Riverbend Water Reclamation Plant Expansion Using the CMAR Delivery Method

carollo

Engineers...Working Wonders With Water®

AGENDA

- North Texas History
- Why Owners Select D/CMAR
- Owner Benefits
- Riverbend WRP Expansion
- Construction Progress

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- **North Texas History**
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D/CMAR legislation in Texas has been an evolution

- 1997 SB-583 & 1999 SB-669
- 2001 SB-510
- 2003 HB-3028
- 2011 HB-628

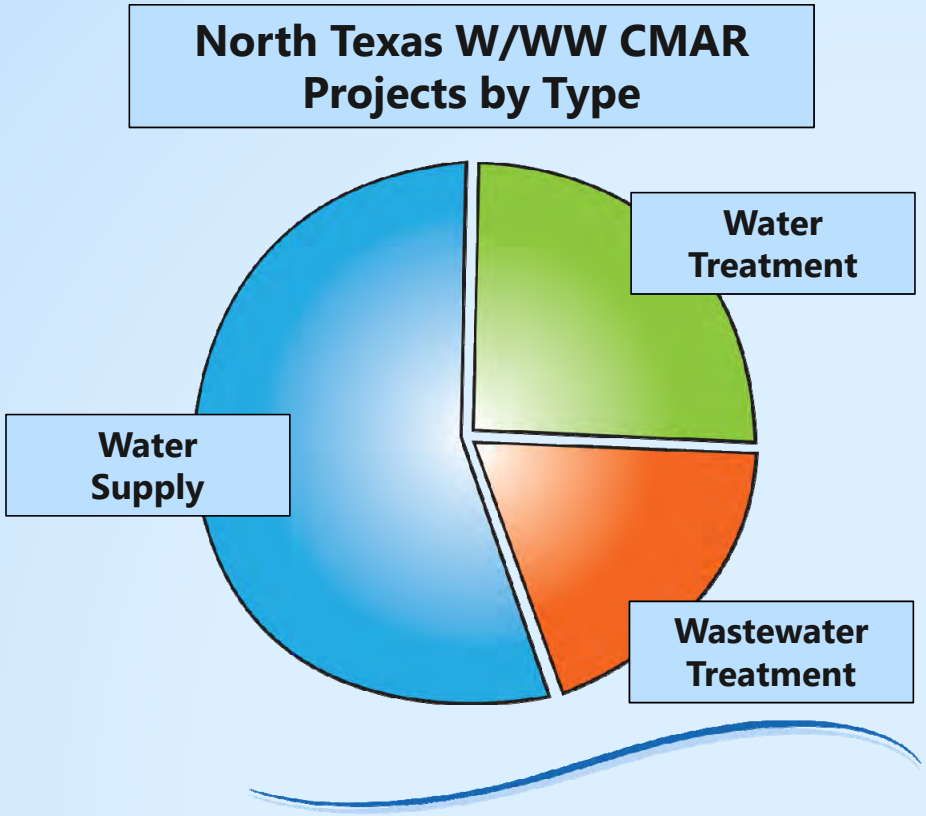
Originally enacted for Education Facilities
Expanded for all state agencies

- 2015 HB-2634

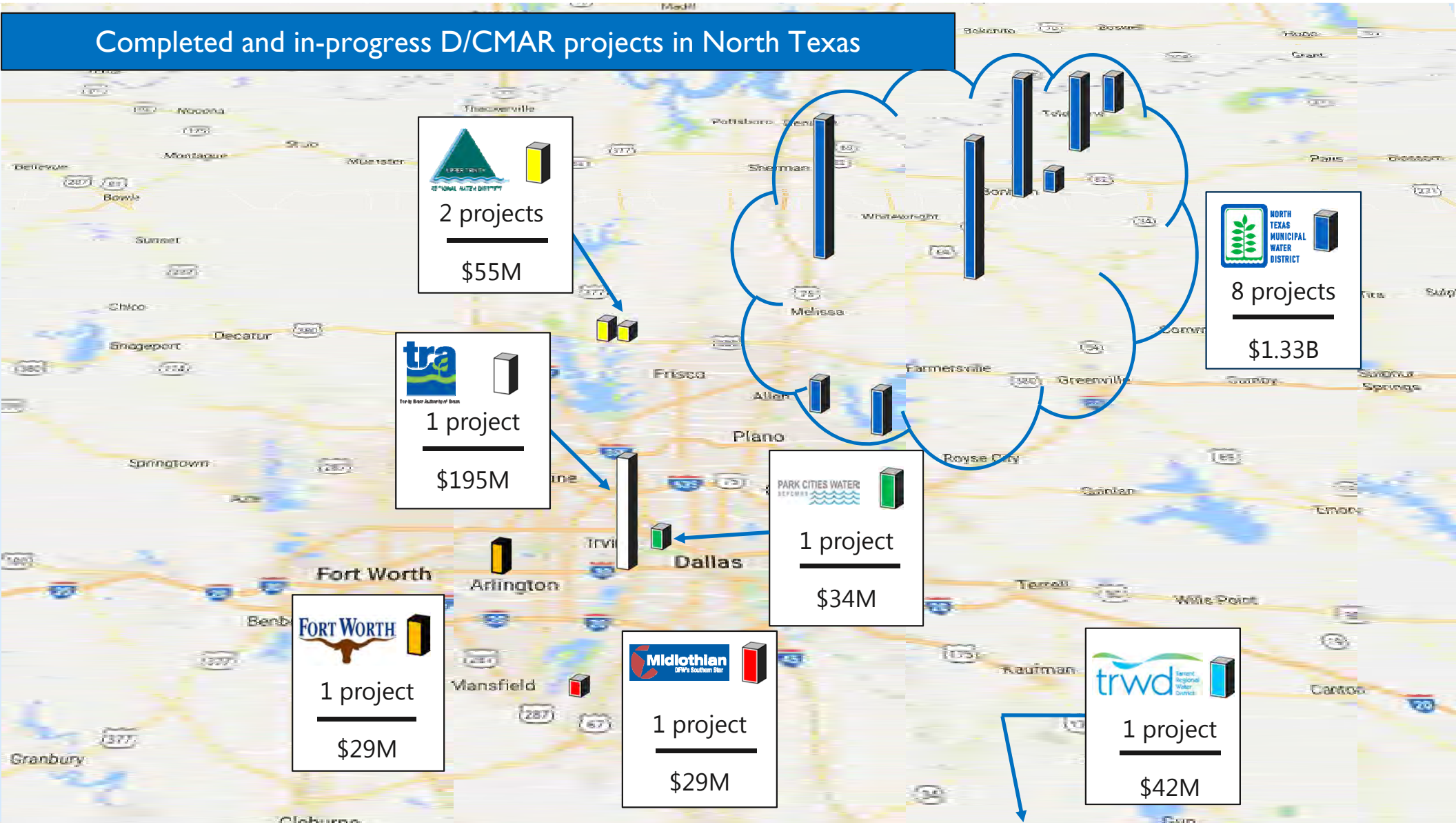
Design Professional is precluded from also acting as the CMAR

North Texas Owners are increasingly utilizing D/CMAR for project delivery

Current Number of North Texas Water CMAR Projects	15
Value of completed projects through 2013	$ 450M
Projects in design or construction	$1,250M
Total value of completed and in-progress projects $1.7B	



Completed and in-progress D/CMAR projects in North Texas



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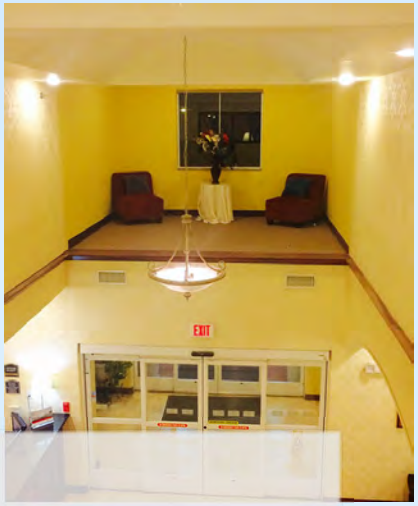
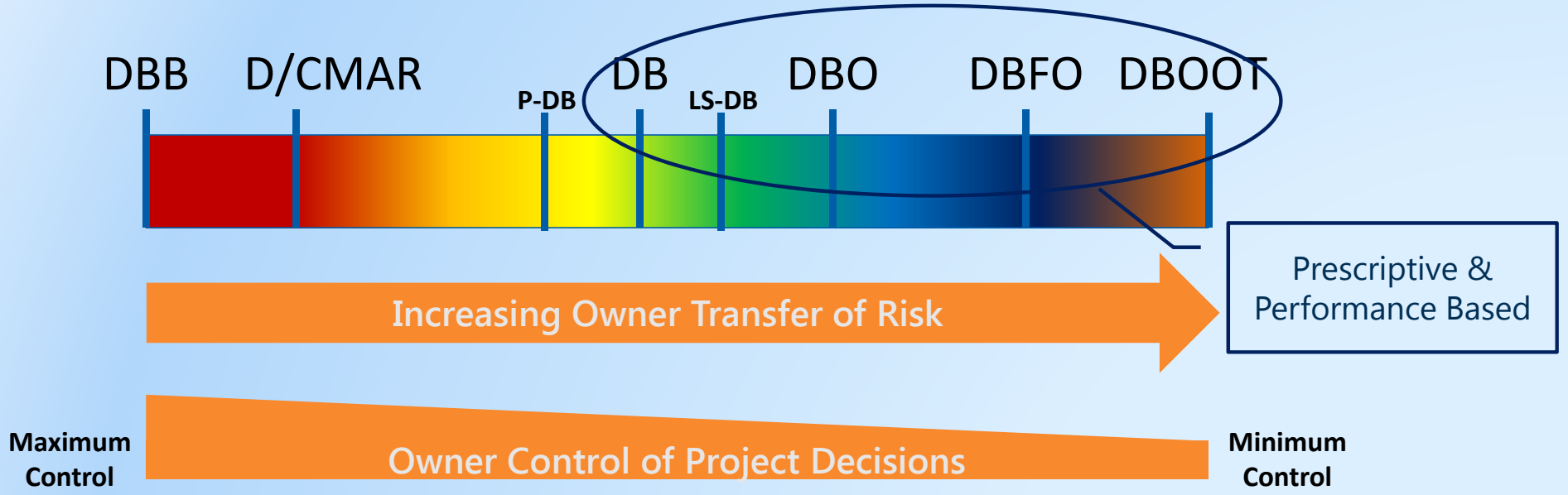
Owners' select D/CMAR to improve project results and provide delivery flexibility

- An easy first step from DBB
- Value vs. cost decisions
- Balanced risk
- Higher quality



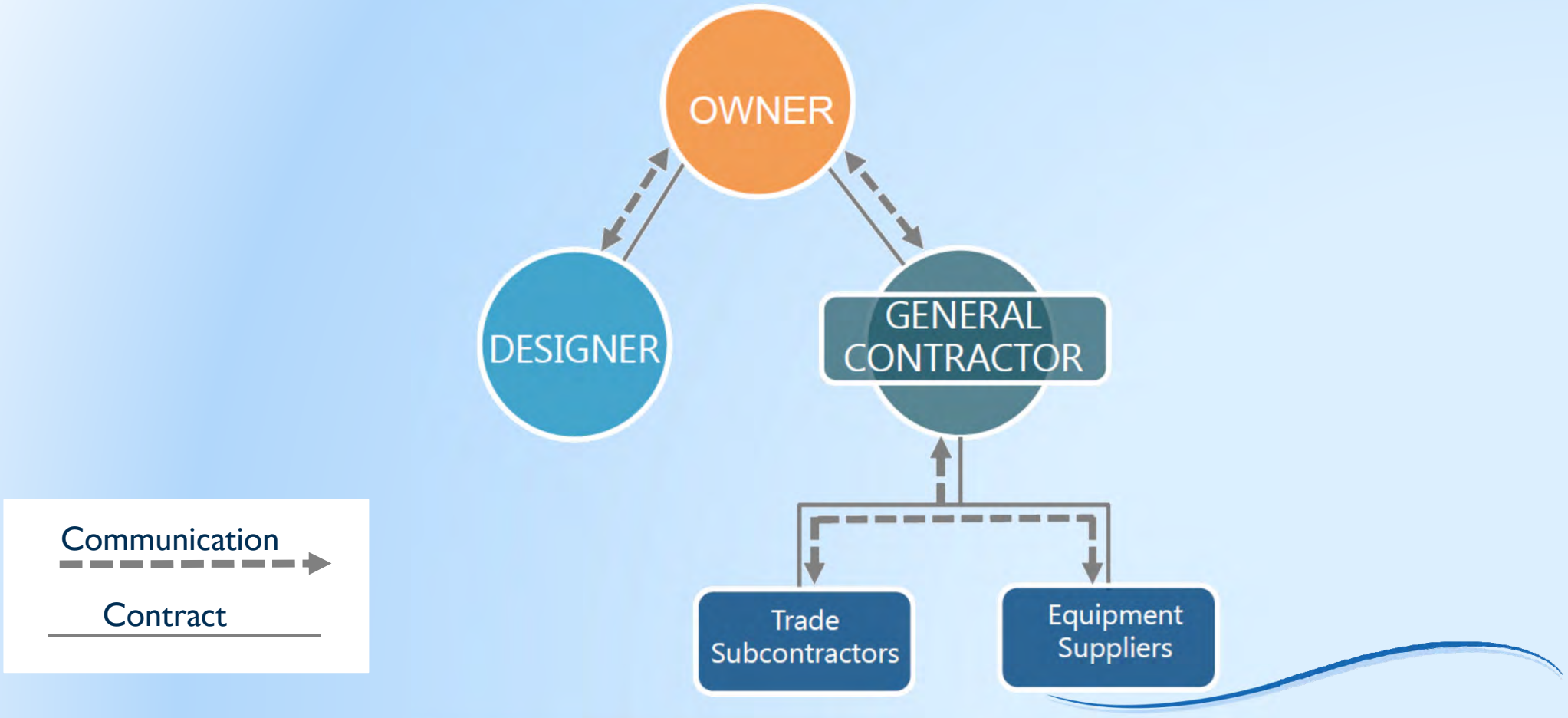
These are not Carollo projects..!

D/CMAR method provides for risk transfer while retaining control



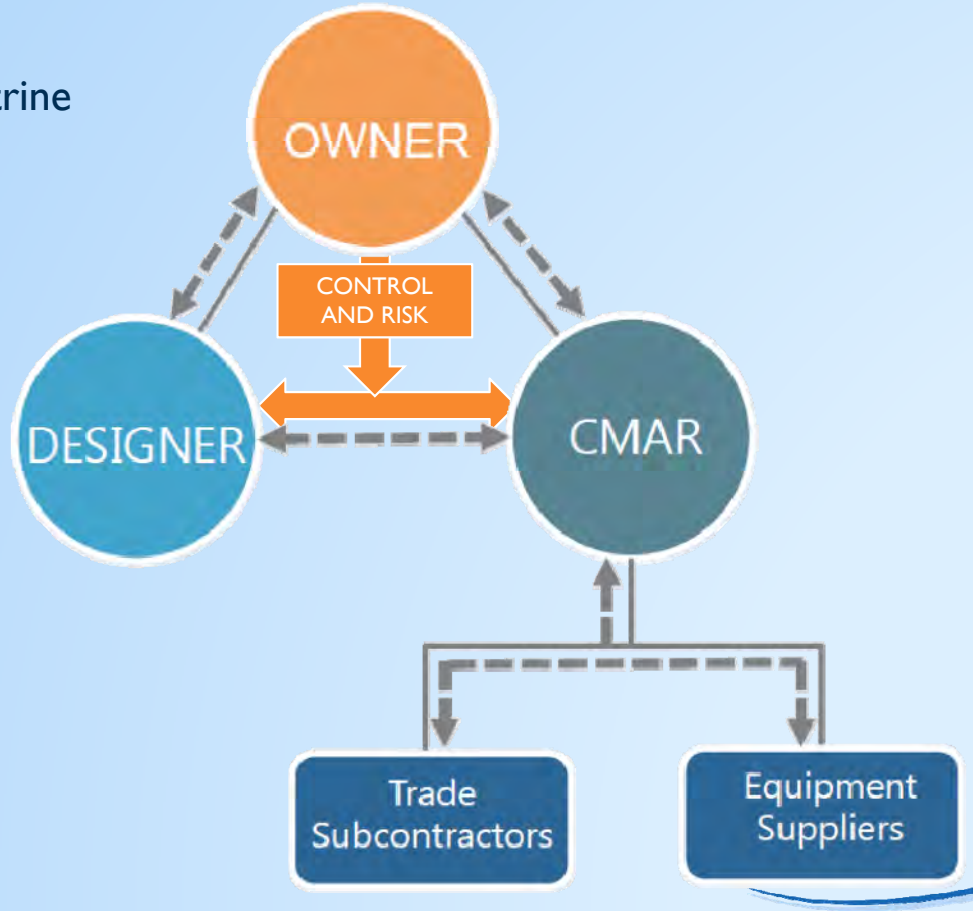
- Why is DBB at the high end of the risk spectrum?
  - Spearin Doctrine (248 US 132)

Design-Bid-Build (DBB) is the traditional project delivery method for municipal W/WW agencies



D/CMAR promotes collaboration across the project team and allows the Owner to transfer control and risk

Does the Spearin Doctrine still apply?



Communication

Contract

Texas Owners' surveyed experience with D/CMAR

Rationale for Using CMAR
Saves Time
Saves Money
Contractor Qualifications
Other

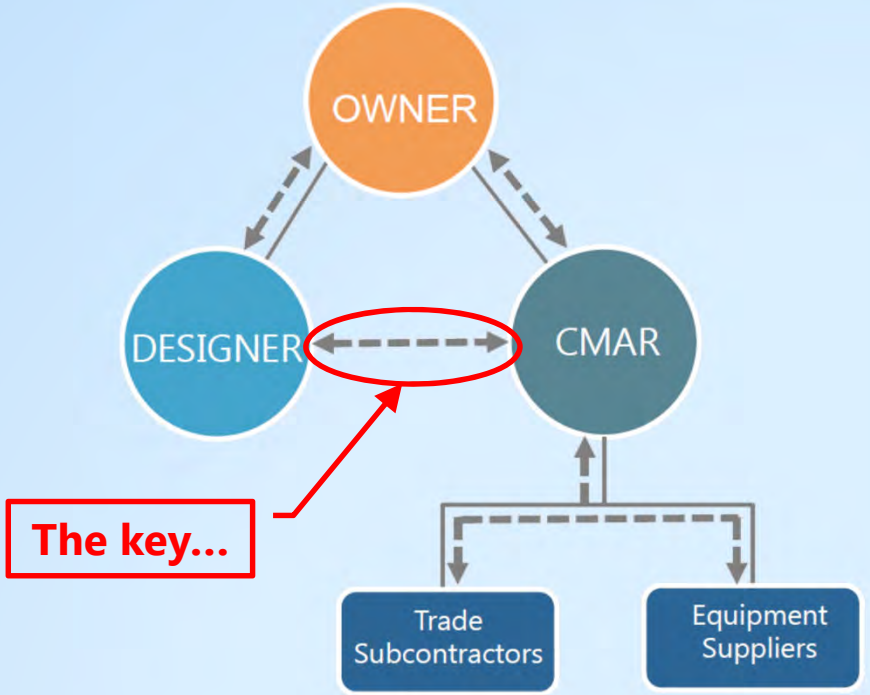
Observed Advantages
Cost savings
Innovation
Effectiveness
Time savings
Flexibility

Observed Disdvantages
Difficulty of use

From: ***Survey on the Use of Design-Build and Other Alternative Project Delivery Methods in Texas***, prepared by the Research Division of the Texas Legislative Council

D/CMAR delivery offers many advantages for the Owner

- Involvement & control
- Design phase construction input
- Project risk identification
- Accelerated schedule
- Maximized local participation

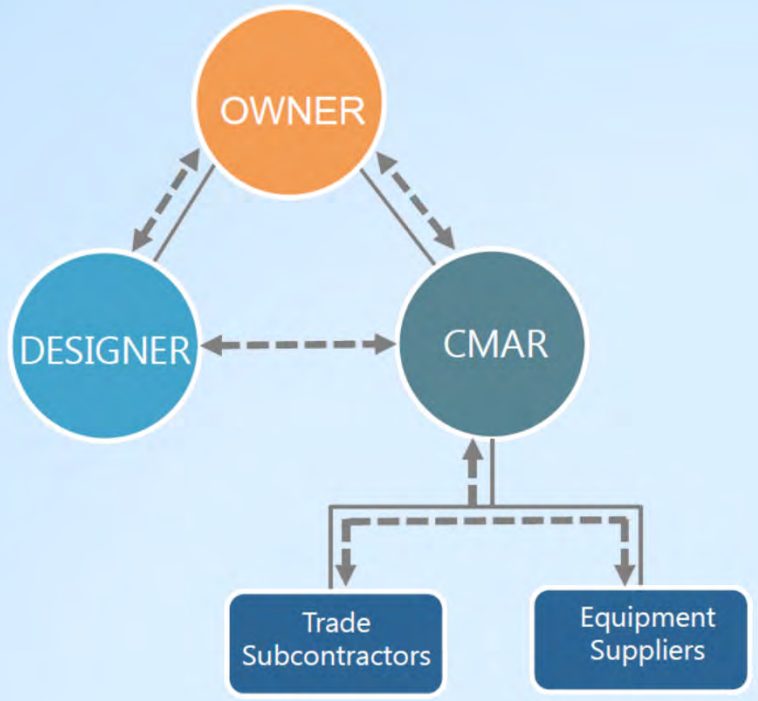


Communication

Contract

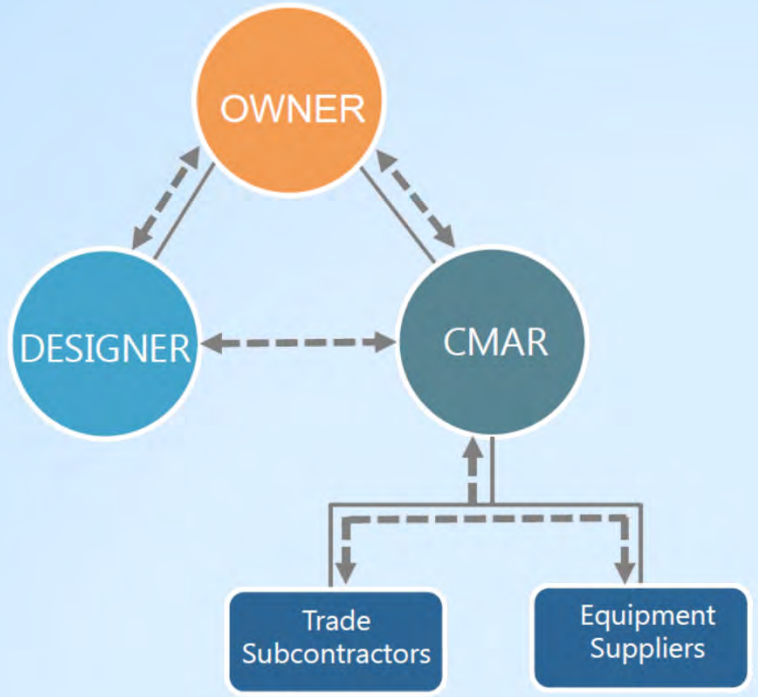
D/CMAR delivery offers the following disadvantages for the Owner

- Split Design & Build responsibilities
  - Spearin
- Multiple contracts
- Limited experience with preconstruction phase



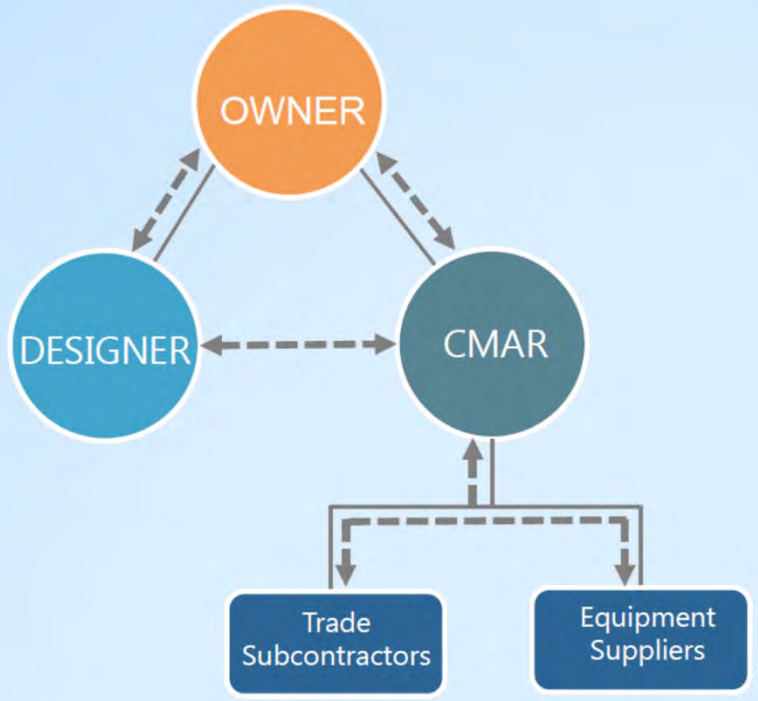
D/CMAR delivery offers the following advantages for the CMAR

- QBS selection
  - Less expensive procurements
- CMAR input reduces risk
- Negotiated GMP, not hard bid
- Shared savings motivate

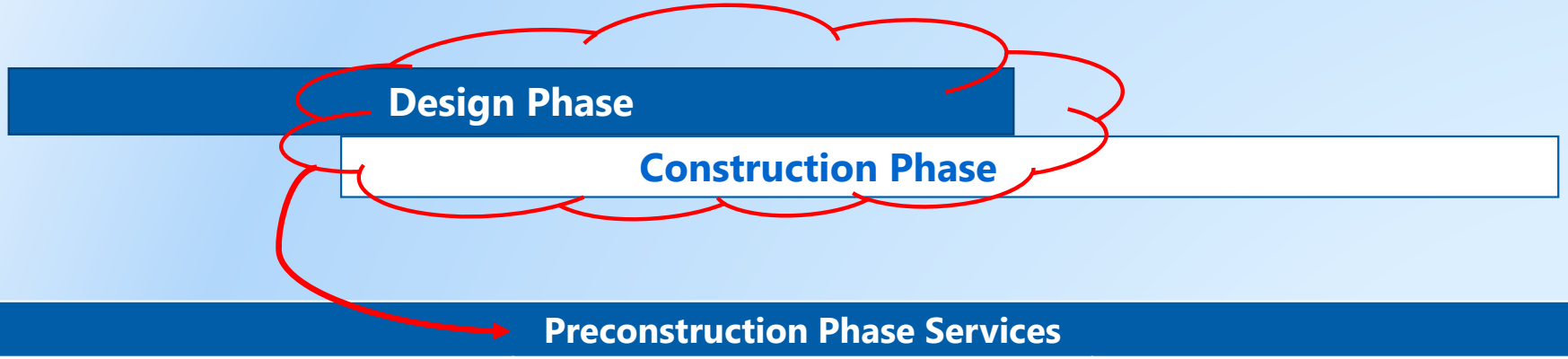


D/CMAR delivery disadvantages for the CMAR

- Self-performance contract limits
- ROI may be lower
- Preconstruction phase ties-up resources
- Limited preconstruction experience



The benefits of D/CMAR delivery are generated through the Preconstruction Phase



Preconstruction Phase Services		
Budget Conformance	Scope Conformance	Schedule Conformance
Design Reviews	Design Workshops	MOPO Development
Value Engineering	Constructability Reviews	Phasing Plans
Bid Gap Analysis	Subcontractor Qualification	Early Out Packaging

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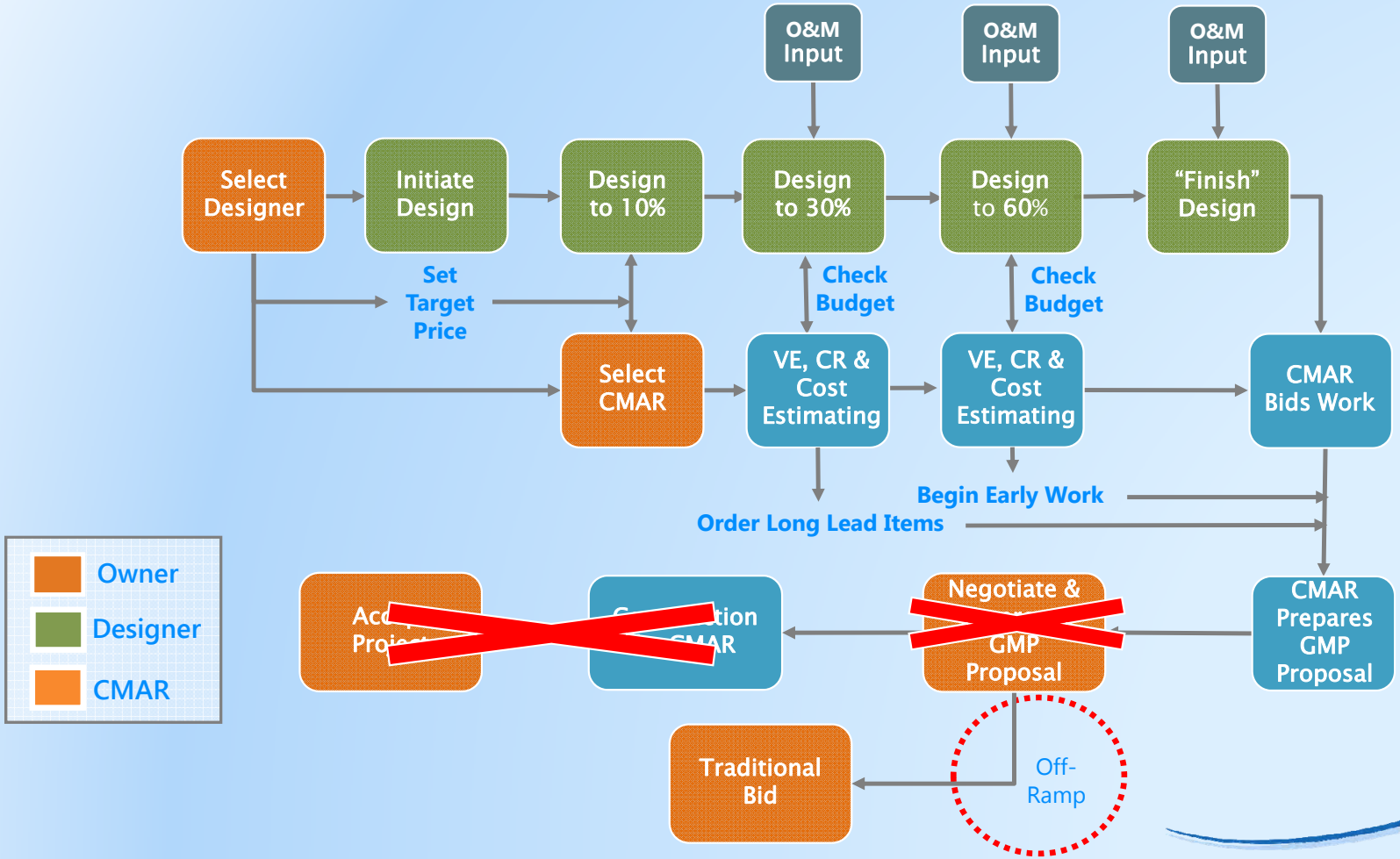
- Why Owners Select D/CMAR
- **Owner Benefits**
- Riverbend WRP Expansion
- Construction Progress

D/CMAR delivery can provide multiple benefits to the Owner

- QBS
- Shorter schedules
- O&M input
- Scope and budget certainty
- Off ramp
- Best Value decisions

D/CMAR delivery maximizes O&M input and provides for scope and budget certainty



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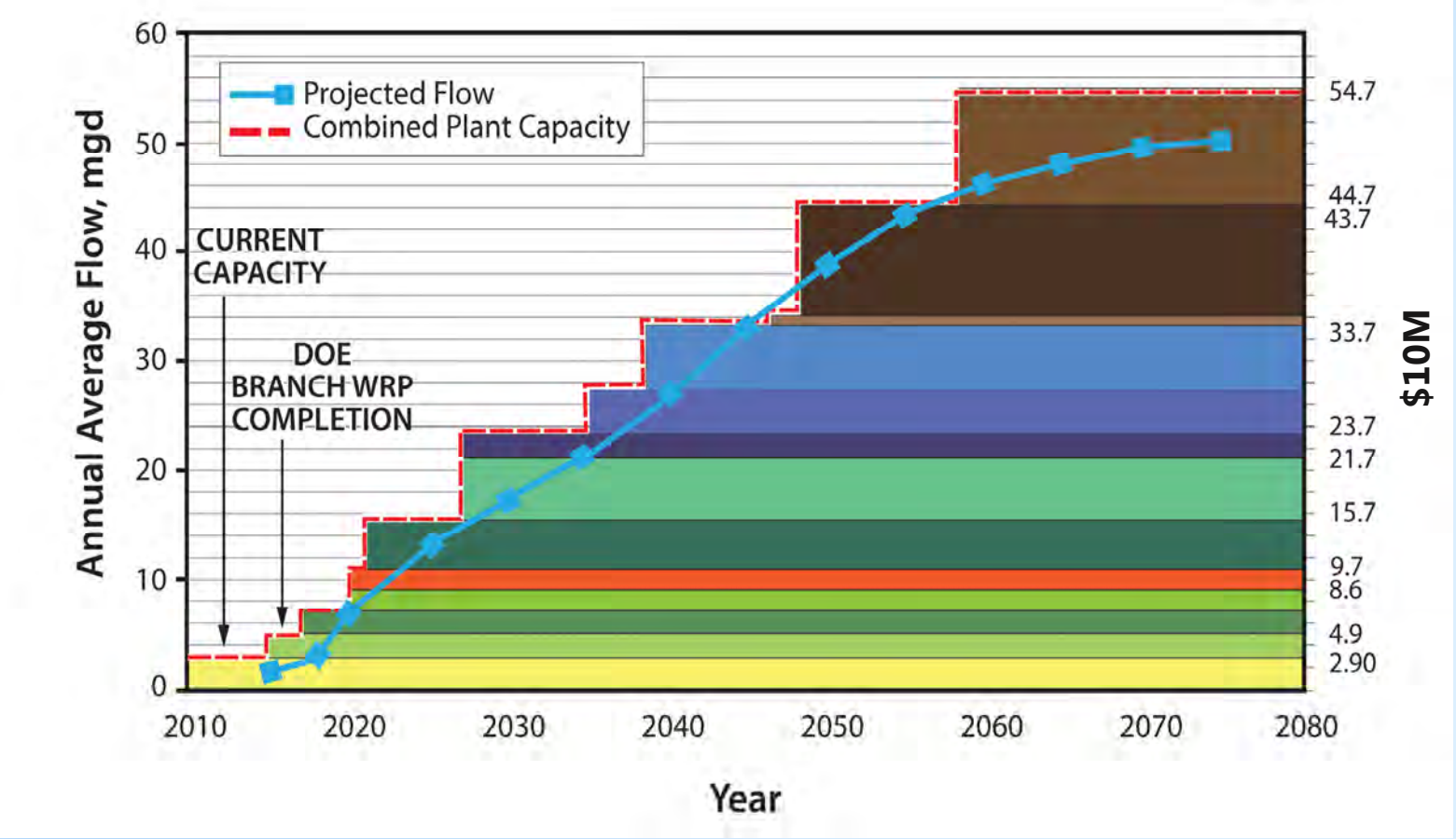
UTRWD's Northeast Region includes three water reclamation plants

- Peninsula WRP – 0.94 mgd
  - Mustang MUD
- Riverbend WRP – 2 mgd
  - Providence Village, Paloma Creek, Mustang SUD
- Doe Branch WRP – 2 mgd
  - Celina, Prosper, Savannah, Artesia, Mustang SUD

UTRWD's Northeast Region is experiencing rapid growth



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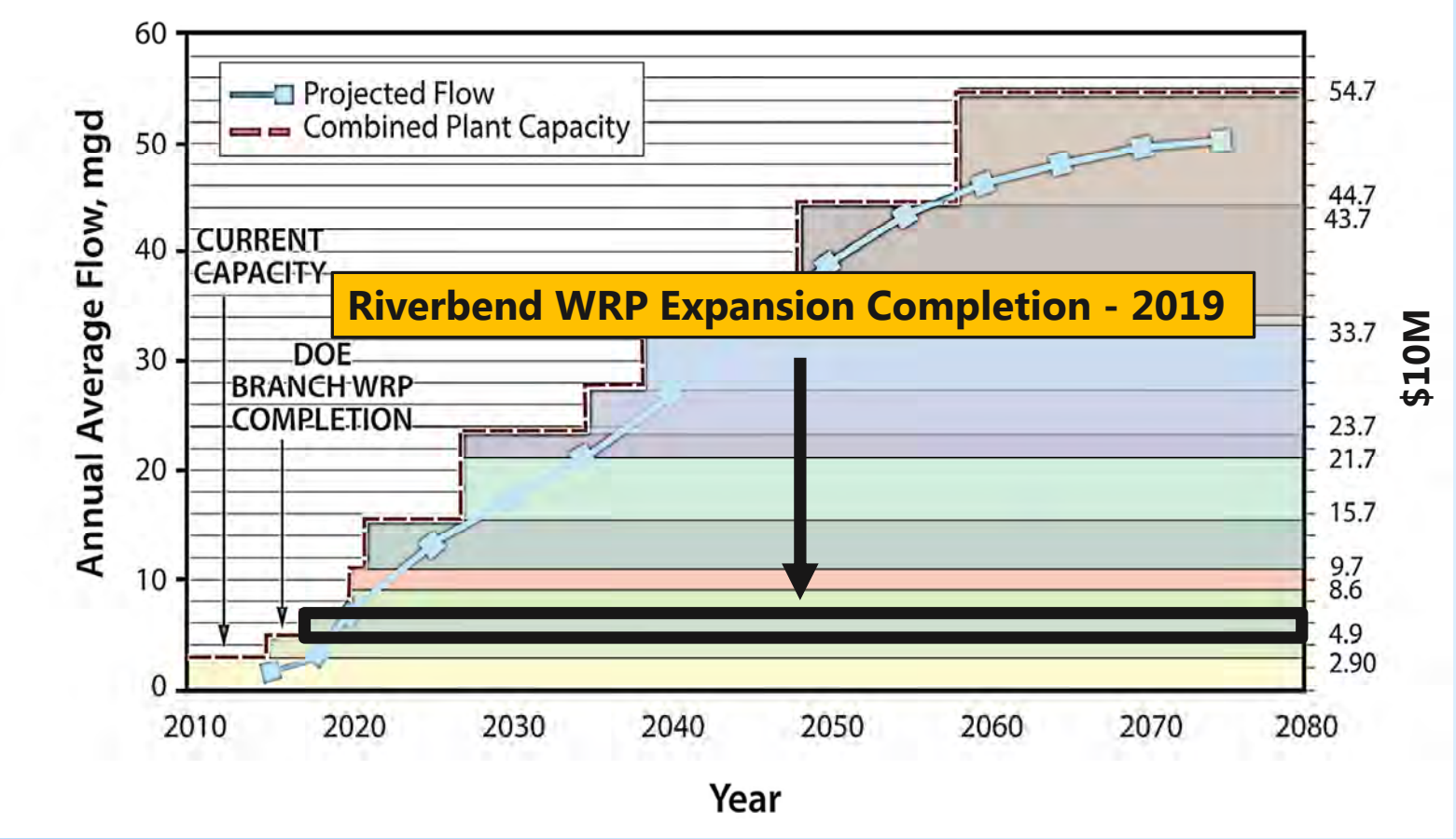

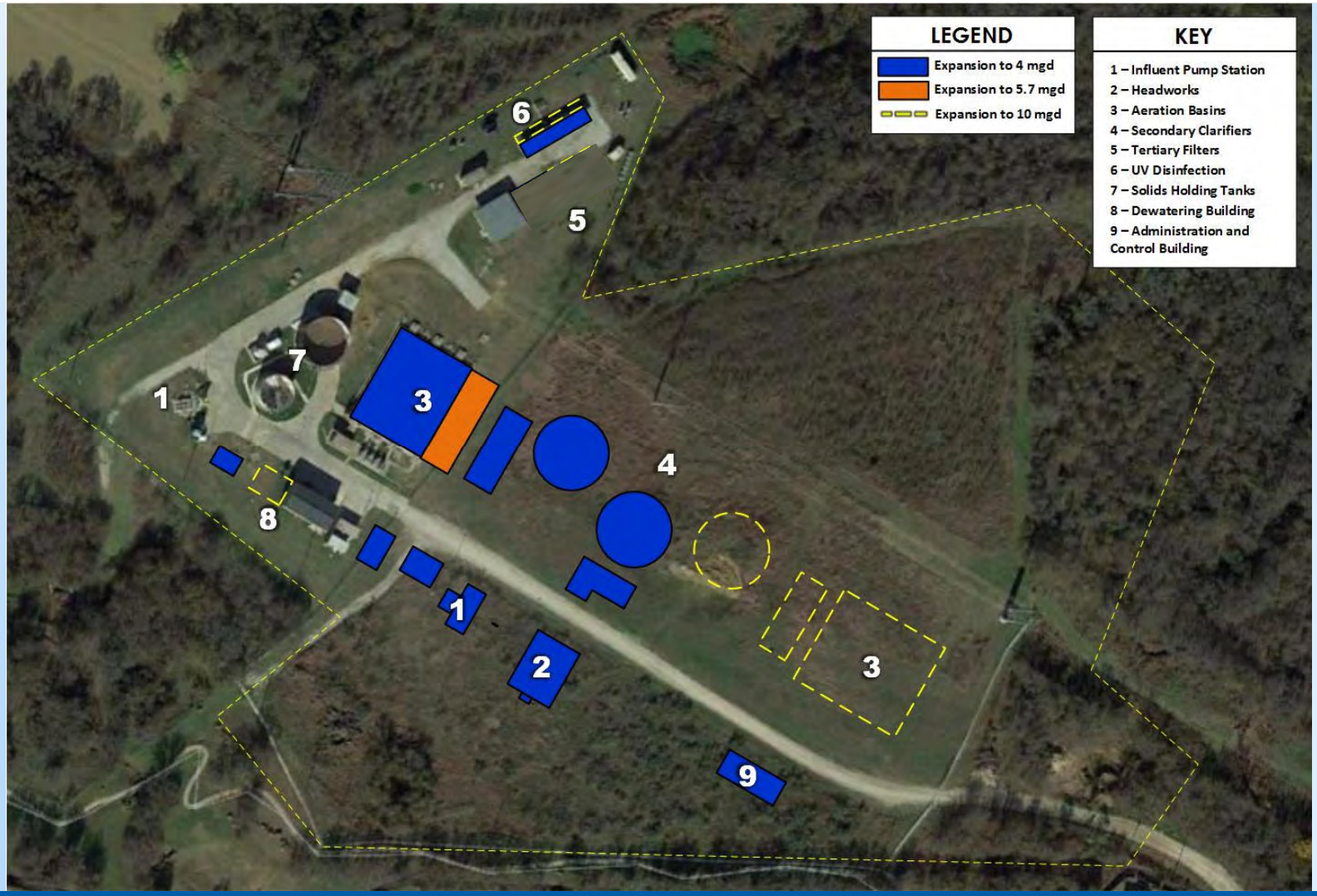

Riverbend WRP Facility Plan with ballasted activated sludge

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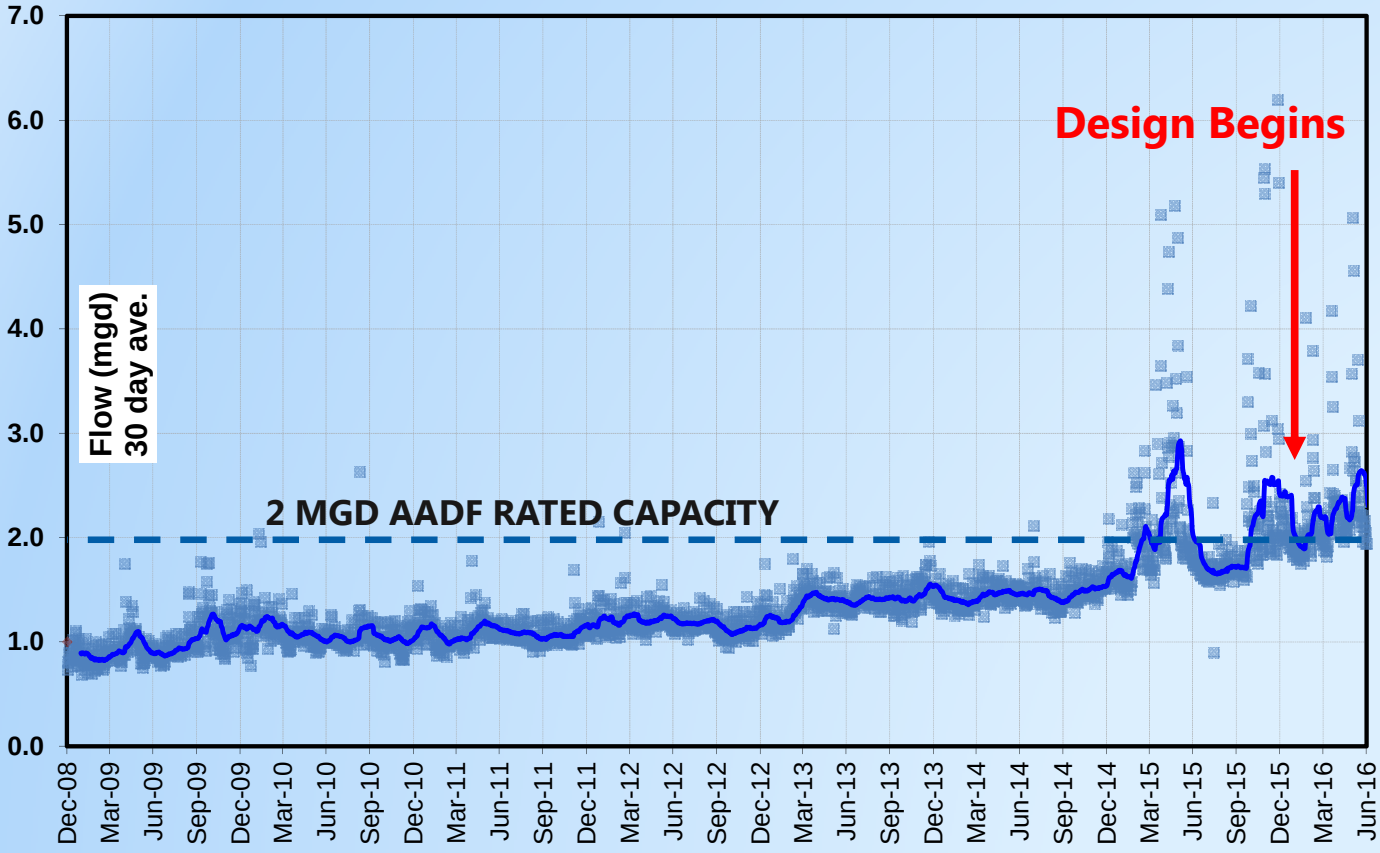
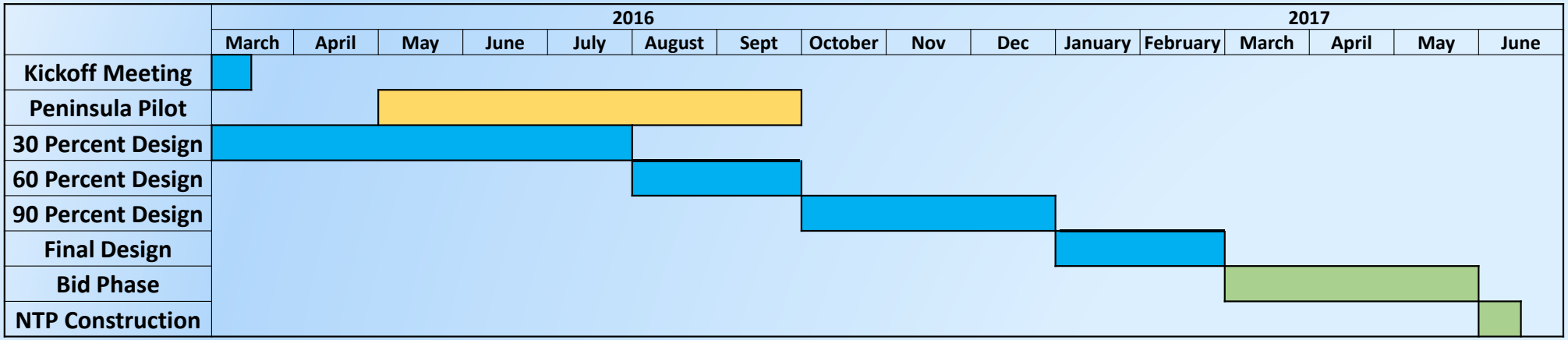
- **Riverbend WRP Expansion** – Shortened Schedule
- Construction Progress

Riverbend WRP flow was increasing rapidly



CMAR delivery method was used to reduce the project schedule by 3 months

Riverbend Expansion Design and Pre-Construction Schedule



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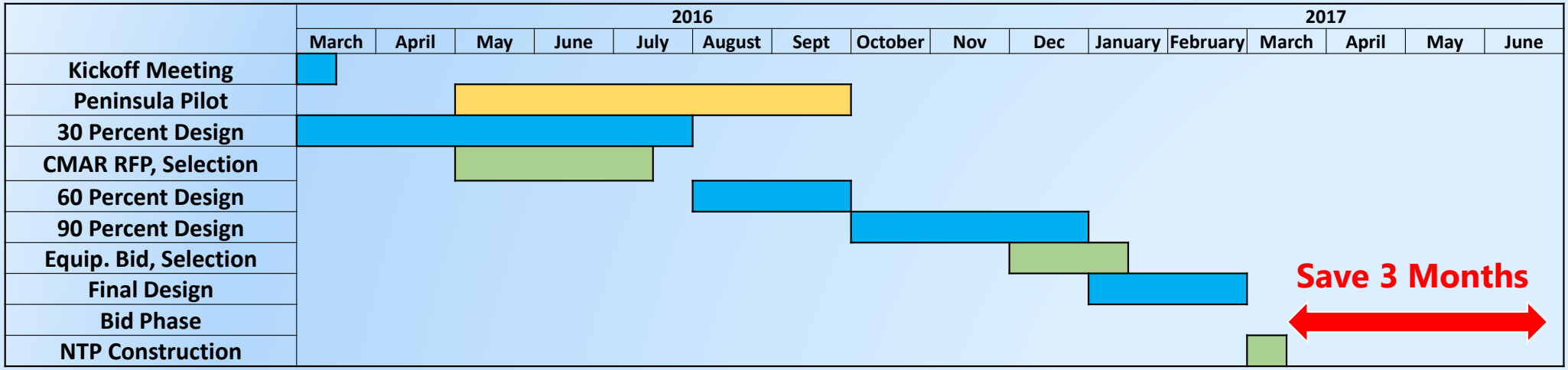

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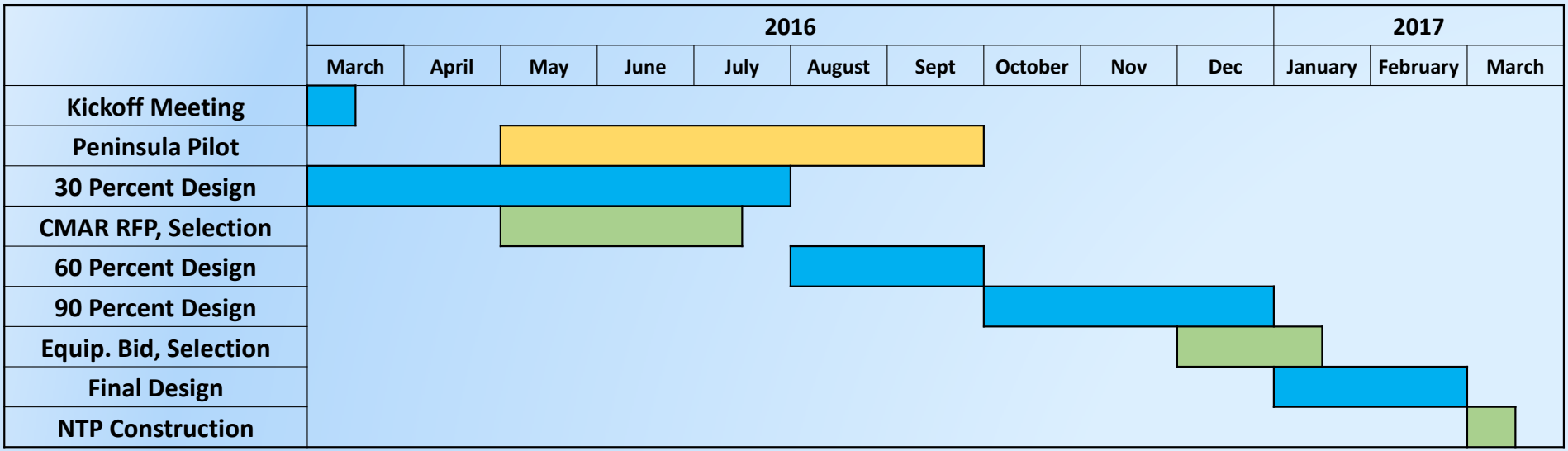
- **Riverbend WRP Expansion** – Scope and Budget Certainty
- Construction Progress

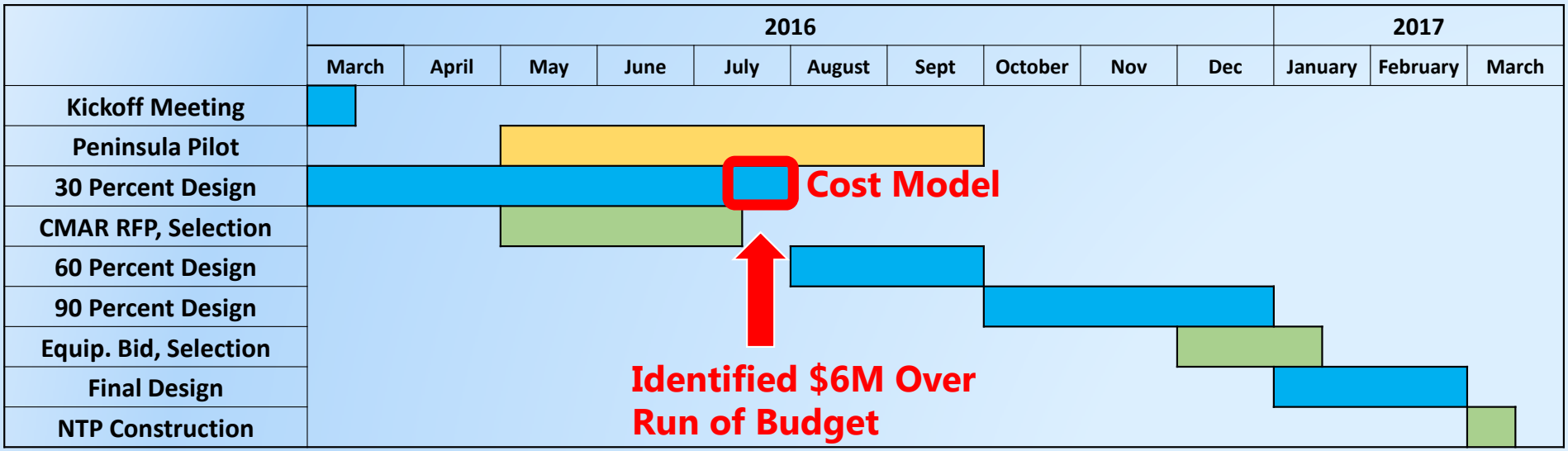
UTRWD had a set budget for this project

Riverbend Expansion Design and Pre-Construction Schedule



The 30% level cost model showed that the project was $ 6M over budget

Riverbend Expansion Design and Pre-Construction Schedule



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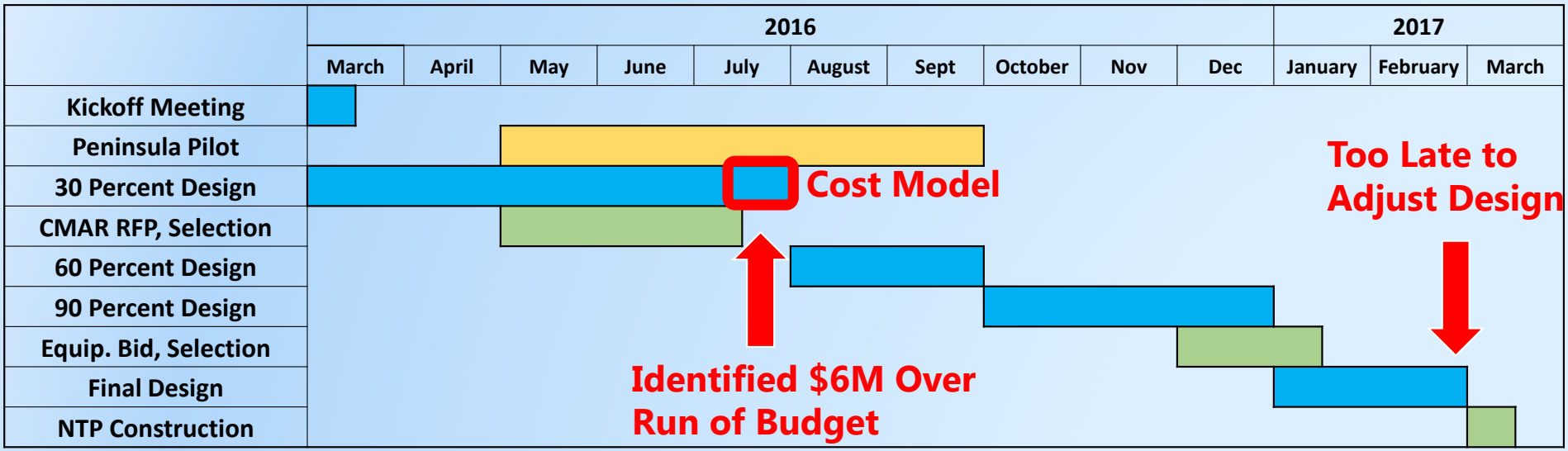
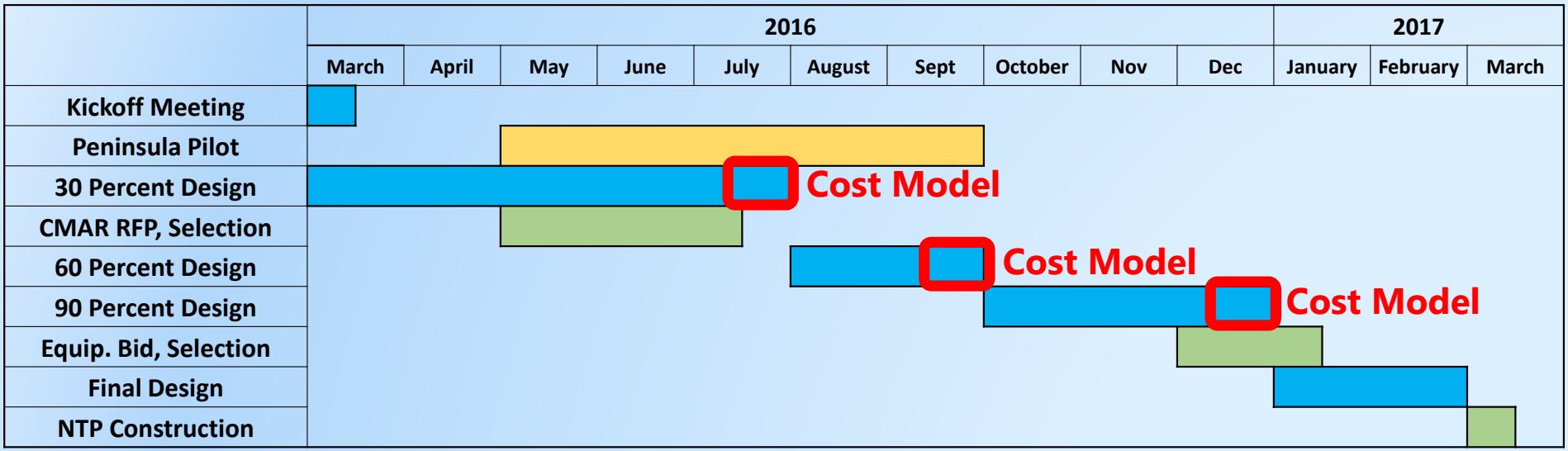


A cost model at each deliverable tracked the budget throughout the pre-construction phase

Riverbend Expansion Design and Pre-Construction Schedule



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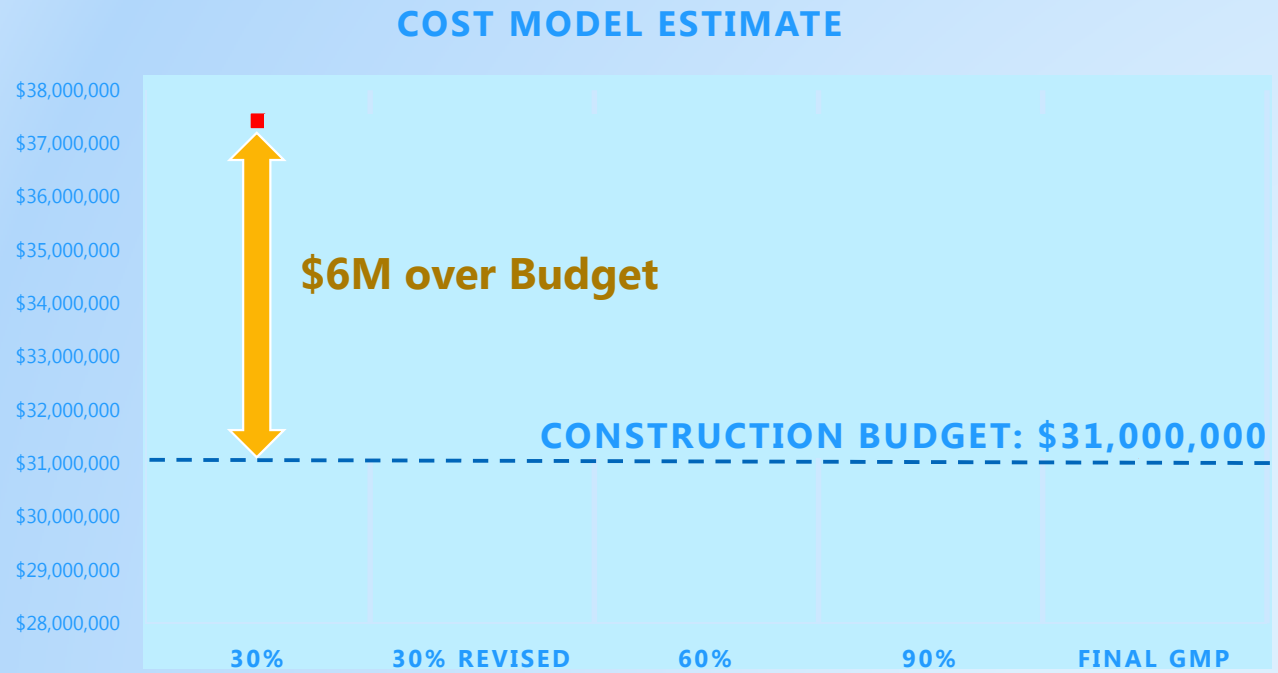
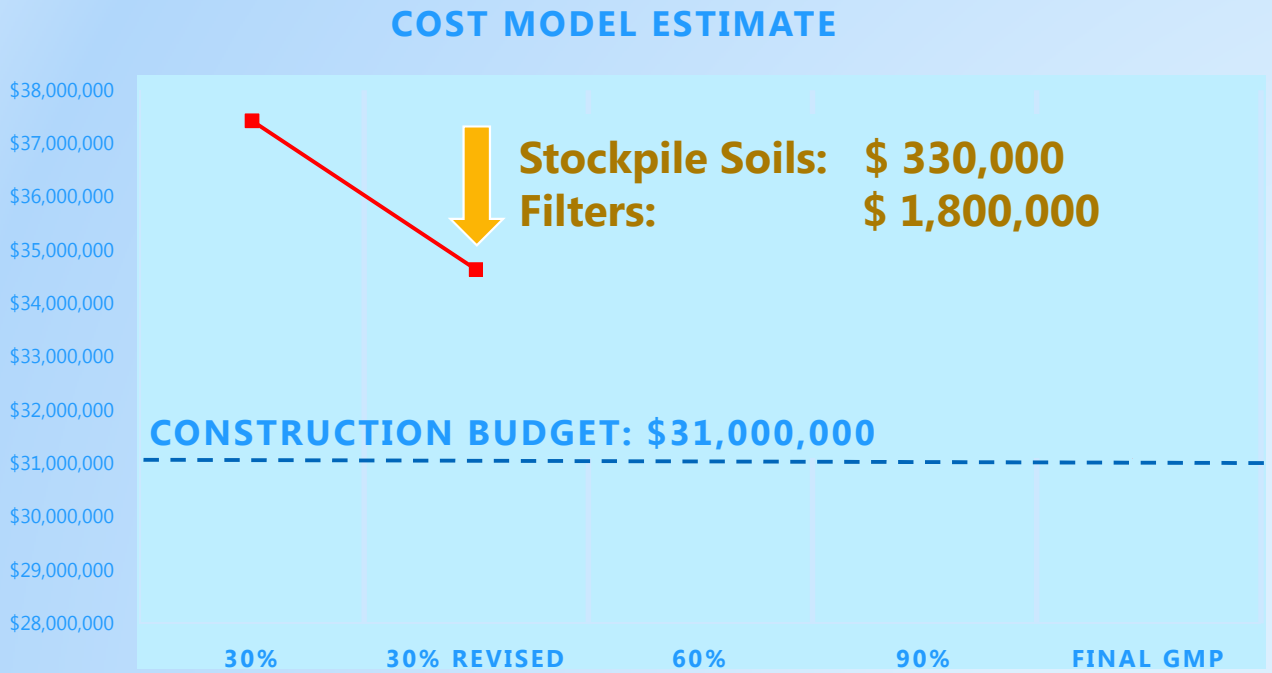


The design was adjusted throughout the project based on constructability review comments and cost model results



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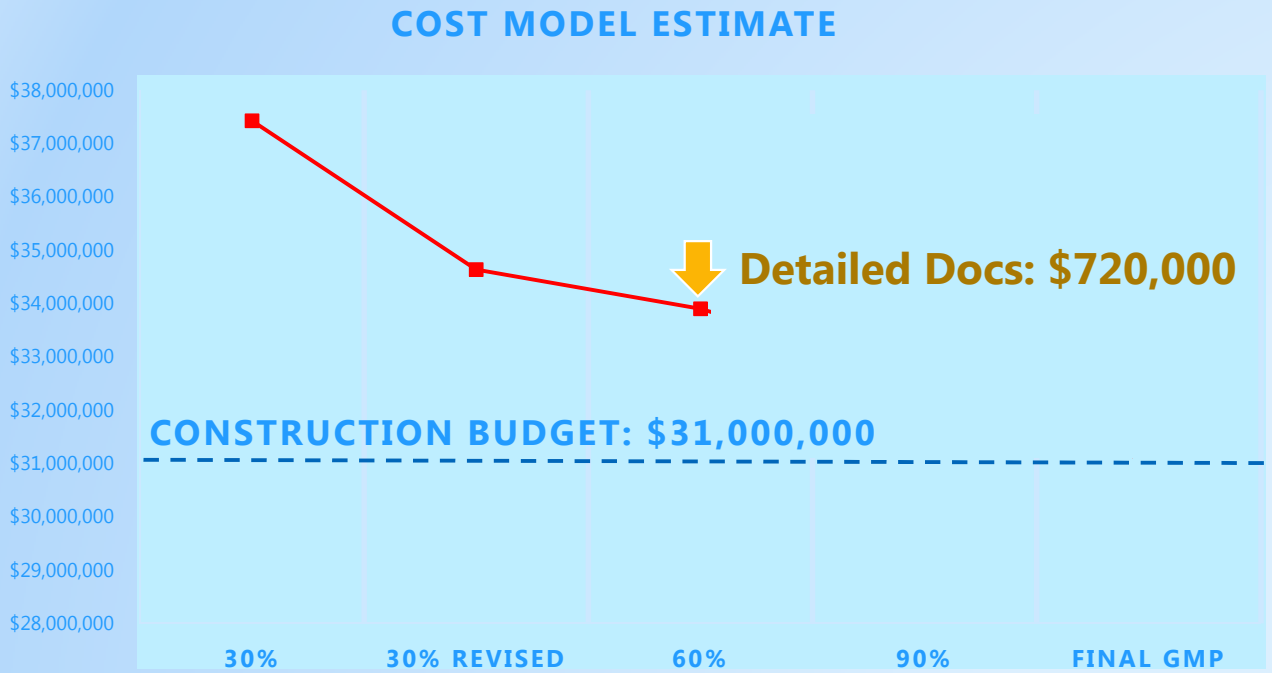

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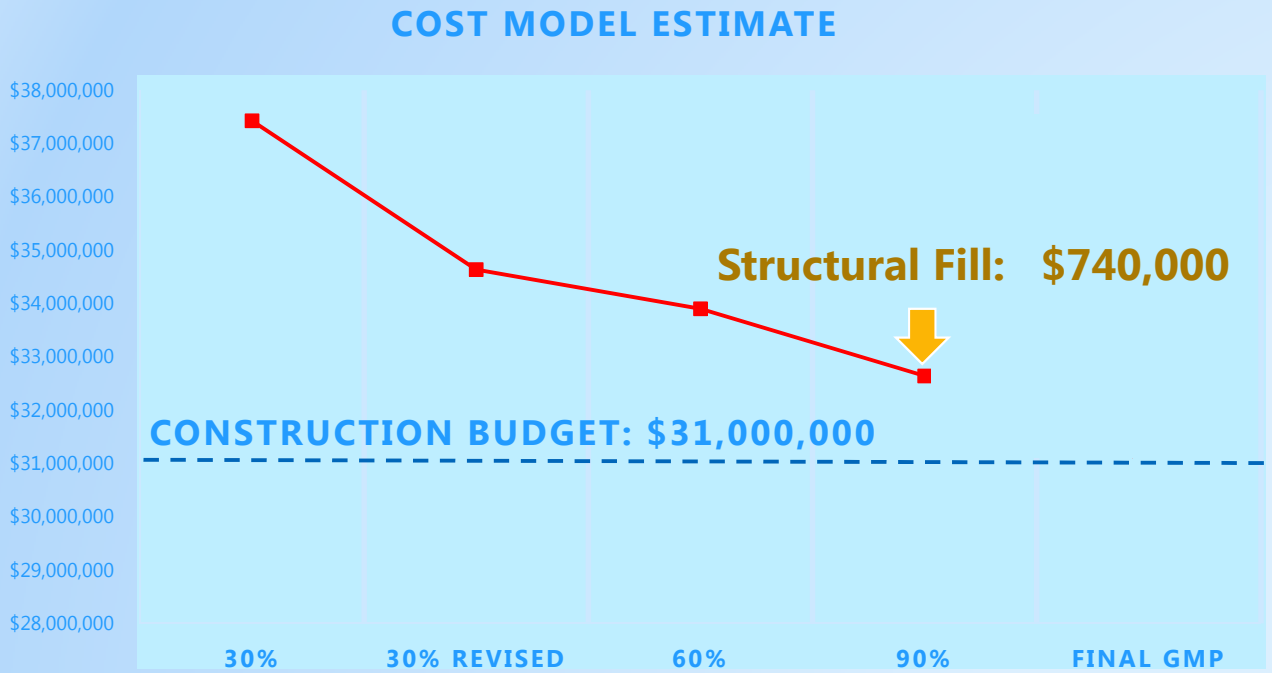
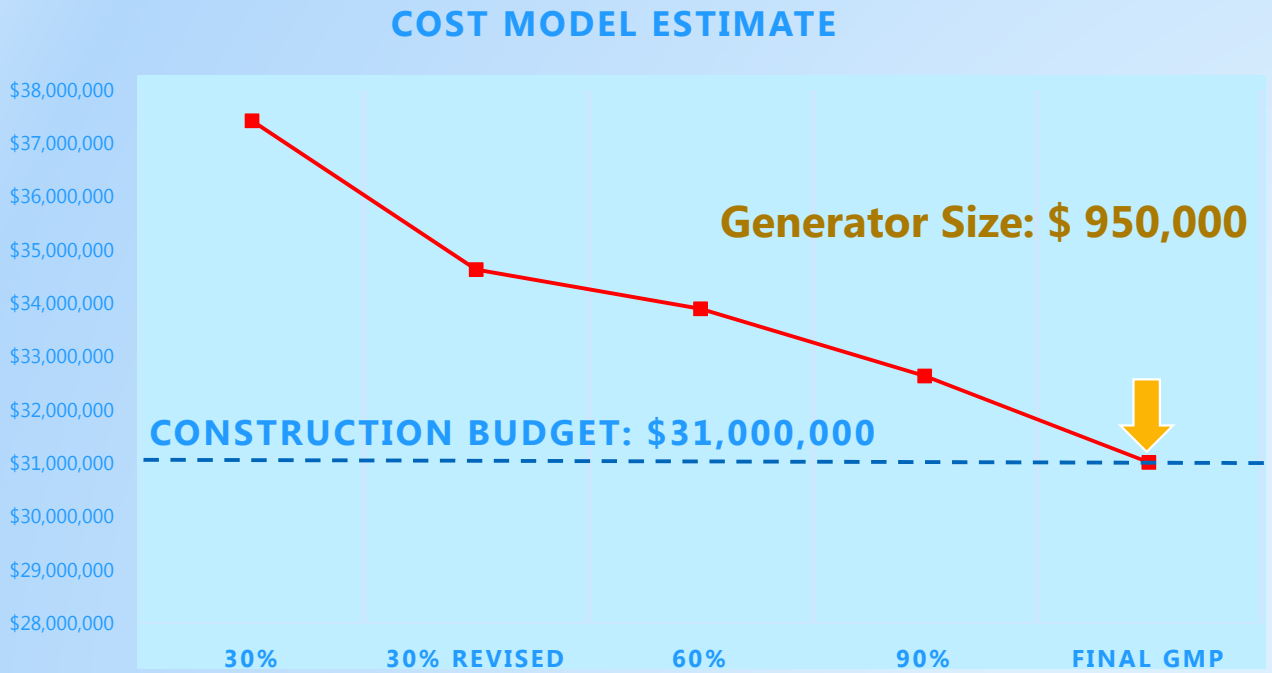
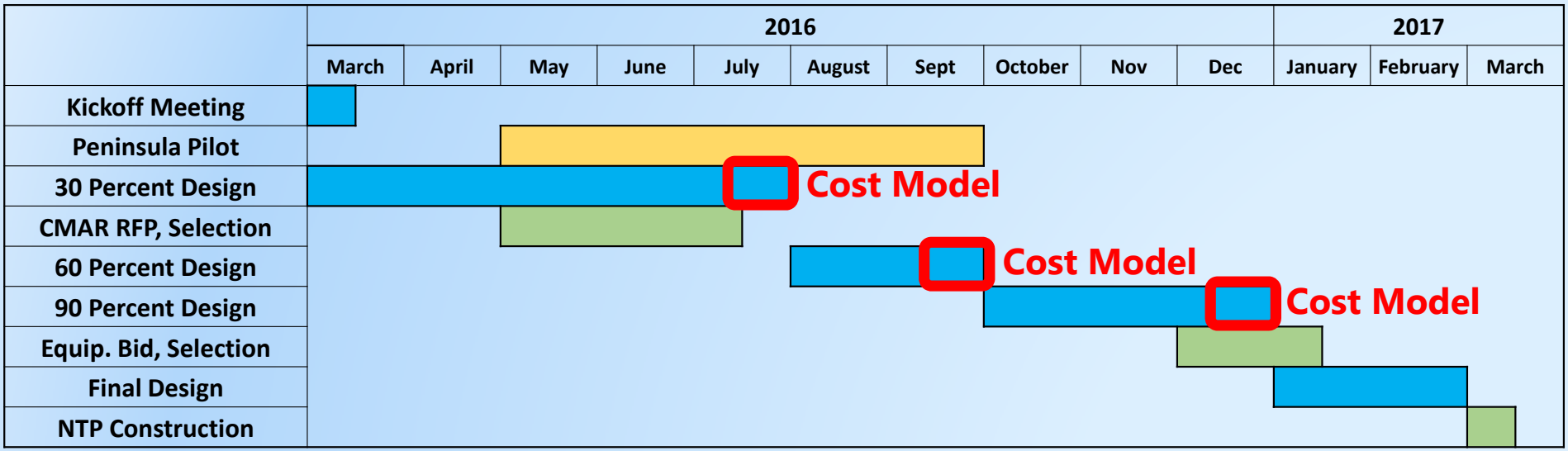


CMAR cost modeling process provided cost certainty



GMP was locked after 90% design, which allowed NTP directly after the construction documents were complete

Riverbend Expansion Design and Pre-Construction Schedule



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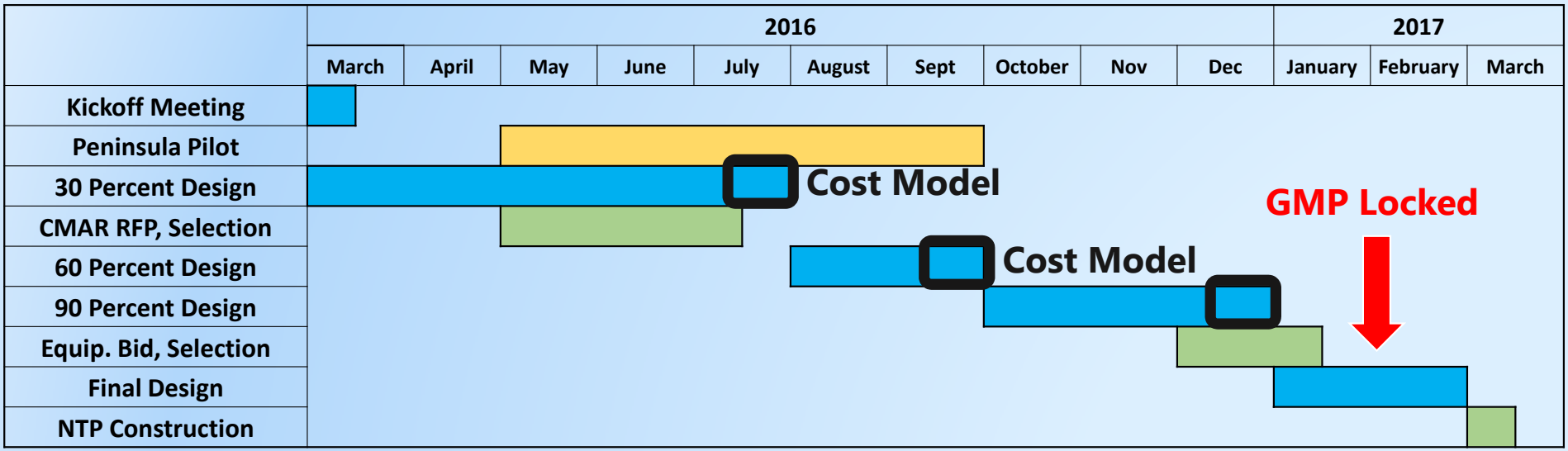
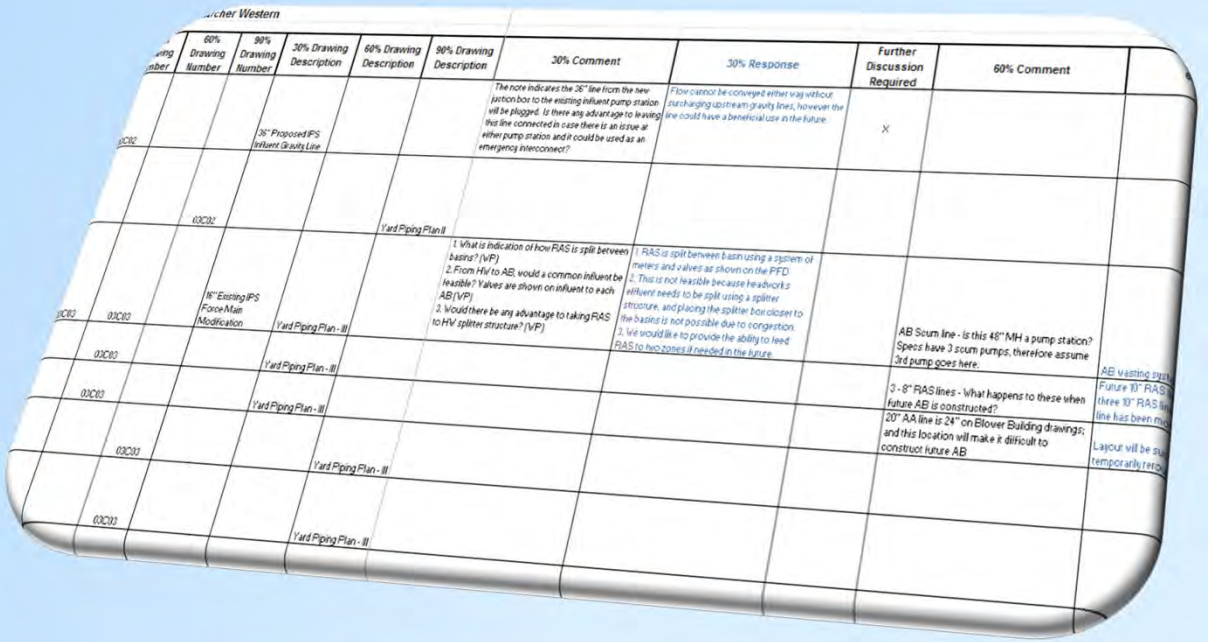


During preconstruction services, 1,270 Construction drawing and specification comments were made

- Communication
  - Four rounds of review
  - Three review workshops
  - Weekly phone conferences
- Informed design decisions



60% Drawing Number	90% Drawing Number	30% Drawing Description	60% Drawing Description	90% Drawing Description	30% Comment	30% Response	Further Discussion Required	60% Comment
		36" Proposed IPS Influent Gravity Line			The note indicates the 36" line from the new junction box to the existing influent pump station will be plugged. Is there any advantage to leaving this line connected in case there is an issue at either pump station and it could be used as an emergency interconnect?	Flow cannot be conveyed either way without surcharging upstream gravity lines, however the line could have a beneficial use in the future.	X	
			Yard Piping Plan II					
	18" Existing IPS Force Main Modification	Yard Piping Plan - III			1. What is indication of how RAS is split between basins? (VP) 2. From HV to AB, would a common influent be feasible? Valves are shown on influent to each AB (VP) 3. Would there be any advantage to taking RAS to HV splitter structure? (VP)	1. RAS is split between basin using a system of meters and valves as shown on the PFD. 2. This is not feasible because he advocts effluent needs to be split using a splitter structure, and placing the splitter box closer to the basins is not possible due to congestion. 3. We would like to provide the ability to feed RAS to two zones if needed in the future.		
		Yard Piping Plan - III					AB Scum line - Is this 48" MH a pump station? Specs have 3 scum pumps, therefore assume 3rd pump goes here.	
		Yard Piping Plan - III					3 - 8" RAS lines - What happens to these when future AB is constructed?	
		Yard Piping Plan - III					20" AA line is 24" on Blower Building drawings, and this location will make it difficult to construct future AB	
		Yard Piping Plan - III						

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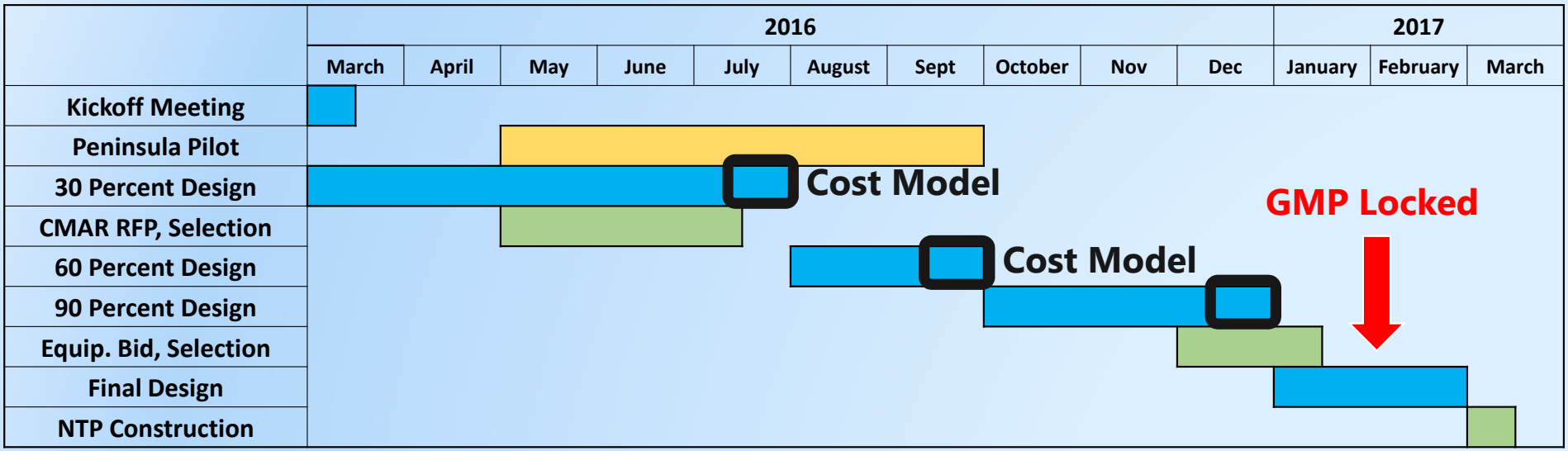
- **Riverbend WRP Expansion –** Best Value Decisions
- Construction Progress

Qualitative bid selection on equipment and subcontractors allowed for value based decisions

Riverbend Expansion Design and Pre-Construction Schedule



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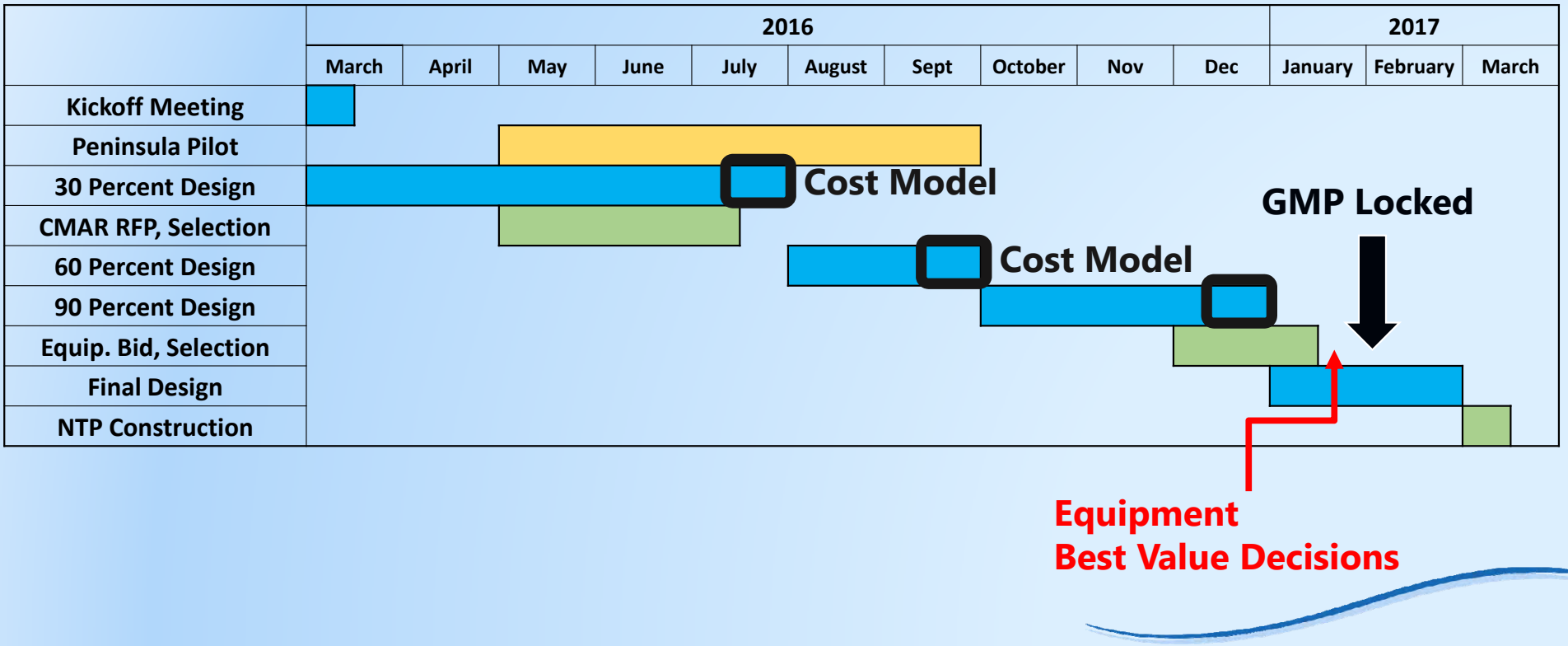

Best Value Decision Workshop was held before the GMP was finalized

UPPER TRINITY
REGIONAL WATER DISTRICT

- Operations
- Maintenance
- Construction
- Management

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Qualitative and quantitative subcontractor bid evaluation criteria support best value decisions

Evaluation Criteria	Maximum Score	Subcontractor A	Subcontractor B	Subcontractor C
Quantitative Score (Bid Price see Note 1)	40	40	34	36

Low bid price scores highest

Quantitative and qualitative subcontractor proposal evaluation criteria support best value decisions

Evaluation Criteria	Maximum Score	Subcontractor A	Subcontractor B	Subcontractor C
Quantitative Score (Bid Price see Note 1)	**40**	**40**	**34**	**36**
Qualifications	20	16	19	18
Experience	20	17	18	16
Project Approach	10	7	10	9
Subcontract Exceptions	10	8	10	10
Qualitative Score	**60**	**48**	**57**	**53**

Highest "Tech" Score

Best Value

Summary

- CMAR delivery method has been used in North Texas for $1.7B of water and wastewater infrastructure
- Riverbend WRP Expansion used the CMAR delivery method
  - The project schedule was reduced by three months
  - The cost model was used to design the project within budget
  - Equipment and subcontractors were evaluated using price and qualifications

Questions?

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