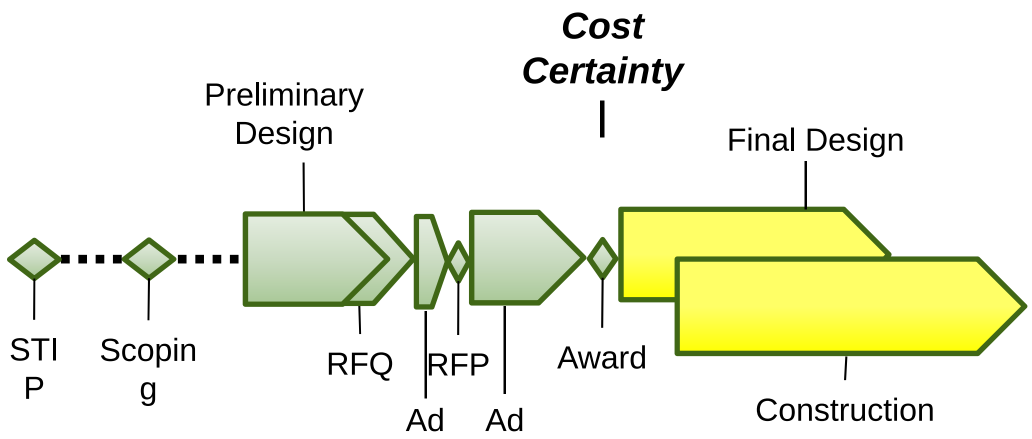
D-B-B Timing of Award



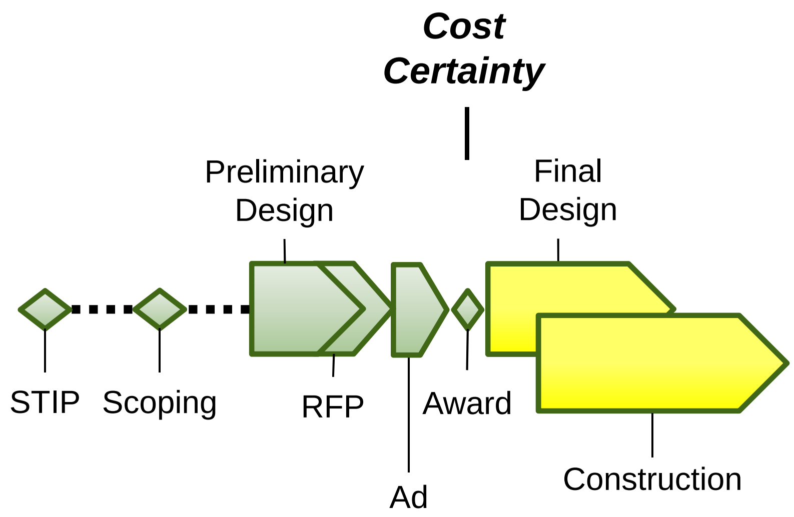
CM/GC Timing of Award



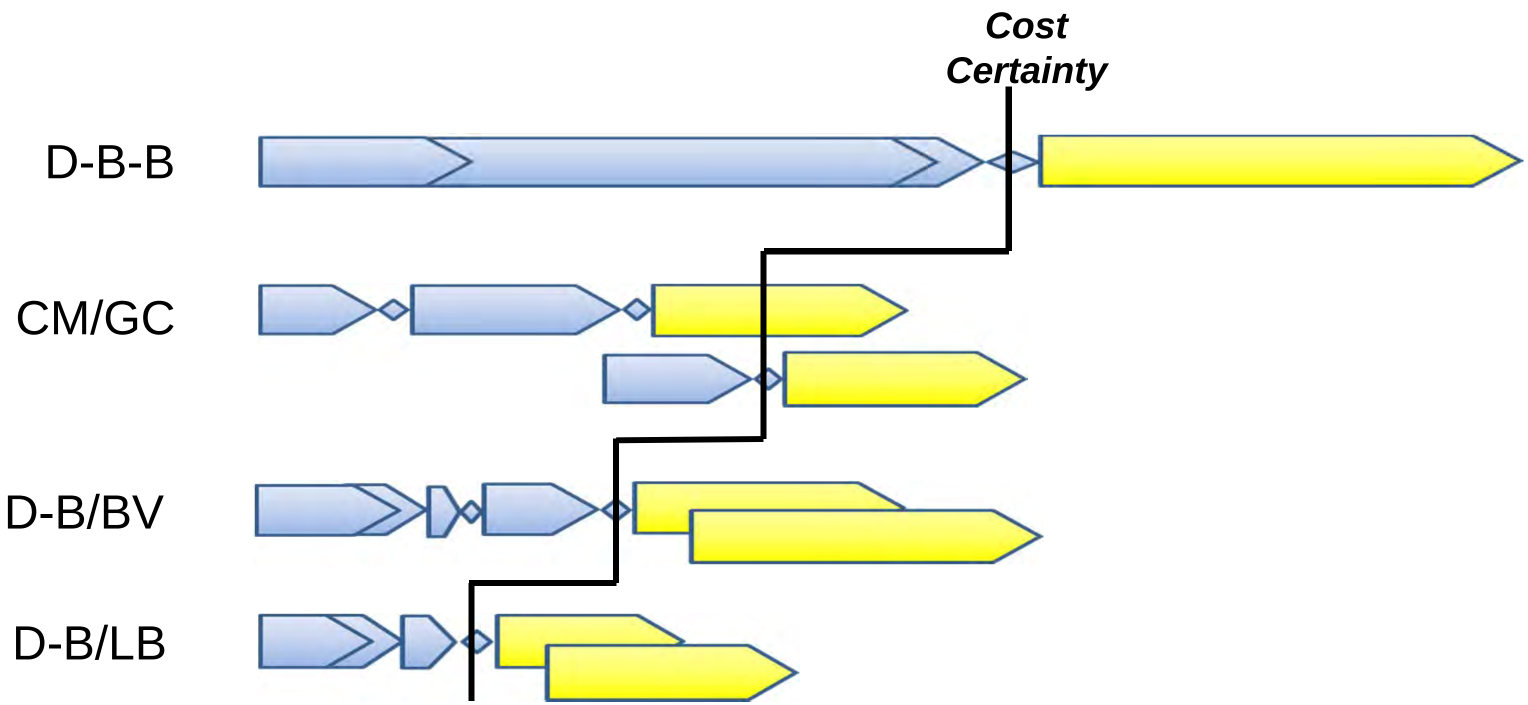
Design-Build/Best Value (D-B/BV)



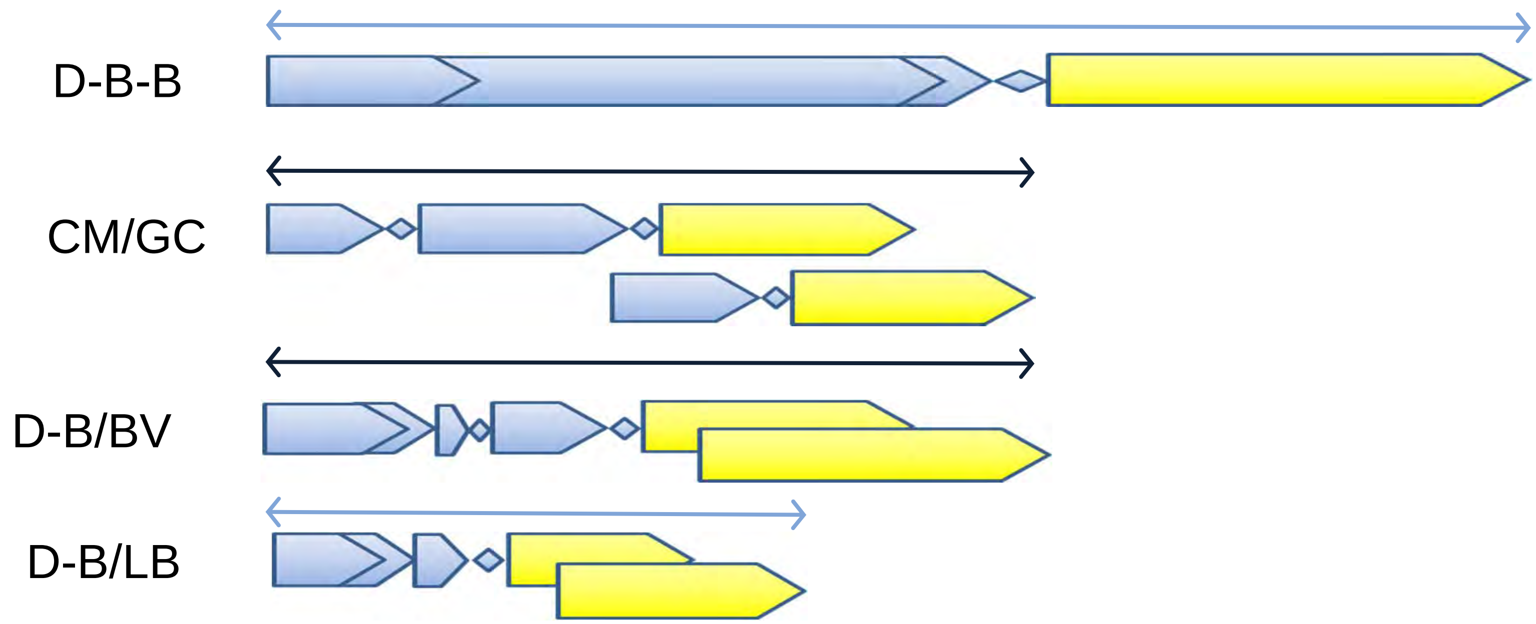
D-B/LB Timing of Award



Timing of Award



Project Intensity ($/Day)



Project Intensity ($/Day)

Contract Method	Mean ($/day)	Median ($/day)	Max. ($/day)
D-B-B (n=82)	13,857	7,244	64,971
CM/GC (n=28)	36,826	23,152	159,030
D-B/LB (n=26)	10,382	5,731	39,943
D-B/BV (n=61)	29,283	27,611	76,811

Cost Metrics

Award Growth

- Engineer's Estimate to Contract Amount

Construction Cost Growth

- Award to Final

Change Orders by Type

Cost Metrics

Award Growth (Engineer's Estimate to Award)

Contract Method	Mean	Min.	Max.
D-B-B (n=129)	-9%	-51%	42%
CM/GC (n=31)	3%	-13%	15%
D-B/LB (n=37)	-5%	-58%	104%
D-B/BV (n=78)	-7%	-51%	77%

Cost Metrics

Construction Cost Growth (Award to Final)

Contract Method	Mean	Min.	Max.
D-B-B (n=131)	4.1%	-21.8%	33.1%
CM/GC (n=31)	0.9%	-12.0%	14.5%
D-B/LB (n=39)	3.7%	-5.6%	24.9%
D-B/BV (n=81)	3.8%	-4.5%	19.6%

*** Note D-B methods include design and construction cost.**

Cost Metrics

Average Impact of Change order Categories (% of Award)

Change Orders	D-B-B (n = 65)	CM/GC (n = 19)	D-B/LB (n = 21)	D-B/BV (n = 57)	All Projects (n = 162)
Agency Directed	1.2%	0.7%	1.6%	1.9%	1.5%
Plan Errors and Omissions	0.9%	0.6%	0.1%	0.5%	0.6%
Plan Quantity Changes	1.1%	0.3%	0.6%	0.2%	0.6%
Unforeseen Conditions	2.4%	1.5%	1.8%	1.8%	2.0%
Other	0.2%	0.2%	0.9%	0.3%	0.3%
Total Cost Growth	5.8%	3.4%	5.0%	4.7%	5.0%

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Summary of Major Results

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- Apply to a variety of project sizes and complexities
- Greatly expedite timing of award
- Significantly increase project intensity
- Have no statically significant impact on cost growth

Questions?

Value of a CM/GC Program Manager

Mike Baker, PE - David Evans and Associates, Inc.

September 20, 2016

Agenda

- Why a Program Manager (PM)
  - Aligning project needs and the PM role
  - Value added through the PM role
  - Early lessons learned
  - Scalability of Program Manager

Reasons Owners Hire a Program Manager

- Fast/flexible access to skilled experts
- Increased staffing capacity for timely delivery
- Strong owner/project partnership and advocacy
- Efficient service and procurement
- Easy transition after project
- ‘A shield in a storm’

Example- Owner's Successful History Delivering Bridge Projects

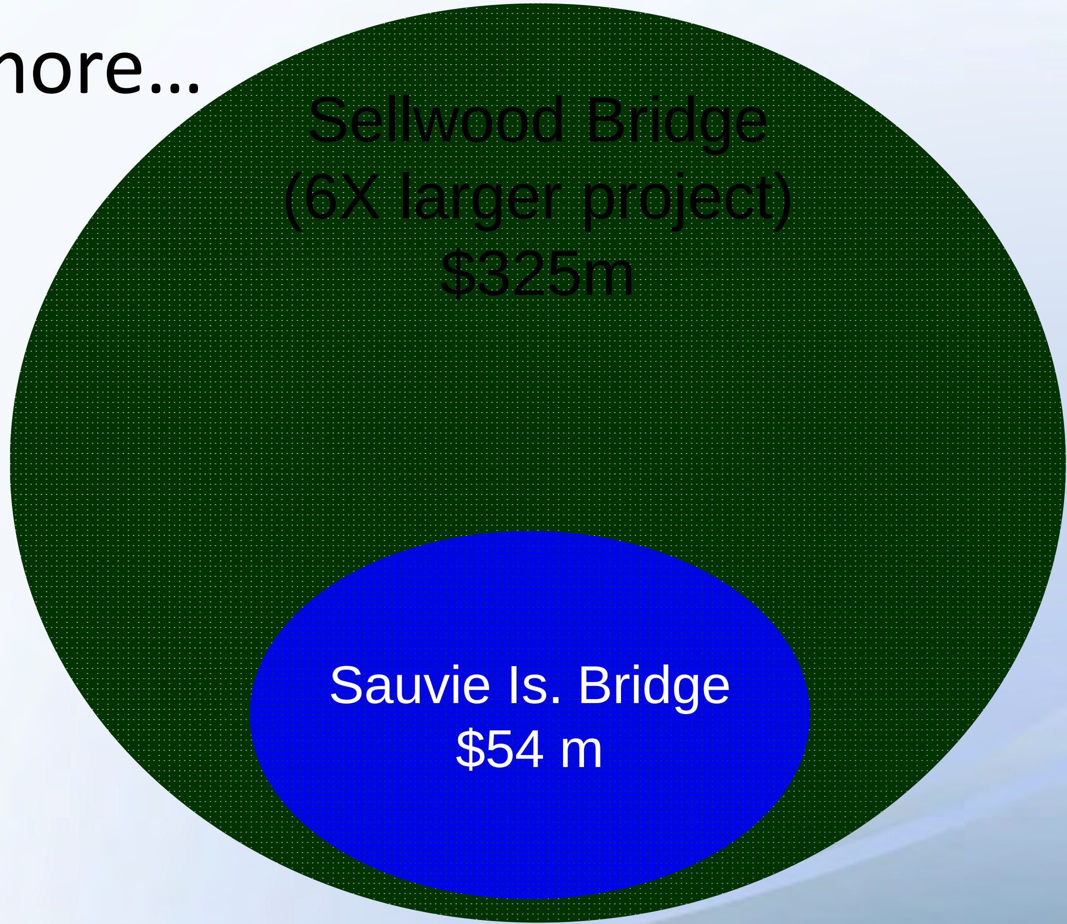
Owner staffed to deliver small to mid-size projects

- Hawthorne Bridge - $21 million
- Broadway Bridge- $26 million
- Sauvie Island Bridge- $54 million

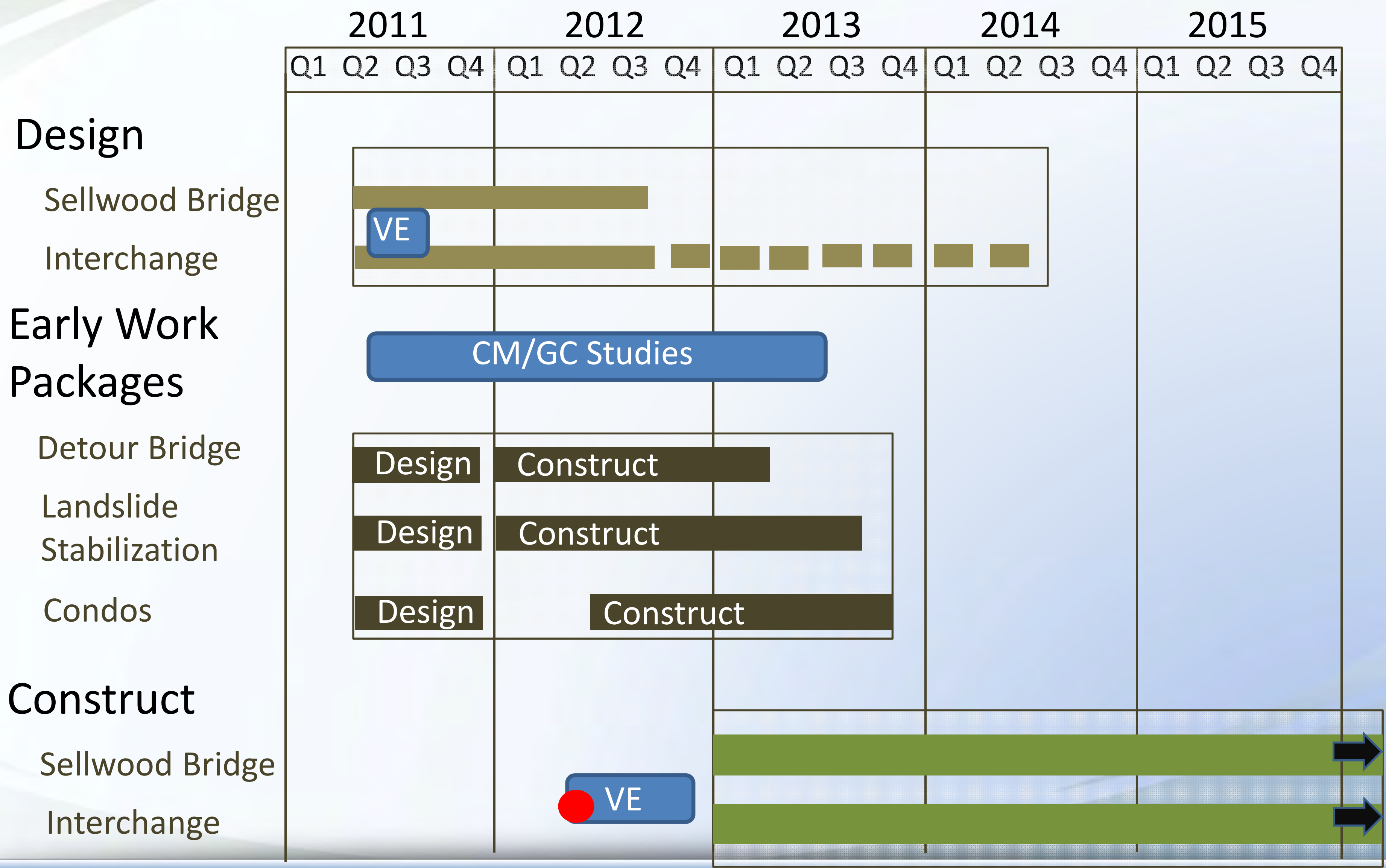
Why a Program Manager

Sellwood Bridge has more…

- Political Oversight
- Public engagement
- Complexity
- Risk
- Intergovernmental coordination
- Funding need
- Scope/cost
- Schedule Risk



Advancing the Project on Many Fronts



Program Manager Role- the First 30 days

- Get up to speed on relevant project issues/materials
- Designer and CM/GC selection
- Assignments and meeting leadership
- Meet Political leaders and other public owner staff
- Integrate program manager team with County staff
- Oh, and we need to build a trusting relationship

Establish Credibility and Build Trust Fast

- Listen, understand and translate needs into actions
- Anticipate owner needs
- Augment the owner's strengths and desired role
- Spend time getting to know each other
- Invite and share feedback
- Support each other while at the woodshed

Supporting Owner During Pre-Construction

Activity	Public Owner	Program Mgr.
Project Leadership & Strategy	Lead	Co-Lead
Key Meeting Leadership	Support	Lead
Lead Design reviews	Support	Lead
Project Controls and cost estimating	Support	Lead
Contract development (A&E, CM/GC)	Support	Lead
Right of Way	Lead	Support
Environmental Permits	Support	Lead
Public Involvement	Lead	Support

Supporting Owner During Construction

Activity	Public Owner	Program Mgr.
Project Leadership & Strategy	Lead	Co-Lead
Key Meeting Leadership	Support	Lead
Project Controls and cost estimating	Support	Lead
Environmental Permits	Support	Lead
Public Involvement	Lead	Support
RFIs, CO's, submittals	Support	Lead
Quality assurance and survey	Support	Support
Field inspection	Lead	Support
On-going cost validation/negotiation	Support	Lead

Early Value Through PM Role

- Accelerated designer and CM/GC selection
- Helped Manage Inter-Agency Relationships
- Quickly established co-located project office
- Pricing, contract and negotiation support
- Risk assessment and value engineering
- Develop strategy and decision-making process

Examples of Early Value Through PM Role

- Timely response to inspection services required
- Flexible staffing transition
- Hired the ICE quickly as owner requested

Early Owner and PM Success Drivers

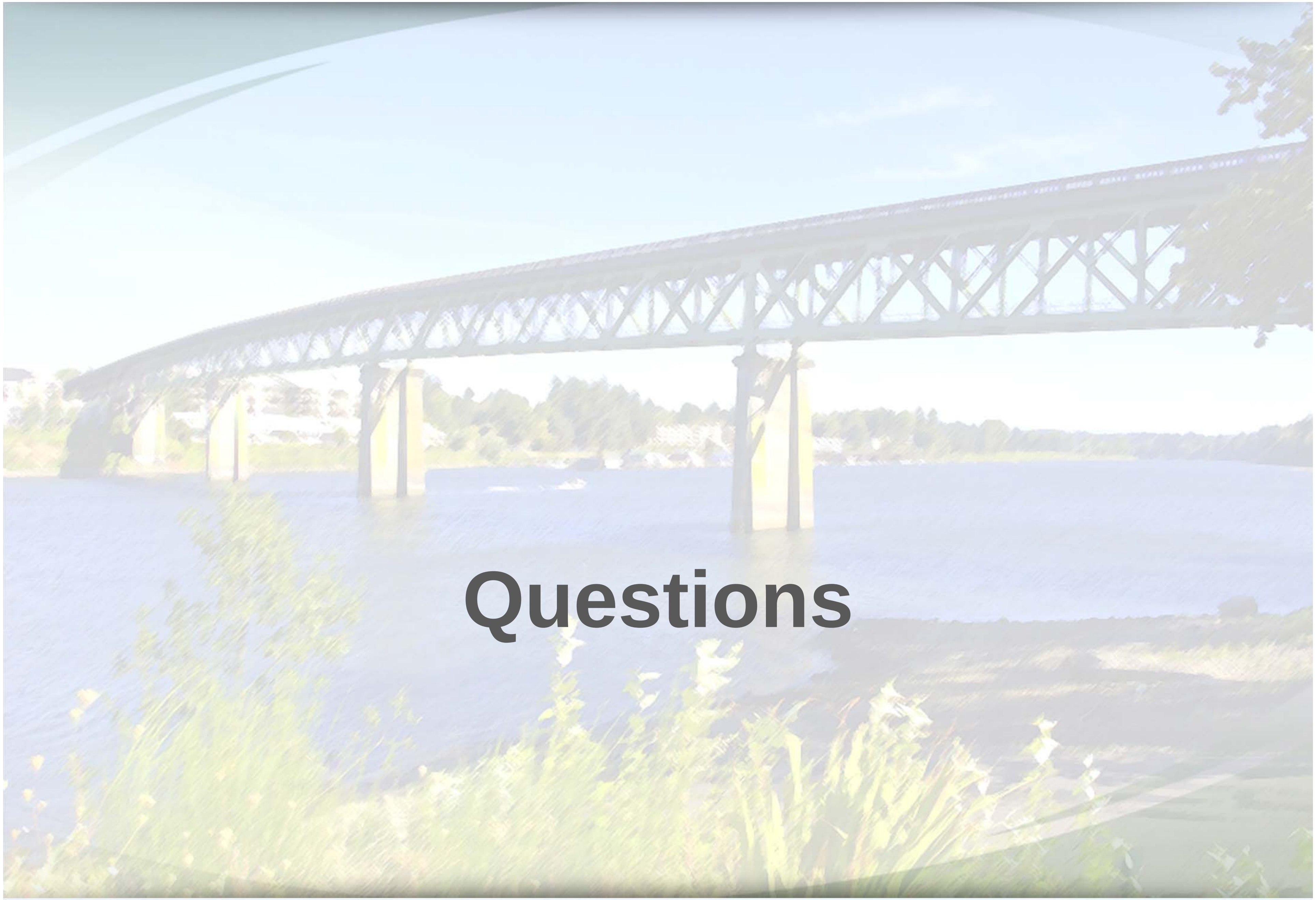
- Create a project-first mindset- helped significantly by team co-location
- Amidst the flurry of day-to-day work, take time to look forward 12 months and plan
- Know the key players and their interests-all of them
- Develop and implement a clear communication strategy and know who's best to deliver key messages

Scalability of a Program Manager

- Bring on as early as possible to inform decision making
- Adaptable to small and mid-sized projects
- Based on client's needs and staff availability and ability
- Consider a program manager where owner needs to:
  - Enhance perceived credibility for project delivery
  - Expand in-house management capability or capacity
  - Mentor an in-house program/project manager
  - Utilize special expertise/experience
  - Have access to a full-service team to respond to needs
  - Provide political buffer

CM/GC

- Promote collaboration, but the owner decides
- Program manager may recommend
- CM/GC doesn't direct designer
- Designer doesn't direct CM/GC
- Program manager works to keep team working well together



Questions

CM/GC Case Studies – 'Perspectives from the Field' - John Haynes, FHWA

U.S. Department of Transportation
Federal Highway Administration

Every Day Counts
innovation ingenuity invention imagination

Construction Manager/ General Contractor (CM/GC)

Construction Manager/ General Contractor

Utah Department of Transportation

Keeping Utah Moving

Alternative Contracting in Utah

Began with the UDOT's first design-build project in preparation for 2002 Winter Olympics in Salt lake City.

Alternative Contracting in Utah

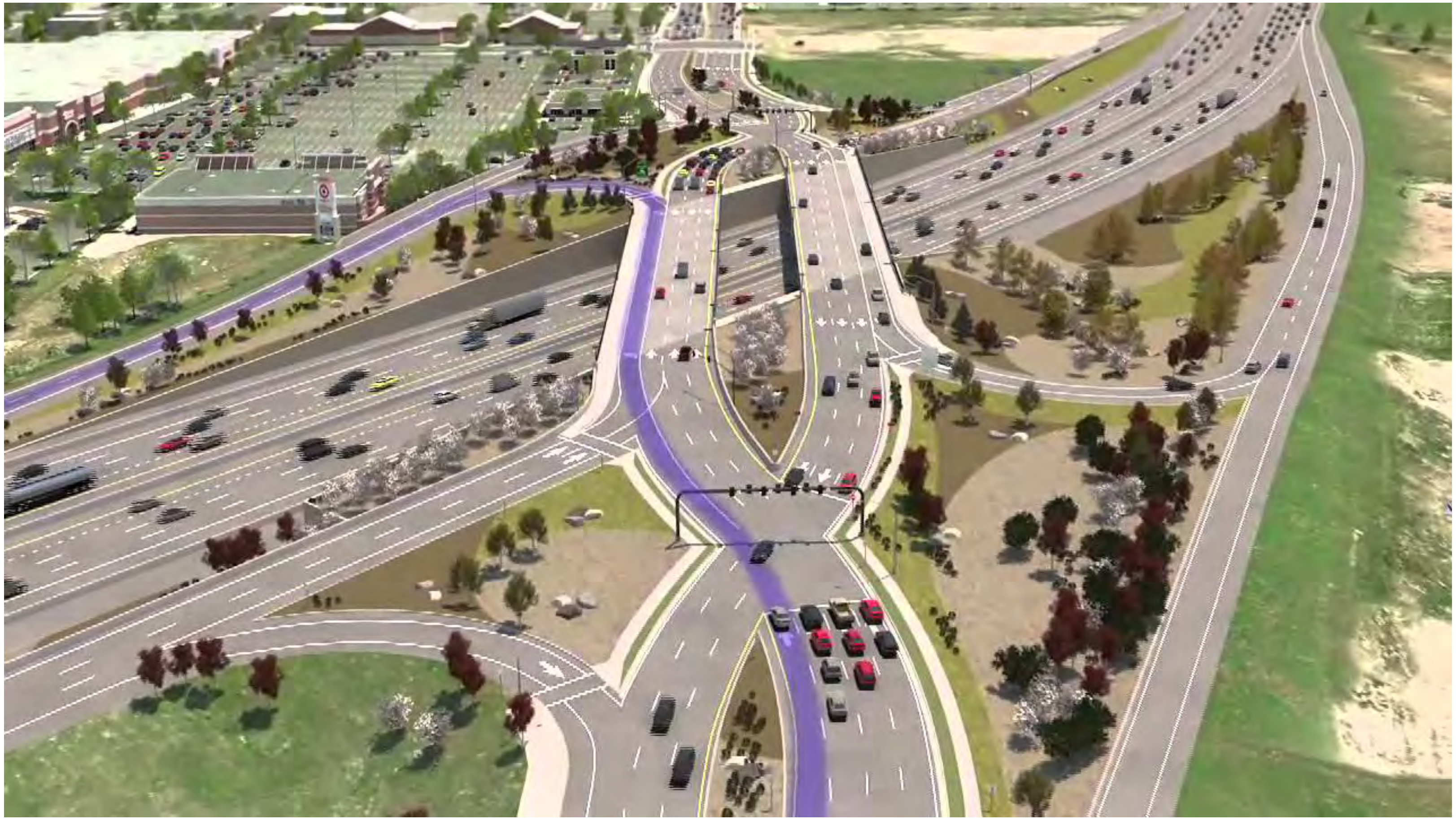
- Interstate 15 Reconstruction project awarded in April 1997 and completed in July 2001
- Cost - $1.63 billion
- Performance specifications encouraged innovation in design and construction.
- **Resulted in huge success and ‘political capitol’ gains with public taxpayers and Utah State Legislators.**

Interstate 15 Reconstruction Project

What is Political Capital ?

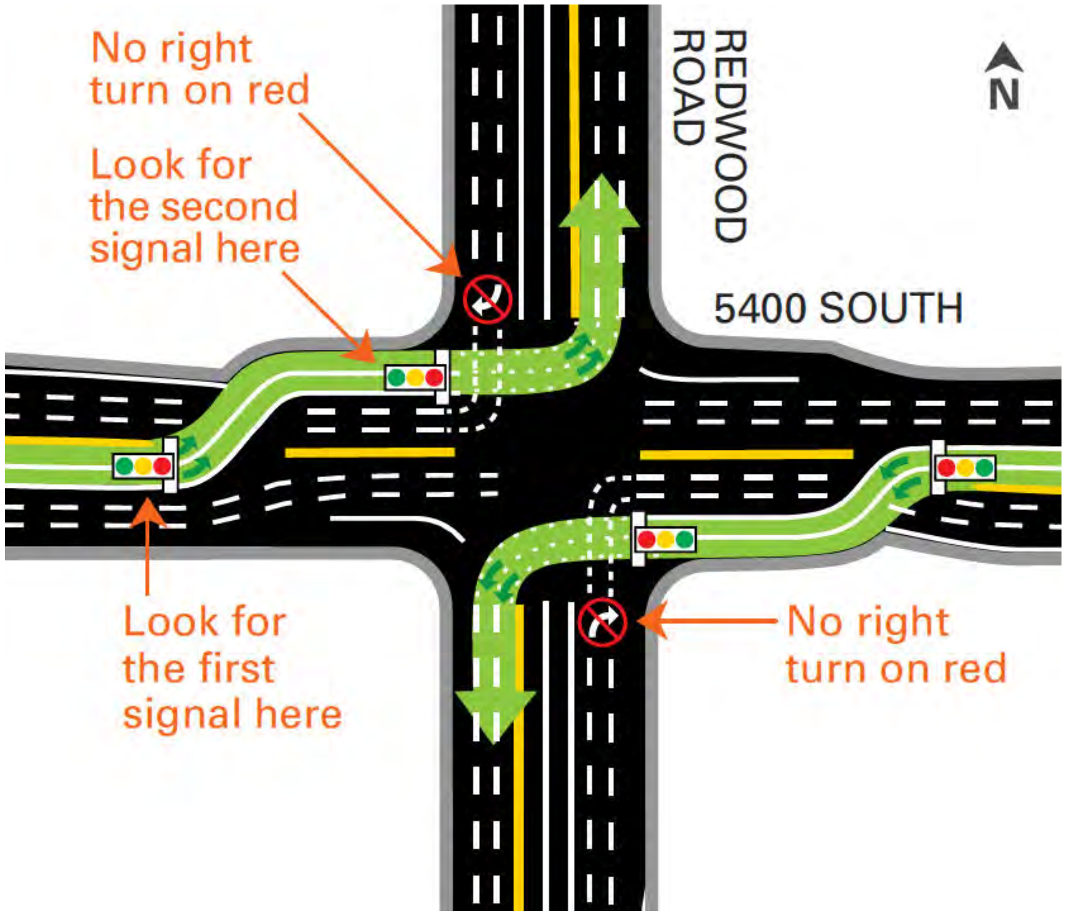
"Obtaining trust, goodwill, and influence with political decision makers and the public taxpayers."

Innovations Resulting from UDOT's Alternative Contracting Program



Diverging Diamond Interchanges

Innovations Resulting from UDOT's Alternative Contracting Program



Continuous Flow intersections

Innovations Resulting from UDOT's Alternative Contracting Program

I-215; 4500 South Bridge Replacement Project

Self Propelled Transport devices (SPMTs) & Accelerated Bridge Construction

Utah State Statute: Title 63G

***Allowed for CM/GC on all Utah state transportation projects.**

Section 1302 - Alternative Methods of Construction Contracting Management.

First CM/GC highway construction project awarded on May 2005.

Construction Manager/ General Contractor

Sample UDOT Projects

UDOT
Keeping Utah Moving

CM/GC – Interstate 80 Innovate
Salt Lake City, Utah

- Replacement of 12 bridge structures along I-80 in Salt Lake City, Utah
- Moved into location using Self Propelled Modular Transporters (SPMTs)
- Bridges replaced in days, not months.

CM/GC – Interstate -70 Bridge over Eagle Canyon, Utah

- Complete bridge deck replacement in 40-days.
- Deck removed and replaced in sections.
- 600-ton crane with 335-ft reach stationed on each end of the bridge.

CM/GC – Utah State Route 9
Hurricane, Utah

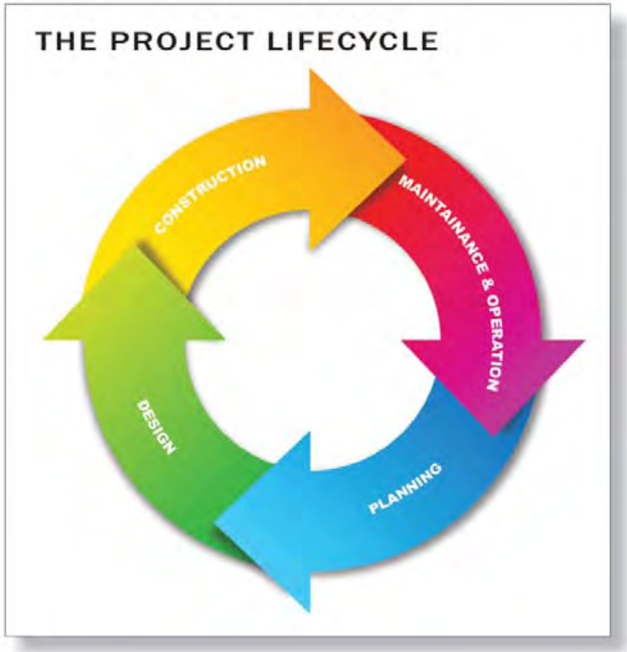
- Gateway City to Zion National Park.
- Additional lanes added in each direction.
- Third Party Issues related to utilities, driveway access, businesses, and public concerns.

CM/GC – Utah State Route 9
Hurricane, Utah

- Contractor assisted with a 3-D utility map and relocation plan.
- Contractor developed utility phasing plan and construction schedule during design phase.

CM/GC & Intelligent Design & Construction (IDC)

- 3-D Models will be provided as legal construction plan at advertising.
- Paper Plan Sets will eventually be phased out.
- Construction crews will work from 3-D Models during construction.
- At project completion contractors will deliver a 3-D as-built model.

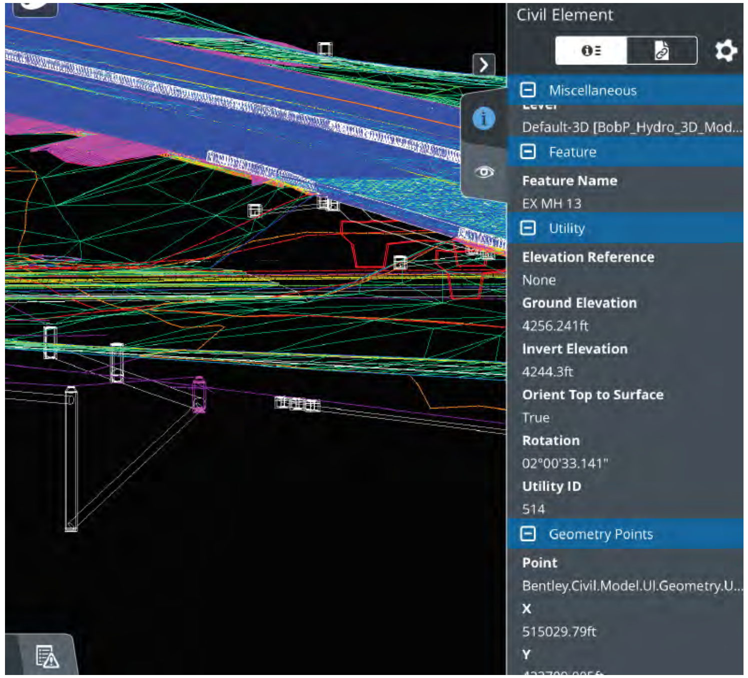


Implementation will have a positive impact on the entire project lifecycle.

CM/GC & Intelligent Design & Construction (IDC)

- Feedback from the contractor during pre-construction helped refine UDOT's model to interface with the contractor's model.

- The CM/GC contracting method will continue to be the method to develop design-bid build templates for increasingly complex projects.



A Bentley Navigator for iPad screen shot — Construction crews are field testing hardware and software for viewing 3-D construction plans.

Construction Manager/ General Contractor

California Department of Transportation (Caltrans)

Caltrans CM/GC Authority

- Caltrans sought to modernize its contracting in 2005.
- State Assembly Bill 2498 signed on September 2012
- Authorized up to 6 CM/GC projects
- First project awarded February 2014

Construction Manager/ General Contractor

Sample CalTrans Project

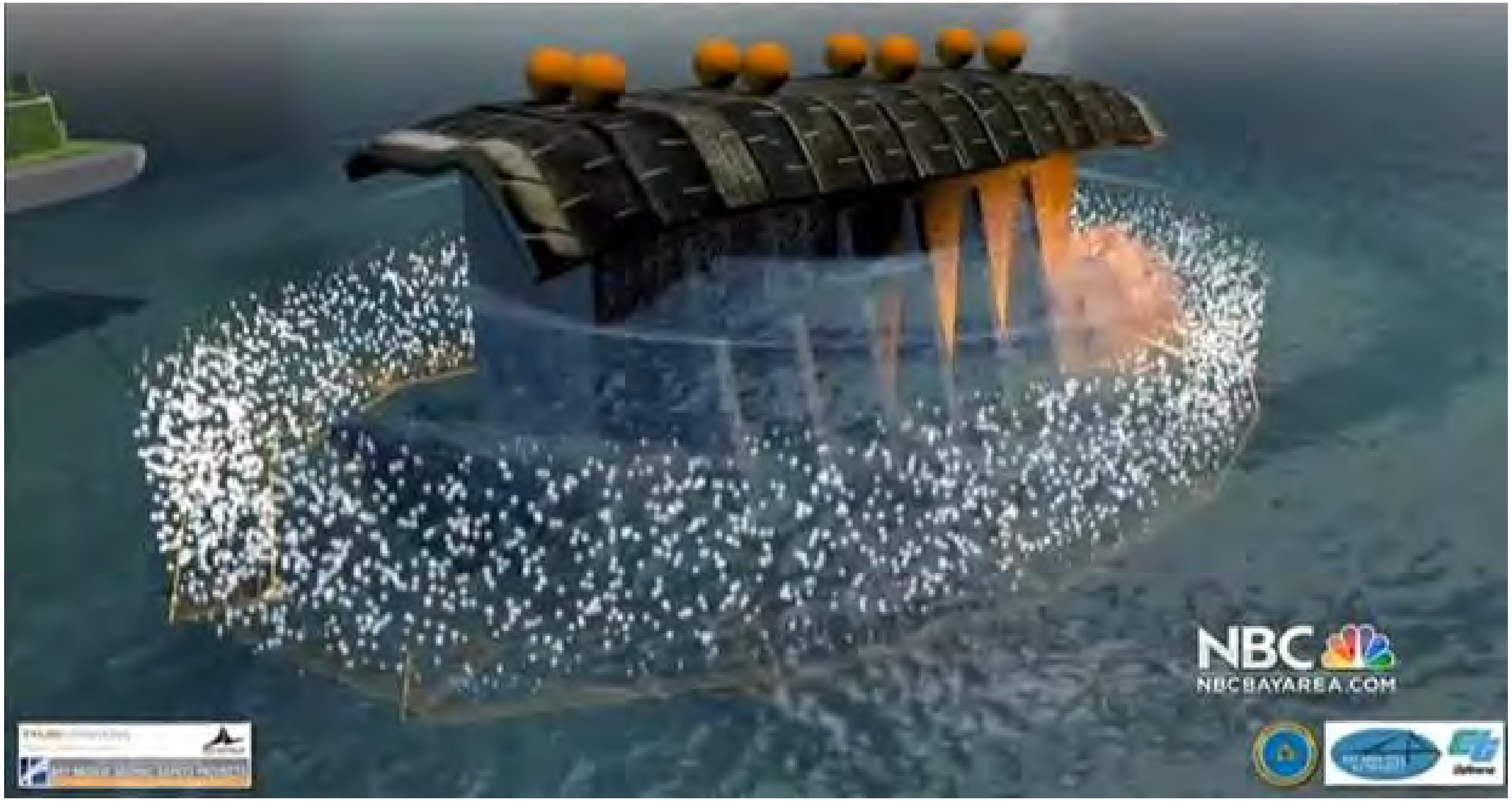
CM/GC – San Francisco-Oakland Bay Bridge Foundation Removal

CM/GC – San Francisco-Oakland Bay Bridge Foundation Removal

- 275-foot tall piers
- 3-foot thick walls
- One-month demolition window
- First time Caltrans had used implosion method

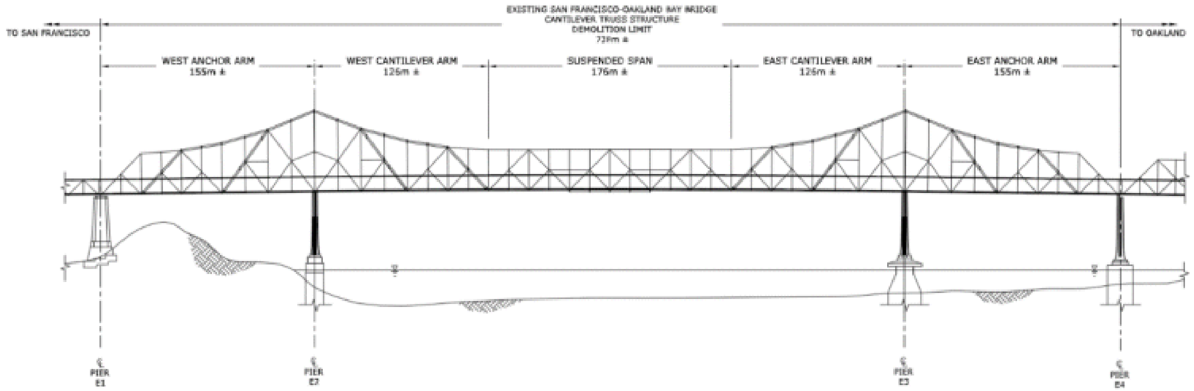
CM/GC – San Francisco-Oakland Bay Bridge Foundation Removal

CM/GC – San Francisco-Oakland Bay Bridge Foundation Removal



CM/GC – San Francisco-Oakland Bay Bridge Foundation Removal

CM/GC – San Francisco-Oakland Bay Bridge Foundation Removal



Benefits of CMGC

- $15 million innovation savings.
- Contractor assisted in obtaining permits.
- Project completed on time and within budget

Summary:

1. CM/GC program is a good contracting method to **deploy new innovations**.

2. When successfully applied **CM/GC can build political capital**. This in turn will open opportunities for future innovation savings and further successes.

3. CM/GC allows for early contractor involvement and **resolution of third party issues**.

4. CM/GC **can be applied to smaller projects** with inherent complexities.

5. The preconstruction planning efforts that occur with CM/GC can result in **reduced construction costs, schedules, and user impacts.**

CM/GC Case Study (Sellwood Bridge)- ‘Perspectives from the Field’

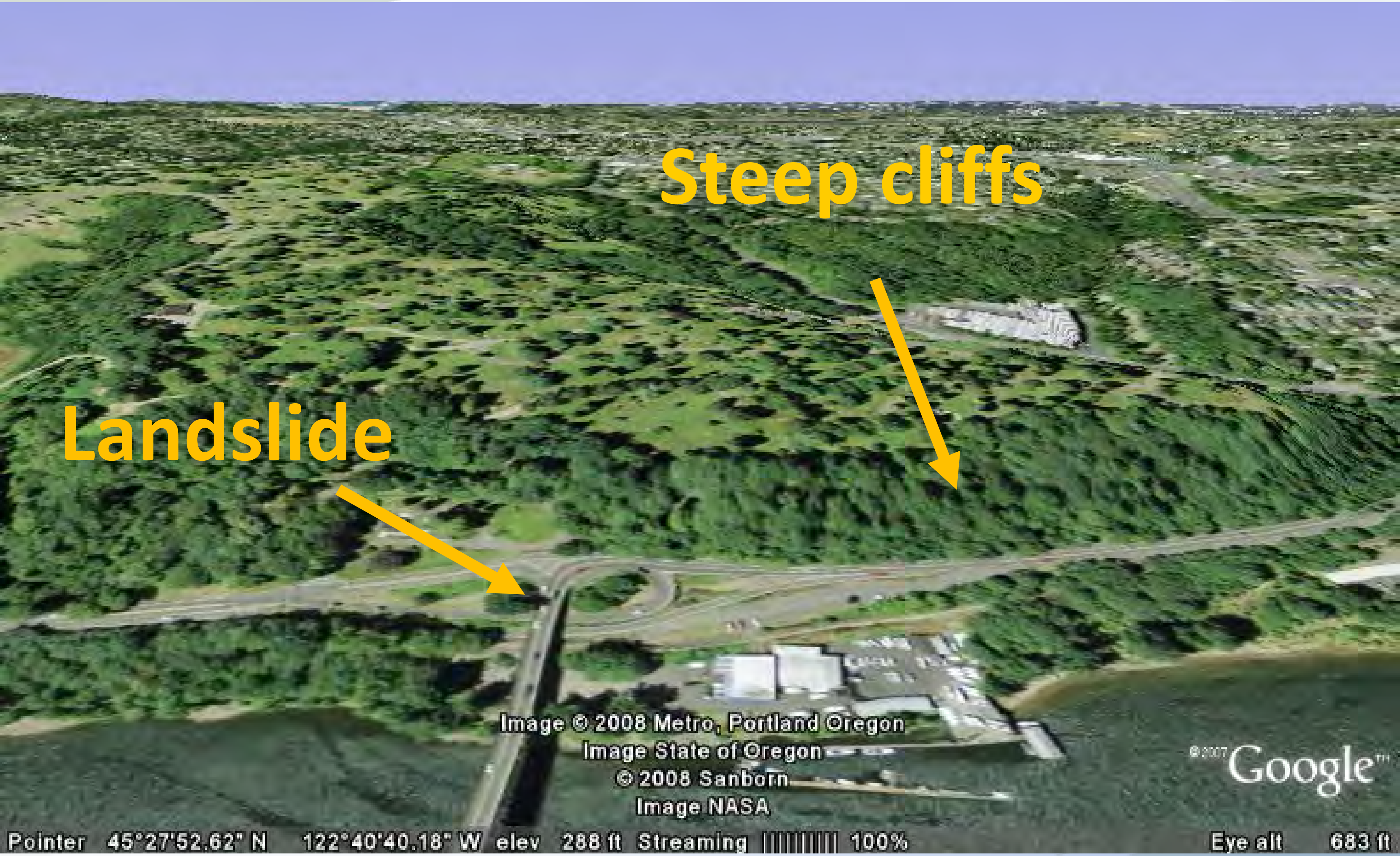
http://www.sellwoodbridge.org/

Mike Baker, PE - David Evans and Associates, Inc.

September 20, 2016

Project Vicinity

Sellwood Bridge looking north- 3 miles south of downtown Portland


Steep cliffs
Landslide
Image © 2008 Metro, Portland Oregon
Image State of Oregon
© 2008 Sanborn
Image NASA
©2007 Google™
Pointer 45°27'52.62" N 122°40'40.18" W elev 288 ft Streaming |||||||||| 100%
Eye alt 683 ft

Issues

- West end slope instability
- Buses/trucks restricted
- General deterioration
- Bridge not designed for earthquakes
- Narrow lanes, no shoulders
- Narrow sidewalk
- No bike facilities/poor access
- Tight turns at west end

Project Summary

- Planning process – 2006-2010
- Right of Way – 2011-2012
- Design – 2011-2012
- Construction – December 2011 to late 2016
  - Early work packages for
    - Detour bridge
    - Landslide mitigation
    - Condominium deconstruction and alteration
- Project Cost at $325-million

When we're done- 2016

Main spans looking East


SPEED
30
SELLWOOD BRIDGE
MEN BELOW PLEASE DON'T THROW
WEIGHT LIMIT 10 TONS
ON BRIDGE ROADWAY

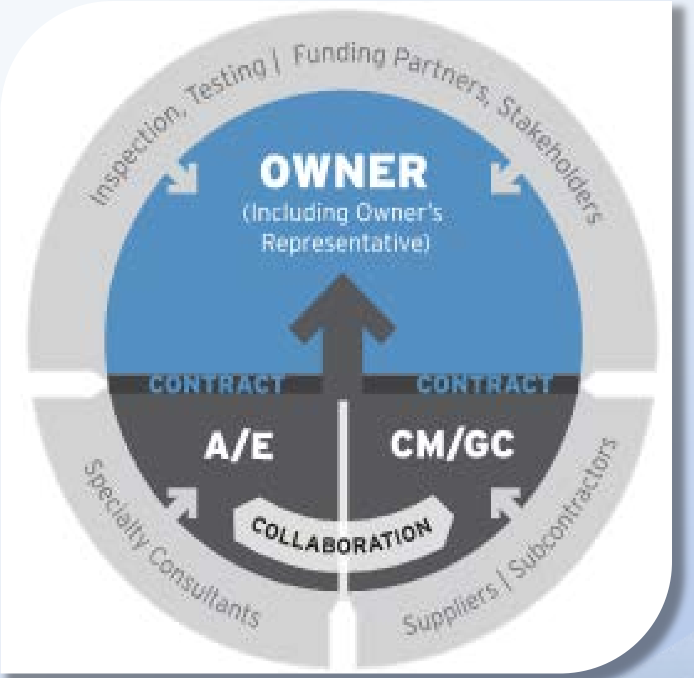
When we're done- 2016

Project Challenges

- In-water work window limitations
- Technical complexity
- Stakeholder influenced design
- Substantial right-of-way acquisition

The Case for CM/GC

- County research suggested CM/GC most benefits the owner for projects that:

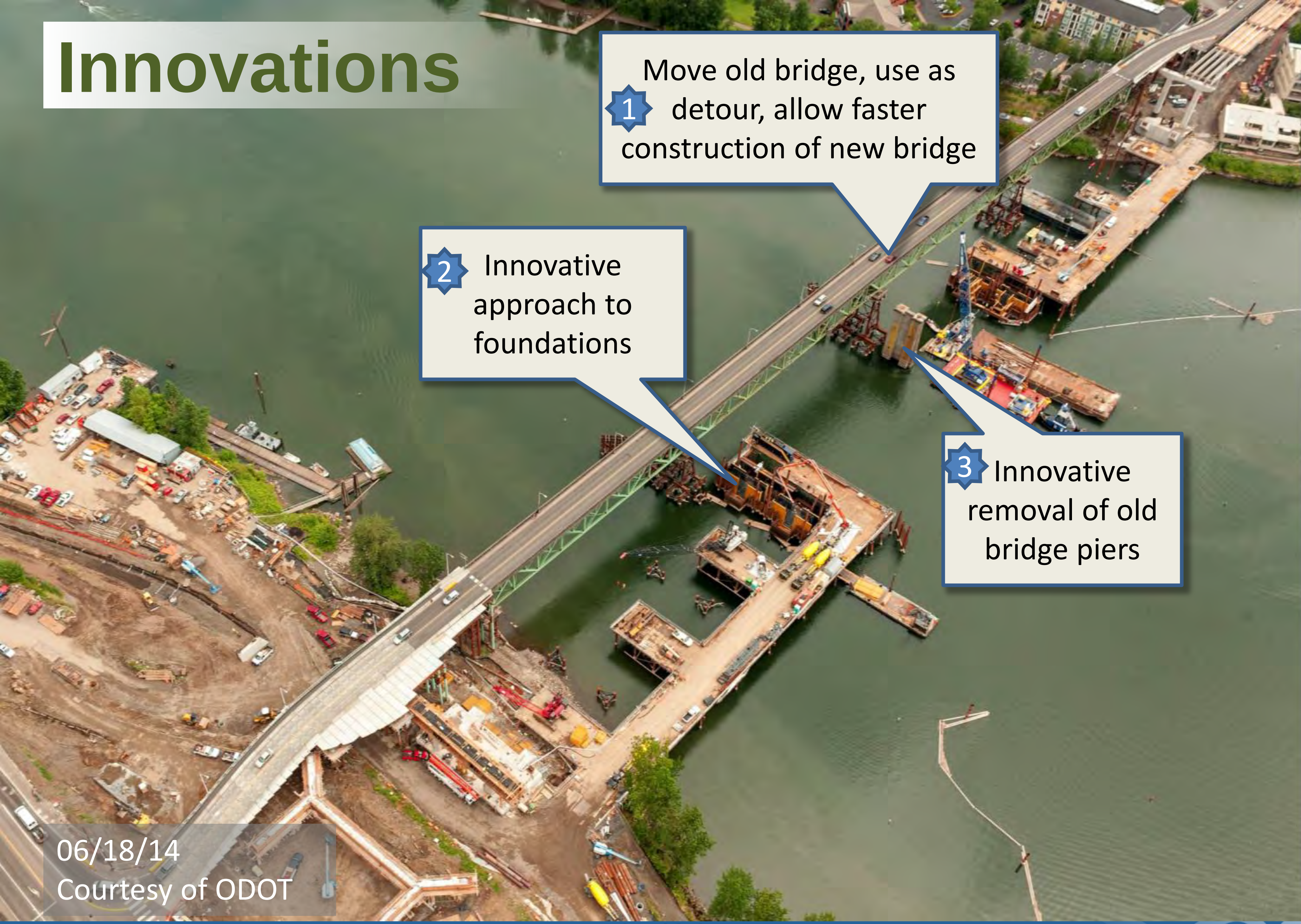


  - ☑ Are high risk
  - ☑ Are technically complex
  - ☑ Have unusual site conditions
  - ☑ Have schedule constraints
  - ☑ Require complex phasing
  - ☑ Have budget limitations
  - ☑ Expected cost savings from innovation

Early Value from CM/GC Input

- Constructability reviews at design milestones identified plan and specification refinements:
  - Enhanced main span construction due to detour bridge
  - Retaining wall refinements
  - Traffic control staging
  - Bridge Arch erection
  - Innovative perched cofferdam approach

Innovations



06/18/14
Courtesy of ODOT

Detour Structure

FEATURES

- Reuse existing structure as a detour bridge by moving it to the north
- Construct new bridge in one phase

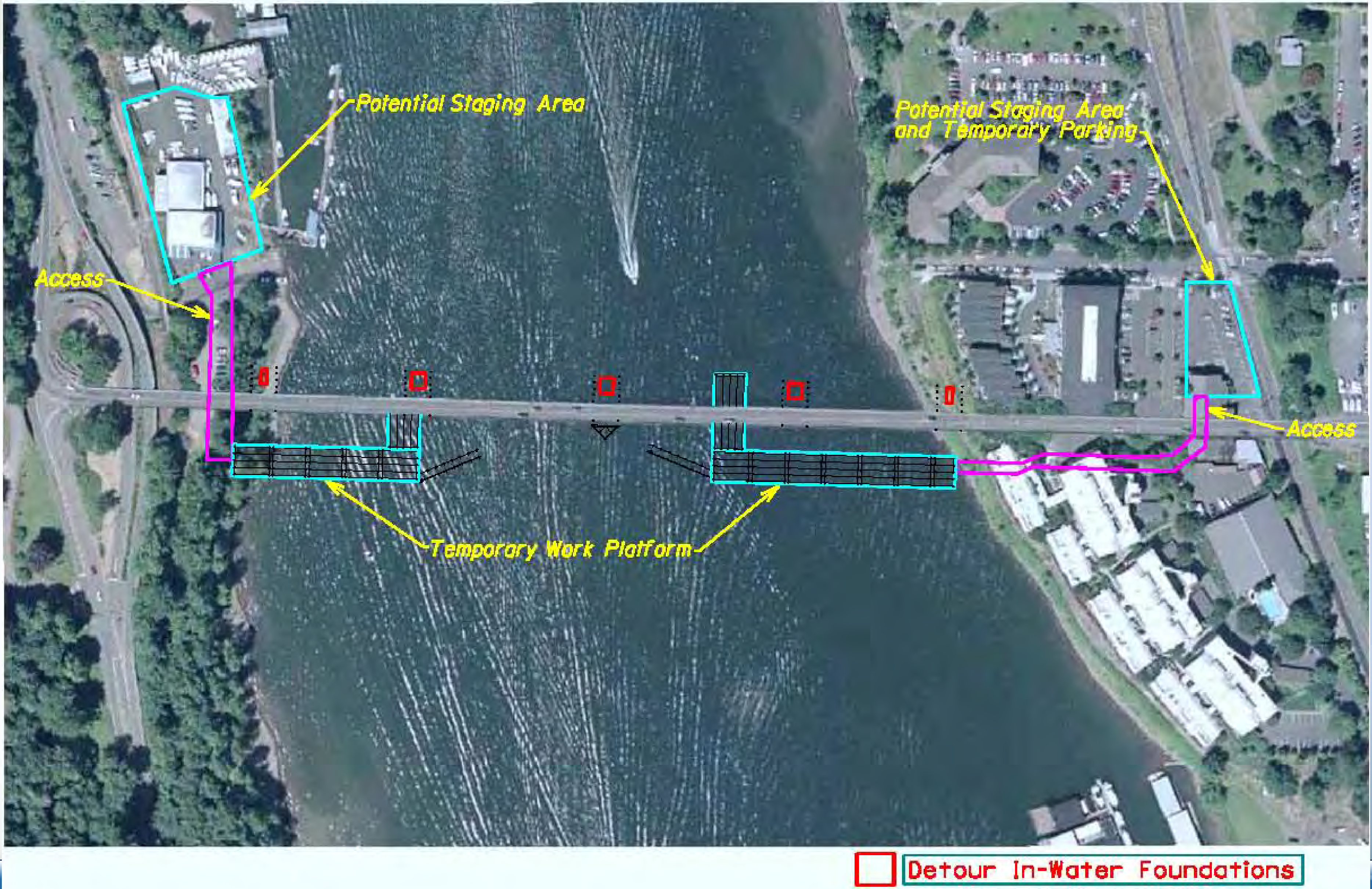
BENEFITS

•Reduced construction duration up to 9 months, minimizing time of impact to the environment and the community

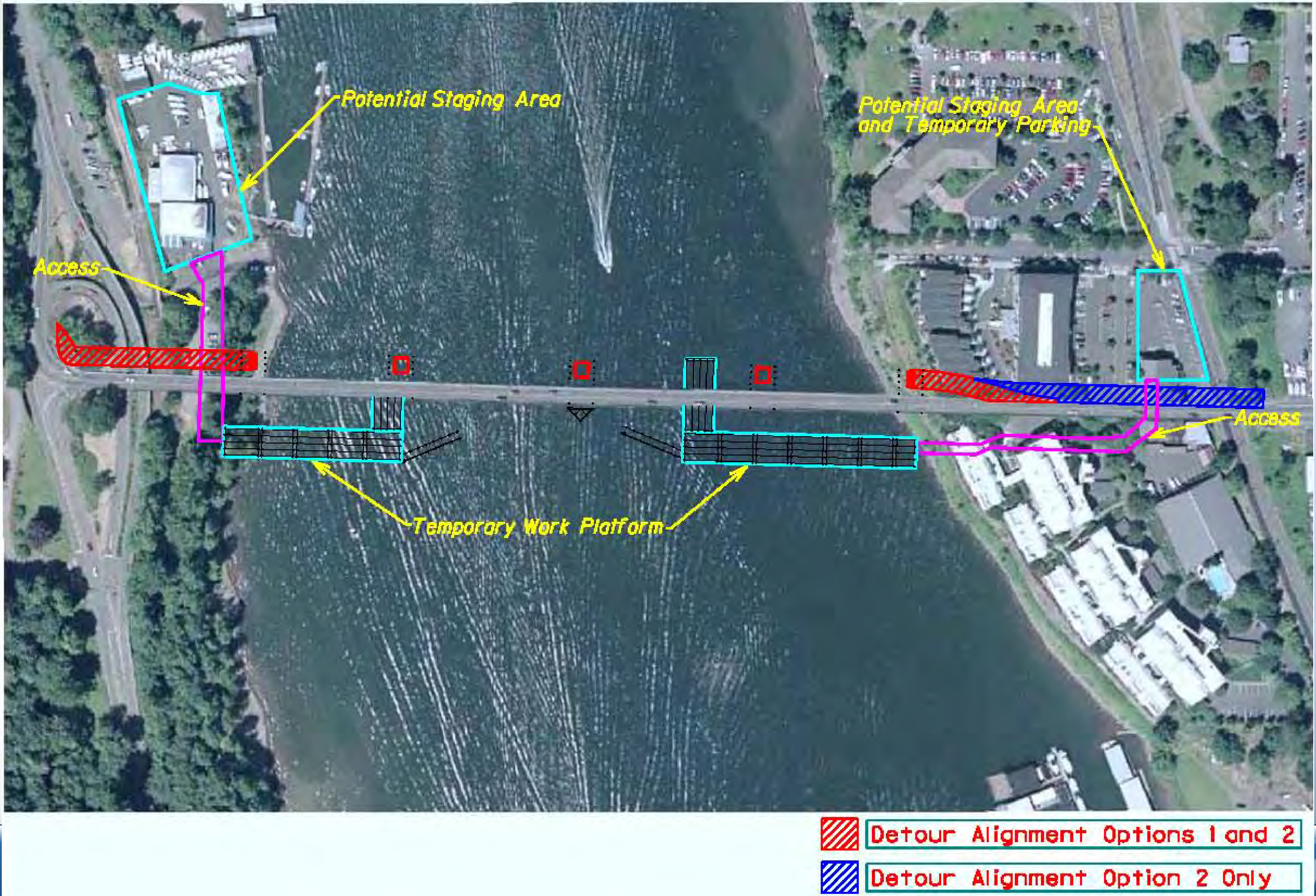
•Reduced costs and environmental impacts associated with bringing new materials on-site for additional temporary structures

•Fewer temporary work bridges, reduced in-water riparian impacts

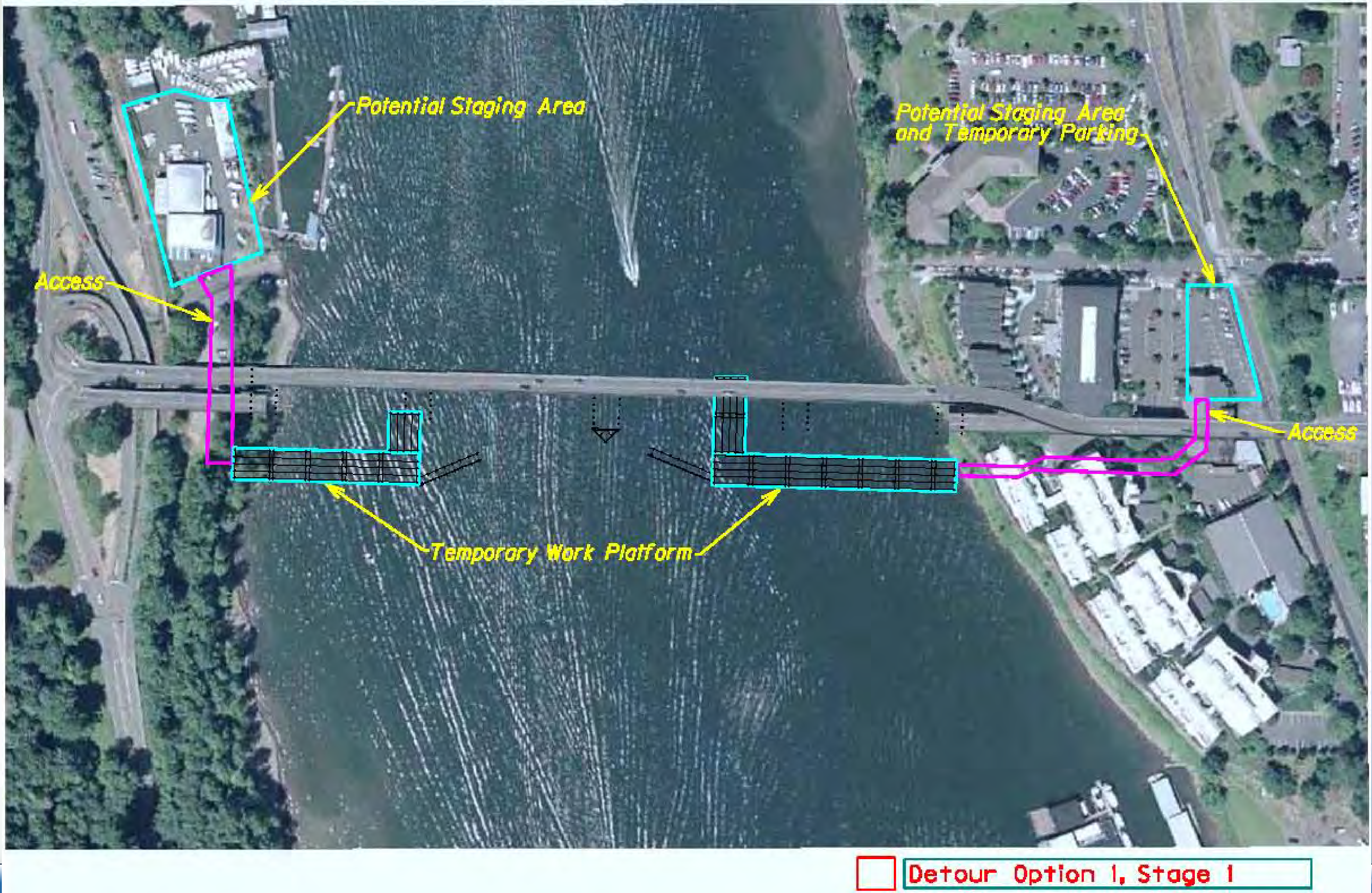
Detour Bridge (Shoo-fly)- **Install temporary foundations and work bridges**



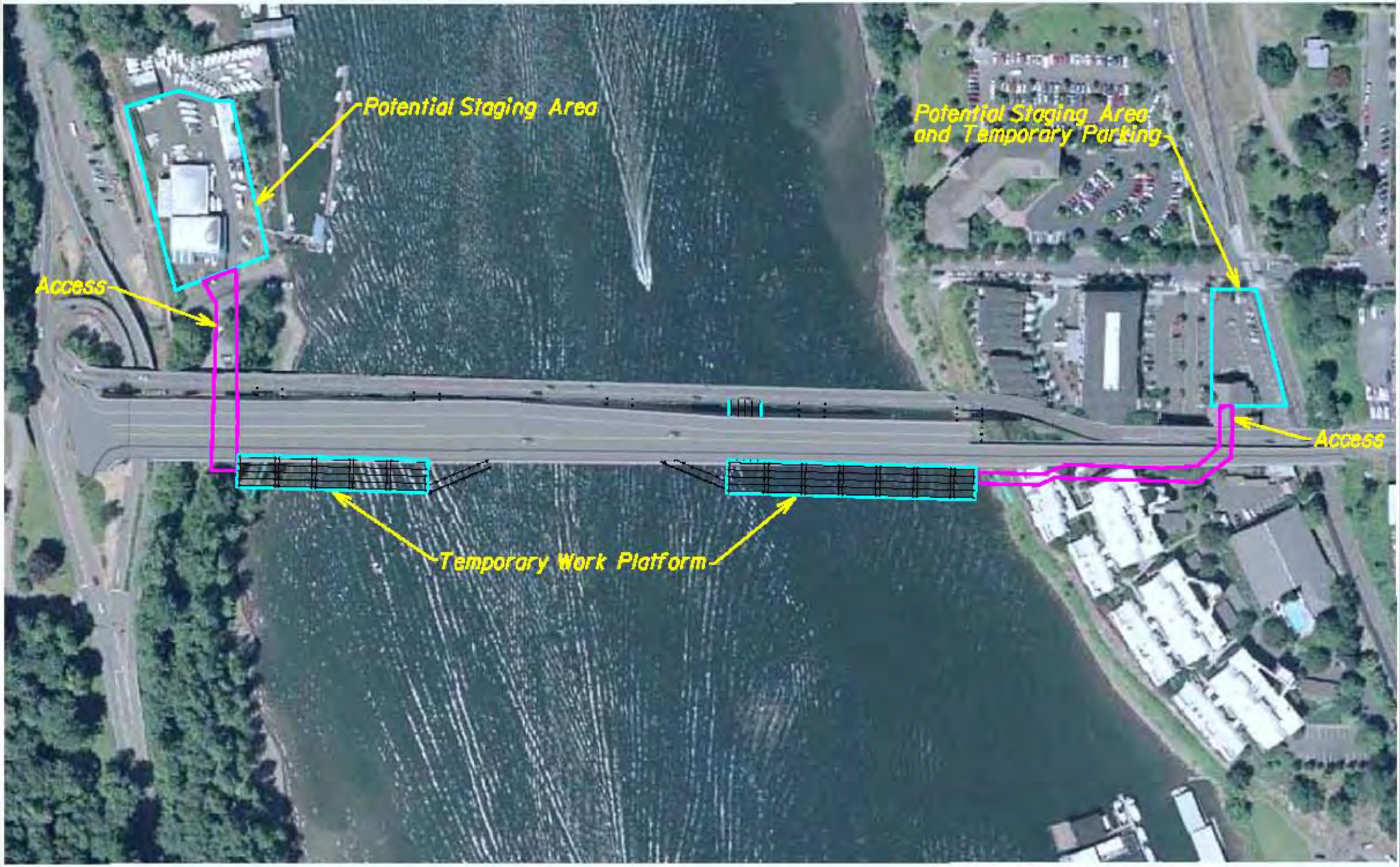
Detour Bridge (Shoo-fly)- **Construct temporary approaches**



Detour Bridge (Shoo-fly)- **Translate existing bridge approx. 50-feet north**



Detour Bridge (Shoo-fly)- **Shift traffic to Shoo-fly and build new bridge in one stage vs. two halves**



Detour Option 1 - Stage 2,
East Approach First
Stage Construction

Detour Bridge (Shoo-fly)- **Remove Shoo-fly, complete east end**

Finished Bridge

Construction Comparison- Sellwood Bridge

Staged Construction built in two halves- 4 Arch Ribs

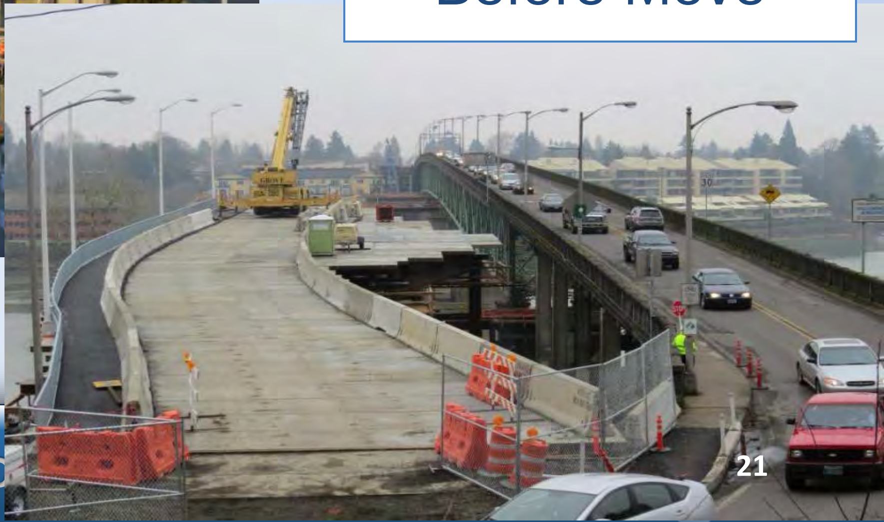
Slide old bridge for detour use, new bridge built in one phase - 2 Arch Ribs

Moving a Bridge

After Move

During Move

Before Move



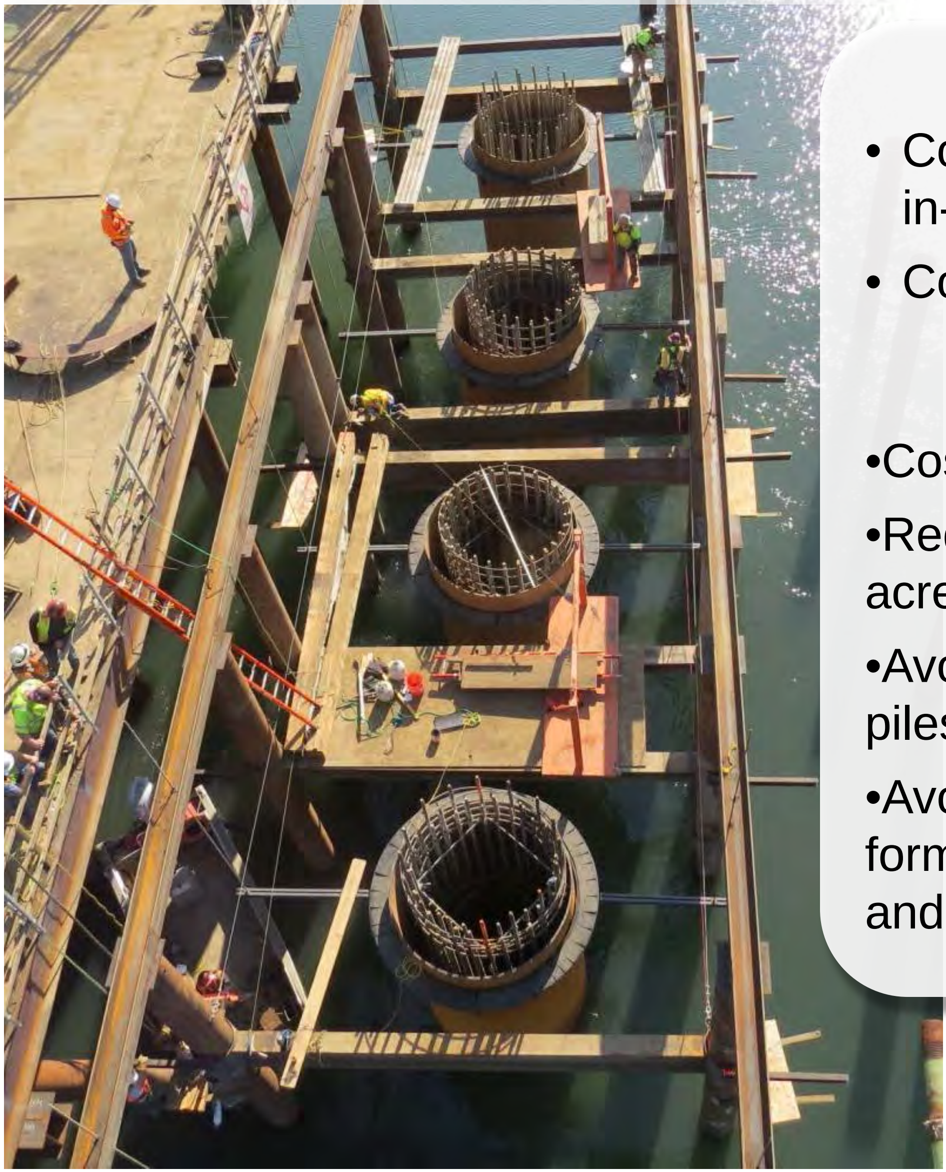
7 Million Pounds
1,100 feet long
Moved 66’ on west
Moved 33’ on east

[Video]

Detour Bridge Benefits

- **Time:** Reduce construction duration up to 9 months
- **Money:** Reduce cost (up to $10 million) in materials, labor, and equipment
- **Safety:** Separation improves safety for workers and travelling public.
- **Design:**
  - Eliminates redundant features
  - Improves appearance (two arch ribs instead of four)
- **Environmental Impacts:**
  - Fewer temporary work bridges
  - Less construction time
  - Reduces in-water and riparian impacts

Perched Box Caissons



FEATURES

- Constructed above river and lowered- no in-water work window limitations
- Concurrent vs. sequential construction

BENEFITS

•Cost, Schedule, Innovation (saved ~ $8M)

•Reduced aquatic habitat impacts from 0.25 acres to 0.03 acres

•Avoided need to drive cofferdam sheet piles into riverbed

•Avoided deep excavation into riverbed to form and pour concrete cofferdam seals and footings

Built above the river

Ready to Lower

Lowered- ready to de-water

De-watered, ready to cut shaft casings

Pier Removal

FEATURES

Original plan to demolish all 5 river piers in large cofferdams

Actual Method:

•Isolated 2 piers on the bank from the river using sandbags

•Removed 3 piers in the river using a diamond wire saw

BENEFITS

- No large cofferdam construction and impact to river bottom
- Avoided impacts to fish
- Removed concrete in large sections

Cost Benefits from CM/GC

- Examples of innovation collaboration (saved $25M)
  - ✓ Slide and use old bridge for detour- saved up to $10M
  - ✓ Perched box caissons for foundations- saved up to $8M
  - ✓ Validated steel vs. concrete deck arch- saved up to $4M
  - ✓ Retaining wall optimization- sav3d up to $500K
- Collaborative cost avoidance- CM/GC proposed alternative traffic staging idea to avoid $5M in cost
- Project overhead costs approximately $1M/month so every day counts

Other Realized CM/GC Benefits

- CM/GC regard for neighborhood context built goodwill
- Advanced schedule-critical early work packages- gained an additional winter in-water work window
- Early procurement of key materials locked in schedule and reduced pricing escalation
- CM/GC process has allowed us to accelerate permits vs. waiting for 100% design

CM/GC Lessons Learned

- Co-location , partnering and teambuilding are key
- Requires a strong owner and collaborative team
- Requires the ‘right’ contractor, designer and owner staff
- Balance of self-perform and sub work matters
- Risk Management is crucial
- Contractor involvement in solving problems is key
- Challenge to get early/meaningful design review input

Questions