Construction Management at Risk (CMAR) Delivery Process
Frequently Asked Questions

Purpose:

This document is a resource for North Carolina airports to assist in the understanding of the Construction Management at Risk (CMAR) process when there is a desire to utilize this delivery method for airport projects funded with State Capital Infrastructure Funds (SCIF22 and SCIF23) and Transportation Reserve Directed Fund (TPRD) state funds. The use of alternative delivery methods for airport projects utilizing federal funds may have additional requirements and prior approval from Federal Aviation Administration (FAA). See FAA Advisory Circular 150-5100-14E here (See Appendix G).

What are the Advantages of the CMAR Method for Aviation Project Delivery?

The increasing popularity of the CMAR delivery process has consistently shown that the innovation and collaboration inherent in CMAR leads to faster project delivery with more reliable performance.

There are several key CMAR benefits versus other project delivery methods:

- Allows faster design and construction schedules and the option of multiple bid packages.
- Owners have more flexibility in the contractor selection process, enabling them to emphasize experience and performance for their specific type of project.
- The designer has early input from the contractor for cost, schedule, phasing and design constructability.
- The process builds the relationship between the airport, designer construction manager/contractor.
- The airport maintains design control since they have a contractual relationship with the designer, and the construction manager does not.
- Works out the details of design and any changes before construction starts for less project impact.
- Allows a more transparent vision of actual project costs.
- Holds the contractor accountable for schedule and adherence to a guaranteed maximum price (GMP).
- Allows subcontractors to provide valuable input regarding quality, constructability and costs.
- The process allows collaboration that drives innovation for the project.

There are also some disadvantages that should be considered as well when choosing this delivery method:

- Limited number of qualified construction managers/contractors who have systems and robust services in place, ready to perform.
- Some designers can perceive the early contractor interaction during design as a threat.
- The contractor may not want to take responsibility for any errors in preconstruction or construction since they do not have a contractual relationship with the designer.
- There is less emphasis on lowest cost with CMAR than the traditional design-bid-build approach.
- Not well suited for non-complex, small or short duration projects.

With benefits like increased flexibility during contractor selection, maintaining design control, clearer vision of project costs and overruns, control of costs with the GMP and accelerated project completion, the CMAR delivery method provides a successful and innovative project delivery method for aviation projects.

When Should You Decide to Use the CMAR Method for Aviation Project Delivery?

The short answer is as early in the process as possible. Making this decision earlier rather than later enables the airport to make key decisions regarding the most important project attributes – what is important to the agency and public, as well as knowing what should be included in the project. The more details that are known and decided upon early in the project, the smoother and more efficient the delivery will be.

Early decisions are key to a successful CMAR project as well. To pursue CMAR delivery, the airport must begin with the vision, needs and objectives of the project concept, including the following:

- ***Scope***: The airport will work closely with the designer and construction manager early in the process to refine the project scope and ensure that it aligns with their goals and budget. This helps identify potential challenges and opportunities and provides a comprehensive understanding of the basic requirements of the project. This process ensures that the project is realistic, achievable and financially sound.
- ***Site Conditions***: Assessing site conditions early is another pivotal step in the initial phase of the CMAR process. This involves a thorough examination of the physical site where the construction will take place, including analyzing the topography, soil conditions, existing structures, access to utilities and local regulations. Understanding these site-specific conditions is critical for design and construction planning, as they influence decisions on design adjustments, construction methods, budget considerations, and project timelines. With these findings, the designer and construction manager can mitigate risks and plan for contingencies, ensuring a smoother project execution. This provides a clear picture of the potential cost increases and schedule delays.
- ***Budget***: Understanding the project budget and being aware of unrealistic expectations is extremely important. Be clear on the financial parameters from the outset with the designer and construction manager. To take advantage of the benefits of CMAR, pivotal financial decisions need to be made early to keep the project on track and costs reined in.

What Kinds of Aviation Projects Make Good Candidates for the CMAR Delivery Method for Aviation Project Delivery?

There are several types of aviation projects that are often considered good candidates for the CMAR delivery method due to certain advantages. Generally, more complex projects lend themselves to the CMAR process. Some examples include:

- ***Runways and Taxiways Construction:***
  - Accelerated construction - Runways and taxiways are critical components of airport infrastructure that must be constructed or rehabilitated quickly to minimize disruptions. The CMAR delivery method allows for condensed design and construction phases, which can significantly reduce the project timeline.
  - Integrated planning - Early collaboration between the designer and construction manager ensures that all aspects of the project, such as topographic surveying, geotechnical investigation, and subsurface utility engineering, are considered from the outset. This integrated planning helps identify potential issues early and develop effective solutions.

- ***Airport and Terminal Expansions:***
  - Seamless integration - Terminal expansions often need to integrate seamlessly with existing facilities. The CMAR approach facilitates this by ensuring continuous communication and coordination between the designer and construction manager. This helps manage complex interfaces and maintain operational continuity.
  - Flexibility in Design - The flexibility inherent in the CMAR process allows for adjustments to be made during the project to accommodate changes in passenger flow, security requirements, and technological advancements. This adaptability is critical for terminal projects that must meet evolving needs.
- ***Airfield Rehabilitation:***
  - Accelerated construction - Runways and taxiways are critical components of airport infrastructure that must be constructed or rehabilitated quickly to minimize disruptions. The CMAR process allows for direct collaboration between the designer and construction manager, minimizing the construction impacts to airline and airport operations. In addition, the condensed design and construction phases can significantly reduce the project timeline to reduce overall impacts.
  - Integrated planning - Early collaboration between the designer and construction manager ensures that all aspects of the project are considered, especially closures. This level of construction coordination includes consideration for complete shutdowns, partial system shutdowns, or long term, smaller, recurring closures as solutions from the outset. This integrated planning helps identify potential issues early and develop effective delivery strategies and solutions.

What are Some Myths About Utilizing the CMAR Method for Aviation Project Delivery?

Here are some of the most common misconceptions about the CMAR methodology:

- "***CMAR is Only for Small Projects…***"

  CMAR can be used for both small and large projects and is generally dependent on project complexity. CMAR's strong points are its ability to address complicated project issues such as operation schedules, material requirements, shortened delivery schedules, and cost constraints more efficiently. This also encourages greater participation from MBE/WBE/SBE/DBE firms.

- ***"CMAR is Less Cost-Effective than Traditional Methods of Delivery…"***

  CMAR can be more cost-effective due to early collaboration, cost control, and fewer change orders. CMAR is one of the best delivery methods to identify, allocate, and mitigate risk before the final cost of the project is determined. Airports utilizing the CMAR delivery method are engaged early in the development process to make it easier to make adjustments and meet the expectations of all parties.

- "***CMAR is Not Suitable for Complex Projects…***"

  The CMAR process was specifically designed for complex projects and can provide better outcomes due to its integrated approach. Traditionally, CMAR projects address complex scheduling or cost issues earlier in the delivery process and, as such, reduce risk and unexpected costs.

- "***CMAR Requires Less Airport Involvement…***"

  The CMAR delivery process requires significantly more airport involvement, especially upfront, during the design phase, to ensure collaboration and cost control. However, this helps develop communication between the designer and construction manager to ensure that the airport's requirements are met for the facility, as well as meeting the schedule and budget.

- "***CMAR Does Not Allow for Innovation…***"

  The CMAR process provides designers with the opportunity to work directly with a specific construction manager during the development and design of the project. This early coordination helps identify where innovative products or practices can be incorporated into the project for faster and more cost-efficient delivery of the project.

Is It More Time and Effort on My Part Utilizing the CMAR Method for Aviation Project Delivery?

The most common answer is yes. However, that may depend on the individual project details, how developed the project plans and specifications are, how prepared the airport is, the complexity of the project and how the project integrates with airport operations.

CMAR delivery is cost-effective and time conscious. It is one of the best delivery methods to identify, allocate, and mitigate risk before the final cost of a project is determined. CMAR projects typically have a faster delivery time than traditional design-bid-build (DBB) projects.

Typically, there may be more upfront work and more collaboration during the delivery process than traditional methods. Here are several key areas that may require additional effort when utilizing the CMAR project delivery method for aviation projects:

- ***Defining Scope and Goals:*** At the beginning of a CMAR project, the airport will need to clearly define the project goals, scope and budget with sufficient details for the designer and construction manager. Define "must-haves" and "nice-to-haves" as soon as possible in the process. This upfront effort helps the designer and the construction manager align their work with your expectations.
- ***Initial Selection:*** Choosing the right designer and construction manager is extremely important. The airport will need to spend additional time evaluating potential candidates to ensure they have the right experience and a good history for the specific type of project.
- ***Active Participation:*** While the designer and construction manager handle most of the project coordination, the airport's active participation in key meetings and decision-making processes is essential to ensure the project stays on track and meets the airport's needs. Additionally, since the designer and construction manager are not contractually obligated to each other, the airport will need to be included if there are any disputes.
- ***Trust and Communication:*** Building a strong, trusting relationship with the designer and construction manager is critically important. Constant, open, and ongoing communication will help address any issues promptly and keep the project moving smoothly.
- ***Establishing the GMP:*** The negotiation of the GMP is one of the key success factors for a CMAR project. This process should include a price for the work to be delivered, including any contingencies and allowances needed. It is typically not considered a "low-bid" type pricing and should represent fair and equitable pricing for the work.

CMAR delivery may offer the advantage of fewer change orders during the project delivery, but only to the extent that contingencies and allowances for those changes are included in the GMP construction contract. The airport and the construction manager should be transparent about any amounts included in the GMP for allowances and contingencies and when those can be utilized.

Overall, while there might be additional work at the beginning of the process, the CMAR method can significantly reduce your workload during the project by consolidating responsibilities, shifting risks to the construction manager and improving efficiency.

Does It Cost More to Utilize the CMAR Method for Aviation Project Delivery?

Generally, yes, slightly more, but this depends on the individual project and its requirements. National studies show that CMAR contracts are slightly higher cost on average (+1.9%) than those for traditional delivery methods. However, this type of contract has about a 25% faster delivery rate than traditional delivery methods.

This increased cost is often justified with risk shifting to the construction manager under the GMP and increased project coordination necessary to move through the design process. Most agencies agree that this is well worth the additional costs, when you consider that the project will be delivered faster and within the target budget.

What Do Other Airports Have to Say About Utilizing the CMAR Delivery Method for Aviation Projects? What are Some "Lessons Learned" From Other Airports' Experience in North Carolina?

The Division of Aviation encourages airports to research and contact colleagues to ask questions to understand their full commitment to an alternative delivery method like CMAR. Here is an example of a North Carolina aviation project that utilized the CMAR method:

Example:

CMAR Project Name: Charlotte-Douglas International Airport Terminal Lobby Expansion (TLE)

Description: The TLE project leveraged the CMAR process to deliver an extensive expansion and renovation of the terminal lobby at Charlotte Douglas International Airport. The project involved a very challenging phasing plan that added 174,000 square feet of new space, a renovation of 191,000 square feet of existing lobby space and the construction of a 171,000 square foot glass canopy of an active 8-lane curbfront roadway.

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This project was extremely successful, and the Charlotte-Douglas International Airport is willing to share insights and lessons learned for their CMAR project.

What are Some Key Takeaways, Insights Gained and Recommendations for Airports Considering the Use of the CMAR Method for the First Time?

Keep in mind the following when considering the CMAR delivery process for projects:

Early Collaboration:

- CMAR fosters early collaboration among all stakeholders, including airport authorities, designers, contractors, state officials, and the FAA. This early-stage involvement helps create more accurate designs, deliverable schedules, and cost estimates, which are crucial for complex, large- or small-scale aviation projects. This early involvement also produces a decision on what is a "must-have" versus what is "nice-to-have" in the project, allowing the designer and construction manager to collaborate during the design phase, improve budget estimates, schedules, and buildability, and meet all expectations for the project. This sets the stage for a trusted working relationship among the parties that can deliver the expected project on time and on budget.

Streamlined Communication:

- The CMAR delivery process promotes open and streamlined communication between the airport, project manager, designer, construction manager and contractor, fostering a collaborative environment with quick decision-making and problem resolution through project transparency. The construction manager can minimize delays and optimize coordination among project stakeholders, ensuring alignment across all parties.

Cost Savings:

- The CMAR process can lead to overall cost savings due to improved collaboration and efficiency, which can reduce the potential for cost impacts and schedule delays during construction. CMAR provides enhanced cost management capabilities through accurate cost estimates, ongoing budget monitoring, and adjustments as needed. It is fair to note that the CMAR process may involve higher initial costs as the construction manager's involvement begins earlier in the project. This can be offset by early coordination, reduction of construction changes, faster delivery and the use of the GMP.

Flexibility and Innovation

- The CMAR process encourages innovative solutions and flexibility from the initial design phase. For example, early in the project, the designer can incorporate the latest technologies and adapt to changing requirements more easily. This is particularly important for airports, which must remain adaptable to future technological advancements and regulatory changes. In addition, when unexpected conditions or circumstances are encountered during delivery, the designer and construction manager can quickly address and incorporate solutions that meet all the partners' needs.

Risk Management

- The CMAR process provides a degree of financial protection for project managers by having the construction manager assume the risk for any cost overruns or scheduling delays through the GMP. The construction manager bears the risk for cost overruns, which incentivizes proactive management of project costs and quality. This is vital for aviation projects, where delays and cost overruns can have significant implications for airport operations and project costs.

Online Resources:

NCDOT Aviation Alternative Delivery Resources:

- *https://connect.ncdot.gov/municipalities/State-Airport-Aid/Pages/default.aspx*
  (See Directed Funding Section)

NCDOT Alternative Delivery Resources

- *https://connect.ncdot.gov/letting/Pages/Design-Build-Resources.aspx*

NCDOT Design-Build Policies and Procedures:

- *https://connect.ncdot.gov/letting/Design%20Build%20Resources/01.%20NCDOT%20Design-Build%20Policy%20and%20Procedures.pdf*

NCDOT Guidelines for Awarding CMGC Projects:

- *https://connect.ncdot.gov/letting/Design%20Build%20Resources/02.%20NCDOT%20CMGC%20Guidelines_230523.pdf*

NCDOT Public Private Partnership Policy and Procedures:

- *https://connect.ncdot.gov/letting/Design%20Build%20Resources/05.%20NCDOT%20Public%20Private%20Partnership%20Guidelines%208-2025.pdf*

FAA Advisory Circular 150-5100-14E:

- *https://www.faa.gov/documentLibrary/media/Advisory_Circular/150-5100-14E-consolidated.pdf*

FAA Airport Design and Engineering Standards:

- *https://www.faa.gov/airports/engineering/design_standards*

Construction Management Association of America:

- *https://www.cmaanet.org/education-training*

Construction Owners Association of America, Inc.

- *https://www.coaa.org/search?q=CMAR*