



Capital Project Management and Construction Manager at Risk Contracting



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Executive Summary – Capital Project Management and Construction Manager at Risk Contracting

Purpose

The purpose of this audit was to evaluate citywide project management of capital construction projects, and separately, to evaluate the City's use of the Construction Manager at Risk (CMAR) contracting method.

Background

The Capital Investment Plan (CIP) is a multi-year plan that supports the growth and vitality of the community. The CIP plans for long-term capital infrastructure, which is broadly defined as the construction or acquisition of fixed assets such as roads, sidewalks, buildings, capital building maintenance, real estate, equipment, culverts, or pipes.

The FY 2020 – FY 2024 CIP included funding for \$992 million in projects for FY 2020 and \$20 million for the establishment of the Advanced Planning and Design program.

Conclusion

The City has not consistently used best practices to manage large capital projects. Improvements should be made in the areas of Project Selection, Estimating, Cost Management and Delivery, Performance Reporting, and the Use of the Construction Manager at Risk Project Delivery Method.

Highlights

Project Selection and Advance Planning (Page 7)

Project budgets have been established without sufficient design.

- The City should document and disclose its capital planning decisions.
- The City should establish a more formal selection process for projects considered for the Advance Planning and Design Program.

Actions Taken/Planned: The Advance Planning and Design Program addresses risks associated with establishing project budgets without sufficient design completion. Strategy and Budget will document the selection and prioritization process for the Advance Planning and Design Program.

Estimating (Page 16)

City-wide cost estimating standards should be established.

- Independent cost estimates should be performed on high-dollar or high-risk projects prior to submittal to Council for approval.
- Independent cost estimates were not performed for two projects for which subcontractor bids exceeded the CMAR's iGMP budgets by \$15 million and \$30 million.

Action Taken/Planned: For the FY 2021 CIP, General Services reviewed all estimates for general fund projects for accuracy and reasonableness. General Services agrees that there is value in seeking independent cost estimates.

continued...

Executive Summary – Capital Project Management and Construction Manager at Risk Contracting Executive Summary - continued

Cost Management and Delivery (Page 28)

The City has established adequate project management controls but has not consistently documented the selection of project delivery methods.

- The City should establish criteria for selecting the appropriate construction delivery method for each project.
- Attempts to accurately and consistently reflect the cost of staff time on capital projects have been inadequate. Costs should not unnecessarily be shifted from the general fund to a capital project.

Actions Taken/Planned: General Services will evaluate the criteria set forth in state statutes when deciding on an alternative delivery method. Strategy and Budget staff will work with departments towards establishing citywide guidance for the methodology of charging staff time.

Performance Reporting (Page 42)

The City has historically followed a decentralized approach to accumulating capital project data.

- The City does not have the systems necessary to facilitate timely project reporting.
- A percentage of completion reporting requirement will improve project tracking.

Actions Taken/Planned: General Services has established a new template for project reporting and is developing a monthly report to be generated using Primavera software.

Use of Construction Manager at Risk (Page 52)

The use of the Construction Manager at Risk (CMAR) Project Delivery Method was not determined to be the cause of project budgetary challenges; the City needs a more deliberate approach when using this delivery method.

- More independent evaluation of subcontractors' bids for trade packages and review of subcontract agreements is needed.
- The City should allocate more resources to projects utilizing the Construction Manager at Risk delivery method.
- While an audit contractor recommended the use of a single, standard CMAR contract for preconstruction and construction services, some departments intend to continue to use separate contracts. The City Attorney's Office will support either approach and Internal Audit concurs.

Actions Taken/Planned: General Services will ensure that CMAR and independent cost estimators evaluate bids and will update manuals to address CMAR recommendations.

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Objective

This audit was requested by the City Manager. The purpose of this audit was to evaluate citywide project management of capital construction projects, and separately, to evaluate the City's use of the Construction Manager at Risk (CMAR) contracting method.

Background

The Capital Investment Plan (CIP), previously referred to as the Community Investment Plan, is a multi-year plan to support the growth and vitality of the community and the quality of life. The CIP addresses long-term capital infrastructure, which is broadly defined as the construction or acquisition of fixed assets such as roads, sidewalks, bridges, buildings, capital building maintenance, real estate, equipment, culverts, or pipes. Consistent with best practices, the City of Charlotte annually develops a five-year CIP. The CIP provides residents with an outline of how the city anticipates investing capital funds for the next five years. Once the City Manager proposes the CIP, City Council adjusts and approves the CIP as part of the Annual Budget adoption process.

Projects included in the CIP are funded by various sources including debt instruments, grants, and cash. The use of long-term debt financing indicates that the anticipated life of the asset is greater than the life of the debt. Management identifies projects for inclusion in the CIP based on several guiding principles:

- Ensure Budget Principles are adhered to
- Promote City Council's priority areas
- Support strong neighborhoods
- Preserve and enhance the existing tax base

The FY 2020 – 2024 CIP contains the final “Big Ideas” bond referendum to be voted on in November 2020. In FY 2014, City Council adopted the Big Ideas CIP, which included projects planned across the 2014, 2016, 2018, and 2020 bonds (see Appendix C for a complete list of the “Big Ideas” projects). In November 2018, voters approved the second-to-last bond of the Big Ideas cycle.

The FY2020 – FY2024 CIP included funding for \$992 million in projects for FY 2020. Changes from the prior CIP included an additional \$54.4 million in funding to advance the Cross Charlotte Trail, \$20 million for the establishment of the Advanced Planning and Design program, and \$4.5 million to create the Uptown Cycle Track. The CIP also doubled the planned housing bond from \$25 million to \$50 million and provides for \$65.3 million over the next five years to ensure proper maintenance of city-owned facilities.

Details on the projects mentioned above and the complete CIP can be found in the City's Adopted FY 2020 Budget on the City's website.

Scope, Methodology, and Compliance

Scope

Internal Audit reviewed current and past practices used in developing recent five-year CIPs. In addition, current project management practices were reviewed throughout departments responsible for capital asset acquisition and development. Projects included in the review were initiated as early as FY 2008 and as recently as FY 2019.

Methodology

Auditors addressed the City Manager's request as follows:

- Performed case study analyses of multiple construction projects (which have been completed or were in-progress during the audit);
- Used authoritative guidance of the Government Finance Officers Association (GFOA) and the Project Management Institute's Body of Knowledge (PMBOK) standards to evaluate City processes;
- Engaged construction auditing firms (Talsen Solutions, LLC and RSM US, LLP) to conduct project-specific reviews;
- Reviewed documentation of new City budget and advanced planning processes under development in FY 2019-2020; and
- Considered related audit reports, including consultant RSM's study of CMAR completed in 2017, and the City Internal Audit report "Financial Consultant Contract Management" issued in October 2019.

While projects throughout the City were reviewed, many of the findings discussed in Sections A through D are more pertinent to General Fund projects and General Services. Where appropriate, auditors have compared selected practices of enterprise funds (as examples) with those used for general fund projects. While recommendations are addressed to the City and applicable Citywide, the enterprise departments have provided specific responses indicating their existing compliance or non-compliance with the recommendations. The recommendations are addressed to the City to highlight those areas where there is a potential need for development of consistent Citywide guidance.

Compliance

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Findings and Recommendations

Audit findings and recommendations are organized into five sections, as follows:

- A. Project Selection and Advance Planning
- B. Estimating
- C. Cost Management and Delivery
- D. Performance Reporting
- E. Use of the Construction Manager at Risk (CMAR) Project Delivery Method

Internal Audit findings result from audit staff efforts and are sometimes supported by the work conducted by two consultants under contract – RSM US, LLP (RSM) and Talson Solutions, LLC (Talsen). The consultants' reports were provided separately to several City departments. While each report stands alone, they are attached as Appendices A and B to this report, and are referenced throughout.

A. Project Selection and Advance Planning

A government must decide what constitutes a capital project (e.g., dollar value) and how far in the future it will plan. The adoption of multi-year capital plans helps ensure effective management of capital assets. Capital investment choices must be financially sustainable, not only in terms of the initial capital outlay and long-term operations, but also maintenance and replacement costs.

Finding A1

The City should document and disclose its capital planning decisions.

The GFOA has recommended best practices for capital planning policies. This includes a description of how an organization will approach capital planning and several other items that should be incorporated in the policy, such as:

- a process to ensure funding is consistent with legal requirements;
- an assessment of the government's fiscal capacity;
- a process to identify capital project selection, prioritization, and
- allocation of limited resources.

The City's CIP and Financial Policies encompass most of the GFOA's recommendations. The policies collectively describe the mission and goal of the CIP, establish a basis of priority for capital project requests and set financial requirements for debt ratios in accordance with State statutes. However, these policies do not specifically address how decisions will be made in the capital planning process, including a structured or documented process for identifying and prioritizing projects, or allocating resources.

In FY 2019, the City established a multi-disciplinary team (City Manager's Office, Strategy and Budget, Finance, General Services and the City's financial advisors) to collaborate and improve capital outcomes and efficiencies. In preparing the FY 2020 CIP, Strategy and Budget (S&B) obtained prioritized lists of projects with cost estimates from general fund departments. The cost estimates for each project were based on consistent instructions and forms provided by S&B. Strategy and Budget, and the City Manager's Office (CMO) reviewed the project lists, comparing the projects to existing master plan goals, available funding and priority. Based on this review, S&B and the CMO proposed a slate of projects for inclusion in the FY 2020–2024 CIP.

The FY 2020 Budget provided for the creation of the Advanced Planning and Design Program. The Program aims to better define project scopes and generate more precise cost estimates. Taking this approach should result in less risk of cost overruns, providing greater accountability to City Council, and reducing the period between bond referenda votes and construction.

The GFOA recommends that governments make capital project investment decisions that are aligned with their long-range master plans and that the CIP presentation should include linkage

to master plans and the impact on master plan goals. The GFOA Guidelines further recommend that the plan detail how the level of funding in the CIP supports the achievement of the desired goals set forth in the master plans.

The CIP did not detail how the projects were selected for inclusion in the proposed plan. In the 2020 CIP, the City identifies numerous projects and related master plans. For example, the CIP notes that the Uptown Cycle Track originated from the Uptown Connects Study and that the Monroe Road Streetscape project will create a more pedestrian oriented and mixed-use development corridor as recommended in the Independence Boulevard Area Plan. Although the CIP identifies projects selected from various master plans, it does not identify the impact that CIP decisions have on master plan goals.

Master plans are prepared, updated and presented to City Council committees or advisory boards. Departments are responsible for updating master plans and communicating status of the plans to City Council as necessary. Presentation of updated master plans may not coincide with the annual preparation of the CIP. Master plans are referenced in the CIP as justification for inclusion of projects or to indicate how projects are prioritized. For example, the CIP notes that new installations of fiber-optic cable and real-time traffic management cameras are prioritized based on the Traffic Signal Communication Master Plan. While this note provides an indication that master plans are considered in proposing CIP projects, the impact of CIP decisions on master plans is not communicated.

Some master plan goals and measures were included in the operating section of the FY 2020 approved budget. For example, the FY 2020 budget notes a revised target of an average pavement rating condition. However, the budget did not address how much additional funding would be needed annually to meet the condition rating goal. Providing the impact of CIP decisions on master plans would assist management and Council in making CIP decisions.

Recommendation A1:

The City should develop its CIP based upon established master plans, and then document and disclose its capital planning decisions. Documentation should include the following:

- How project selection/prioritization decisions will be made in the capital planning process.
- How the level of funding in the CIP allows the City to reach desired goals set forth in master plans.
- The impact of CIP decisions on master plan goals. As practical, the City/departments should update master plans or master plan progress reports in coordination with the preparation of the CIP.

Management Response

Strategy and Budget – We have included a new General CIP Process section in the FY 2021 Budget Book that outlines the connection between project origination and prioritization with City Council and community priorities and project selection. We will continue to reference Master Plans and other guiding documents in the Budget Book to clearly connect projects and programs with desired outcomes. We will also begin requiring departments to not only provide the linkage to master plans in their funding request, but also how the funding level supports the desired goals set forth in the master plan.

General Services – We utilize Facility Master Plans to inform Departmental recommendations for new buildings as well as minor renovations for the existing portfolio. Master Plans have been created for Police, Fire, Fleet, and the ‘Central Yard’ area which includes Solid Waste and CDOT functions.

Storm Water – We are adjusting to an asset management focus, and the Strategic Planning Team is currently determining the approach for project selection and prioritization. The project selection/prioritization process will be based upon scoring of individual assets as they constitute a capital project. This process will be identified as part of the Storm Water Master Plan. The current process for project selection/prioritization is a risk-based approach taking into consideration condition of the infrastructure and risk to the public.

CDOT – As the City’s lead transportation planning agency, CDOT is embarking on the development of a Strategic Mobility Plan (SMP). This plan is a complement to the City’s 2040 Comprehensive Plan. It will bring together the current transportation policies (Urban Street Design Guidelines, Charlotte Walks, Charlotte Bikes, Vision Zero) and integrate transit into overall mobility planning for the City. A product of the SMP will be a documented capital spending methodology along with a package of projects for the next round of CIP investment. Prior to development of the SMP, project prioritization was performed using the goals presented in each of the transportation policy documents (Urban Street Design Guidelines, Charlotte Walks, Charlotte Bikes, Vision Zero).

Charlotte Water – Comprehensive master plans have been developed for our water and wastewater systems that look out 30 or more years. These plans are regularly updated and inform our financial proforma, the CIP and future rate projections. Our traditional CIP prioritization process is being modified to a Multi-Criteria Decision Analysis approach that aligns our strategic plan with the project criteria.

Finding A2

Budgets for projects have been established without sufficient design completion.

Historically, (pre-Big Ideas approach), the City’s CIPs were five-year infrastructure plans, which matched the City’s highest priority capital needs with a financing schedule. The plans included

investments in neighborhoods, housing, storm water projects, roads, transit, water and sewer projects, the airport, and government facilities. Each CIP was developed concurrently with the operating budget. Following City Council's annual retreat to establish priorities, departments identified projects and funding needs in support of Council's goals. Revenue projections were finalized for future years and capital needs were matched with resources based on Council Focus Areas and priorities.

According to a July 8, 2011, memo from the City Manager, the change to the Big Ideas CIP planning approach was motivated by 1) a desire to apply "culture shift" initiatives and principals to the CIP process, and 2) the perceived need for more complex funding considerations. The City Manager directed departments to look at the City's issues and CIP options in a way that would demonstrate the City's responsiveness to the community's needs as a whole. Departments were challenged to work collaboratively to develop a list of large scale, transformative "big idea" projects that addressed the major community issues.

Departments used existing staff cabinets and City work groups to generate ideas for large projects with potential long-term impacts addressing systemic issues. The resulting bond packages detailed different capital groupings and priorities to better meet the infrastructure needs. Once the initial list was grouped and prioritized, a formal capital projects request was developed and presented to City Council. Preliminary estimates for the projects included in the Big Ideas CIP were based on high level analyses completed internally. See Appendix C for initial Big Idea project list of 2011.

The practice of using preliminary estimates as the basis for project budgets proposed in the CIP continued. Some project budgets were authorized prior to conceptual design.

CDOT/General Services

For example, the Back Creek Church Road project was approved for \$4.5 million in 2008 bond funds. The project was first selected based on a prioritization of Farm-to-Market projects included in the 2006 Transportation Action Plan (TAP). It was anticipated that the project would *begin* with a planning study and that some portion would proceed to design and construction. The final project was scoped to fit the 2008 budgeted amount after CDOT learned from the budget office that the \$16 million anticipated for construction would not be included in the 2010 bond. A planning report was completed in 2011 and after several delays and scope modifications, the final design was presented in November 2015. Although the final product may not have included all elements originally desired, the project initiation document stated that only a portion of the project was expected to proceed to design and construction.

Cross Charlotte Trail (XCLT)

In contrast, there was confusion surrounding the XCLT project. As part of the Big Ideas CIP, the project budget for *initial development* was authorized for \$35 million in 2014. Most segments of the trail had not progressed past the pre-planning stage and it was not clearly communicated how much of the trail could be completed with the initial funding. A Cross Charlotte Trail master

plan was not completed until 2016, which identified the primary alignment for the trail and design guidelines. The full costs of the project could not have been projected with reasonable accuracy prior to completion of the 2016 master plan. However, the \$35 million initial 2014 authorized budget was not adjusted.

The XCLT master plan did not include estimated costs or a segment design schedule. After additional planning and design was performed through FY 2019, City management informed City Council that the trail would need additional funding. When City Council approved the FY 2020 CIP, it included \$54.4 million in funding for the Cross Charlotte Trail (Segments 1 – 9) and noted that planning and design work would be needed for Segments 10 and 11 before an accurate estimate could be determined. Funding for those segments will be proposed in the future.

The multi-segment, multi-year nature of the Cross Charlotte Trail project contributed to the communication deficiencies. Presented as a single project in the CIP (2014 and annually thereafter), each segment of the trail is monitored and tracked as a distinct project.

Aviation and CATS

In comparison to General Fund projects, funds are provided for planning and design work *before* final construction budgets are established for large-scale Enterprise Fund projects. Aviation's Terminal Lobby Expansion (\$21.8 million design budget), CATS BLE (\$39 million for preliminary engineering) and CATS Silver Line (\$50 million for pre-project development) are examples of projects where the final construction budget is not established until substantial design work is completed. Early estimates for Aviation's Terminal Lobby Expansion led to the establishment of a \$247 million budget in the FY 2017 – 2021 CIP, which was subsequently increased to \$600 million due to increases in general construction costs, scope changes desired by the City and the airlines, and the addition of the central energy plant and roadway canopy projects to the overall effort.

According to CATS, the BLE budget was finalized at the 65% design level with the approval from the Federal Transit Administration (FTA) to enter Final Design and apply for a Full Funding Grant Agreement. In November 2019, City Council approved a \$50 million design contract for the Silver Line design, which is expected to bring the project to a 15% to 30% design level and preliminary cost estimate. CATS has targeted the development of a preliminary construction cost and financing plan for the project by 2023.

Actions Taken

Advance Planning and Design Program

The approved FY 2020 Budget included \$20 million for the creation of the Advanced Planning and Design Program (AP&D Program). The Program was established to better define project scopes, create more precise cost estimates, and reduce future risks of cost overruns. As a project moves through the planning and early design phases, a cross-departmental team will review project findings and progress and make recommendations about the project's continued viability. If the

project scope and cost estimate remain viable after planning and initial design work, total project funding will be considered for inclusion in a future budget.

In FY 2020, City Council approved the following high-priority projects for inclusion in the Advanced Planning and Design Program:

- Cross Charlotte Trail Segments 10 and 11
- Ashley Road/Tuckaseegee Road/Freedom Drive Intersection
- Eastway Drive/Shamrock Drive intersection
- Bryant Farms Road Extension (Phase II from Rea Road to Ardrey Kell Road)
- Robinson Church Road (between Harris Boulevard and Hood Road)
- Construct and Renovate Fire Stations
- Complete Police Division Stations
- Upgrade Existing Animal Care and Control Facility

Advance Planning and Design Program Observations

The Advance Planning and Design Program is too new to address as a post-implementation review. However, auditors have examined a sufficient number of construction projects to offer observations, and a recommendation.

Program Definition – For the initial selection of projects, departments were asked to provide a prioritized listing of projects to be considered. Per S&B staff, City management and department directors confirmed the highest priorities.

Determination of Program Investment Size – The projects selected for the first AP&D Program were in various stages of planning when selected for inclusion. Through May 2020, AP&D Program funds were allocated to the following projects:

Advanced Planning/Design Program Project Transfers Through May 2020	
Project	Transfer
XCLT Mallard Creek Ch – Pavilion Blvd	\$600,000
XCLT Pavilion Blvd to Cabarrus Co.	900,000
Ashley/Tuckaseegee/Freedom Intersection	625,000
Bryant Farms Road Extension Phase 2	3,110,000
Robinson Church Rod	2,400,000
Total	<u>\$7,635,000</u>

As design contracts are signed, the final amount required for design will be determined. For the facility projects not yet funded, land must be purchased before planning and design can occur.

Also, planning costs for the Eastway/Shamrock intersection have been covered by the CNIP allocation. Animal Care and Control is currently working within its prior allocation.

In establishing the Advance Planning and Design Program at \$20 million, General Services worked through cash flow scenarios to determine the appropriate amount for a two-year period. This was part of the work of the multi-disciplinary team referenced in finding A1, above.

Replenishment for Projects Not Approved – As outlined, the Program intends to be replenished with bond proceeds or other funding when projects are ultimately approved. Specifics regarding the replenishment process when potential projects are determined unfeasible were not provided. As the Program matures, more specific policy or guidelines can be developed to ensure the fund is able to sustain advance planning efforts. If AP&D Program funds had been used for the Joint Communications Center, the portion of funds used to bring the project to 30% design (a portion of the \$8 million expended, excluding land costs) would be needed to replenish the fund.

Recommendation A2

As the Advance Planning and Design Program continues to develop, the following actions should be taken:

- a. Establish a more formal selection process for Advance Planning projects, including identification of criteria such as size, complexity and risk.
- b. Periodically evaluate the success of the Advance Planning and Design Program and determine whether additional (or reduced) funding should be allocated to the program.
- c. Establish a more specific policy, or guidelines related to fund replenishment for projects that do not move forward, including the identification of any permanent source or allocation of funding.

Management Response

Strategy and Budget – A selection process for projects included in the Advanced Planning and Design Program already exists, but we will document this process and prioritization. Evaluation of the Program funding level will be assessed annually based on upcoming funding replenishments and new projects added to the Program. Funding decisions for projects that do not move forward will be addressed individually in conjunction with the City Finance Department, the City's Financial Advisors, Bond Counsel, and the City Manager's Office.

CDOT – We agree with the recommendations noted above and will be able to document any new recommendations on goals/methodology as the Comprehensive Plan and Strategic Mobility Plan are finalized.

Charlotte Water – The master planning of our water and wastewater systems serves as the advanced planning and concept design program for the department. Because of how our financial proforma is loaded with our 10-year CIP, we must “fully load” our CIP with project costs to determine the revenue/rate needs into the future. Our rate setting methodology is cost-of-service based which includes operating, pay-go capital (i.e., cash) and debt service that is completely funded by our rate payers without subsidy. As projects move through our CIP and are further developed into preliminary and detailed design with costs estimates, the project requests are revised in our CIP submission each year.

Finding A3

Not all City departments have routinely inventoried and measured the physical condition, existence and functional performance of all capital assets.

According to GFOA, capital asset management practices should require a complete inventory and periodic measurement of the physical condition and existence of all capital assets. The physical condition inventory and measures used should be kept current, with facility condition ratings updated every one to three years. A qualified engineer should assist with the preparation of the plan as it relates to infrastructure. The inventory should be linked in some manner with the government’s capital asset schedule used by the accounting function such as by a capital asset tagging system.

Departments noted that they have established condition standards for assets. For example, CDOT retains documentation on bridge inspections, traffic signal preventative maintenance, and pavement condition rating evaluations. These are conducted on a routine basis and are included in annual reports that are provided to Strategy & Budget and City Council. General Services has established condition standards for the assets it maintains. However, the department noted that full condition assessments are not conducted each year for every asset.

During FY 2019, the City completed a Capital Needs Inventory (CNI) for general fund projects for the first time in 12 years. The CNI identified anticipated public infrastructure needs over the next ten years. Projects were identified from master plans, studies and City Council-adopted action plans. The CNI was not a comprehensive assessment of all of the City’s assets.

Progress made towards stated functional performance goals and the overall condition of capital assets are not reported as part of the City’s CIP. Departments report progress as part of master plans or annual updates provided to City Council. The impact of CIP decisions on functional performance measures and the overall condition of capital assets is not communicated through the CIP.

Recommendation A3

The City should regularly inventory and measure the physical condition, existence and functional performance of capital assets, considering the following:

- a. Establish criteria for completing periodic inventories and measurements of the physical condition of all capital assets.
- b. Establish condition and functional performance standards to be maintained for each type of capital asset. The condition measures and related standards:
 - Should be understandable and reliable.
 - May be dictated by mandated safety requirements, federal, state, or local funding requirements, or applicable engineering and other professional standards.
 - Should be used as a basis for multi-year capital planning and annual budget funding allocations for capital asset maintenance and replacement.
- c. Monitor and communicate to City Council and the community the progress made toward stated goals and the overall condition of capital assets with appropriate controls to ensure the validity and accuracy of the information.

Management Response

General Services – We have established condition standards for the City’s physical assets. Buildings managed by General Services are compared to a Facility Condition Index (FCI). We have completed FCI studies on approximately 25% of the square footage under management. Full condition assessments have not always been conducted each year for every asset. A program is now in place to assess the full portfolio of buildings.

Storm Water – We transitioned to an asset-based approach in 2018. The Strategic Planning Team currently completes periodic inventories and inspections of critical capital assets. A scoring system is being developed to provide a risk-based evaluation of each asset to assist with capital planning needs.

CDOT – The current ADA inventory includes sidewalk, accessible ramps, pedestrian signals and transit stops. CDOT has implemented several process improvements to document the ADA improvements completed through the Land Development and CIP projects.

Charlotte Water – We agree with this recommendation. However, our capital asset inventory includes over 8,400 miles of water/sewer pipe. It is not practical to assess all of these assets within given frequencies. This infrastructure typically has a life cycle that approaches 100 years. There are some permit requirements that prescribe some high-priority asset management driven metrics for which we comply. Our asset management philosophy is to

collect data about our assets as we conduct reactive and predictive maintenance, which is then analyzed to determine improvement recommendations such as rehabilitation or replacement.

B. Estimating

Cost estimates provide the basis for budgeting and managing; evaluating and selecting alternatives; making scope and funding decisions; and construction planning and procurement. Reliable cost estimates are key to effectively plan and manage capital projects.

Finding B1

City-wide cost estimating policies and procedures should be adopted, addressing criteria for independent cost estimates, staff qualifications and training.

Cost estimates should be prepared and updated at each successive stage of project development which includes conceptual, preliminary and final design. The City should establish requirements and guidelines to help ensure that cost estimates are prepared:

- In a consistent manner that adheres to adopted practices and industry standards;
- At the required level of detail; and
- In a manner that is consistent with the level of precision provided.

Third parties, construction management consultants or contractors may augment a department's cost estimating procedures; but in cases of conflict, the City's established procedures should govern.

While most departments have estimating standards and tools (e.g., spreadsheets, forms), there is no City-wide standard that establishes expectations and provides guidance regarding the use of consultants and independent cost estimates, inclusion of contingency, or training and qualifications of staff to prepare estimates.

As a member of the Charlotte Regional Transportation Planning Organization, the City engaged a consultant to develop an online cost estimating tool. The tool utilizes algorithms and formulas that contain county tax values to calculate the cost for right-of-way instantly. The same is true for construction, utilities, environmental and professional services. The tool calculates the cost as a user draws a line on a map. While the tool is useful for planning purposes, it is not sufficiently detailed to estimate costs based on preliminary or final designs.

The Engineering Services Division of General Services utilizes an Excel spreadsheet to estimate costs. The spreadsheet includes some standard costs and rates and provides specific ranges for contingency values based on the completion stage of design. The spreadsheet is updated as the percentage of design completion increases.

While the tools described above provide specific examples of estimating tools used by individual divisions within the City, there is not an overall document that provides guidelines that would lead to consistency across the City. CATS has utilized cost estimating reports for its large-scale projects (Blue Line Extension and Blue Line Capacity Expansion) that summarize the methodology to develop capital cost estimates for multiple FTA cost categories. While the reports are for specific projects, the methodologies and guidelines establish consistency across the projects. For example, the reports address the expected ranges for contingency percentages at different stages of project development for each cost category (i.e., stations, sitework, systems, and right-of-way).

Actions Planned

For the FY 2021 CIP, Strategy and Budget, and General Services agreed to have all estimates for general fund projects reviewed by General Services for accuracy and reasonableness. As differences, strengths and weaknesses are identified, General Services will be able to establish consistent guidelines.

Recommendation B1

Cost estimating policies should be adopted City-wide. Policies should address:

- a. Criteria for the use of external consultants and independent cost estimates
- b. Regular evaluations of the City's available and qualified staff to establish current capabilities
- c. Defined training required to attain the desired internal abilities vs. the need for using external staff.

Management Response

General Services – The Engineering Services Division has standardized its cost estimating workbook. Also, a request for qualifications for cost estimating and analysis services was issued in May 2020. The consultant(s) selected by General Services will be under the direction of the City Engineer and utilized for various cost estimating services.

CDOT – We agree to follow city-wide policies on use of independent cost estimates and regular evaluations of qualified staff for work that we manage in-house (i.e., Intelligent Transportation Systems and traffic signal projects).

Aviation – Our project controls team has a contract with Anser Advisory Services that includes a third party cost estimator that we use to evaluate project costs for the projects in our CIP. Projects estimates are developed when the project is added to the CIP and re-evaluated as needed to accommodate changes in scope and market changes.

Charlotte Water – We agree with the recommendation for cost estimating policies. Due to current market conditions (supply vs. demand), especially in technical disciplines with limited subcontractors, even the best approach to cost estimating may not yield the accuracy desired in these cost estimates.

Finding B2

A policy outlining estimating standards for capital projects is needed.

Cost estimates for general fund projects have been included in the CIP without a specific individual or department responsible for ensuring that the estimates were prepared on a consistent basis. This has resulted in varying levels of cost estimate accuracy. According to General Services staff, cost estimates are:

- Produced by project managers and supervisors that may not be experienced cost estimators. General Services management indicated that experienced cost estimators are needed to develop estimates for atypical, high cost stand-alone projects.
- Updated infrequently, using inconsistent methods.

Actions Taken

Beginning with FY 2020 projects, cost estimates were reviewed by General Services Department staff prior to inclusion in the CIP or the Capital Needs Inventory (CNI). Management expects increased consistency, accountability, and accuracy of estimates for all projects.

General Services management has created a Quality Assurance and Control (QA/QC) Plan and an Estimate Review team to review work products of every horizontal general fund project managed by General Services. Reviews will include plans, specifications and estimates.

Action Planned

General Services is in the process of hiring consultants for costs estimating and analysis services. An evaluation committee is scheduled to meet in July to make selection(s) or short list firms for interviews. The consultant(s) selected by General Services will be under the direction of the City Engineer and utilized for various cost estimating services.

Charlotte Water proposed to hire both a CIP Manager position and Project Estimators. Given the varied and multiple disciplines a team of experienced, in-house estimators may not be able to forecast project costs on complex projects. Third party entities will be needed to assist in estimating these projects or certain disciplines.

Recommendation B2

A policy related to capital project estimating should:

- a. Establish and refine estimating standards and be revised as necessary based on QA/QC review, and
- b. Require a review and update of capital project estimates and forecasts semi-annually to reflect known changes and impacts to the design and costs.

Management Response

General Services – We agree with the recommendation. We will continue to use cost estimating spreadsheets to set budgets and track against the budget throughout the life of the project (at least twice a year). As we engage with the Cost Estimating Consultant, we will evaluate whether or not to make any changes to our current practices and procedures and formally document these.

Storm Water – We are currently evaluating the project estimating process as part of the Storm Water Master Plan.

Strategy and Budget – We will continue to rely on General Services for all cost estimations for construction projects in the General CIP.

Charlotte Water – We agree with this recommendation. In addition, a standard method of cost escalation should be included and applied consistently for future year projects.

Finding B3

No guidelines have been established for the percentage of design completion required prior to including capital project estimates in the capital budget, resulting in a lack of confidence in the City's projections.

Capital project estimates can range significantly in their degree of accuracy, depending upon the amount of project definition (i.e. scope and design work) completed prior to the formulation of the estimate. As the design effort progresses, the accuracy of the estimated cost will improve over early estimates developed in the conceptual stage.

Enterprise Fund Example

For the enterprise funds, capital projects originate from master plans. Funding sources allow for more fluid budget authorizations as projects are developed and design completion percentages increase. For example, Aviation's Terminal Lobby Expansion project was first included in the City's FY 2016 – 2020 CIP as a \$244.9 million project. It had been approved by the Airline Airport Affairs Committee (AAAC), which includes representatives of the Airport's signatory airlines.

After additional design work and scope changes, the Airport obtained AAAC approval to increase the project budget to \$445 million in April 2019.

Subsequently, the Central Energy Plant (\$63M) and Terminal Lobby Canopy (\$69.1M) projects were combined with the Terminal Lobby Expansion. In October 2019, City Council approved a \$500.2 million GMP for the Terminal Lobby Expansion, pushing the total project budget to \$600 million.

The example above demonstrates the flexibility that enterprise funds have in establishing and modifying project budgets to accommodate scope changes, dependent upon funding source.

General Fund Examples

General Fund project budgets are established based on a variety of approved funding sources, some of which require subsequent voter approval to increase funding for scope changes. For example, if cash funds are not available, the City may need to seek voter approval for additional funds for Segments 10 and 11 of the Cross Charlotte Trail.

Prior to FY 2020, General Fund departments had no guidance regarding the level of design completion required for inclusion of a project in the capital investment plan. Case study examples include:

- The Back Creek Church Road project, where the initial budgeted amount was based on a very early conceptual estimate, and
- The Joint Communications Center (JCC)

As the projects moved through preliminary to final design phases, scope changes and project reductions were needed to keep project costs within the initially approved budgets. The Back Creek Church Road project was completed within budget, *but* at a much reduced scope than initially planned. Scope changes and budget challenges resulted in termination of the JCC project after about \$8 million was expended for design work. An additional \$5.9 million was expended for the purchase of land, which will be repurposed for another City use.

The use of estimates in the capital budget, based upon a low level of project definition, can result in large increases later as projects become more defined, and design work is more complete. The lack of clarity regarding the level of accuracy to be expected from initial capital project estimates has contributed to decreased confidence in the City's ability to accurately estimate the cost of capital projects when significant increases are required.

Cross Charlotte Trail (XCLT)

The XCLT is another example in which a project could have benefited from an established standard for percentage of design completion requirement. Details of the XCLT are provided in Section A, above.

Storm Water

Storm Water's current approach for project budgeting consists of a pre-planning estimate of proposed improvements based upon an initial evaluation of the known issues. The evaluation is completed as part of the investigation process to determine the potential problems, and the pre-planning estimate is determined using conservative assumptions for the extent of the infrastructure improvements that may be warranted. The project estimate is refined once the project is initiated and a thorough study can be completed by an external consultant. The Strategic Planning Team is evaluating the potential for pre-planning cost estimates to be performed prior to project selection and initiation and this is to be part of the Storm Water Master Plan.

Resource limitations impact the ability to initiate design prior to including a project within the capital budget; however, pre-planning estimates could be better quantified based on information collected as part of the asset management system.

For the FY 2020 CIP developed in early CY 2019, Strategy and Budget personnel required General Services to utilize standard CIP Budget Estimate Forms to produce Pre-Planning (Level 1) estimates for most of the proposed general fund construction projects. The majority of these projects have not progressed to the 10% design phase and therefore a risk exists in establishing authorized budget amounts. As noted in Section A, above, the City is attempting to mitigate this risk through use of the Advance Planning and Design Program.

Note: The FY 2020 CIP did not detail the design percentage completion by project. Most projects proposed for inclusion in the CIP included a contingency amount of 40%, in addition to separate inflation factors for planning/design and real estate/construction costs. While this level of contingency is in line with best practices (and reduces the occurrences when budgets will be exceeded), such a significant cushion decreases the number of projects which could have been funded, if the contingency was overstated or unnecessary. Most of the projects reviewed by Internal Audit were planned prior to the use of the standard estimating form and other new procedures.

Recommendation B3

The City should establish guidelines for the level of design required prior to including projects in the capital budget, as follows:

- a. Outline the required design completion level necessary for inclusion of estimates in the capital budget, based upon the size and complexity of projects, in addition to the expected timeframe for project initiation, and
- b. Detail in the capital budget the level of design completion and the amount of contingency included for each project.

Management Response

General Services – There is a tradeoff to consider between accuracy and the time and cost of designing a project which may not be selected for advancement. It may be appropriate to vary the level of preliminary design based on the project priority and complexity. We will document the practice for the evaluation of advanced planning projects including information and decision points related to the level of design necessary to produce estimates for capital budget.

Strategy and Budget – We support a standard percentage of design completion consistent with the project priority and complexity. We recognize that the standard may vary based on the type of the project (facility versus road, for example) but will rely on General Services to provide that guidance. We anticipate the Advanced Planning and Design Program will help support this recommendation.

It is worth noting that any design percentage completion standards only apply to significant stand-alone construction projects and not programs, minor projects, housing trust fund dollars, or economic development projects. For example, if programs and projects similar to the Comprehensive Neighborhood Improvement Program, Sidewalk and Pedestrian Safety Program, or Dixie Berryhill Area Roads were being funded in the future, the individual projects within the programs would not each receive the required percentage of design prior to being included in the CIP.

Strategy and Budget will incorporate an explanation in the CIP section of the Budget Book to link a project's status (planning, design, construction, etc.) with the corresponding standard percentage of contingency included in the project budget. However, Strategy and Budget does not believe the Budget Book, which is a presentation tool, is the appropriate place for line-item detail of project budgets.

Charlotte Water – We generally agree that a minimum-level or concept design should be established before a project is submitted in the CIP. For Charlotte Water, concept design of 15% is used to establish initial CIP budgets.

Finding B4

Independent cost estimates were not performed for two projects for which subcontractor bids exceeded the CMAR's iGMP budgets by \$15 million and \$30 million.

Talson review of JCC and Convention Center

During its review of the Joint Communications Center (JCC) and Convention Center Renovation projects, external consultant Talson Solutions noted that each initial guaranteed maximum price (iGMP) was approved by City Council without benefit of an independent cost estimate. Subsequently:

- JCC subcontract bidding exceeded the iGMP estimate by \$15 million.
- Convention Center subcontract bidding exceeded the estimate by more than \$30 million

Although some of the increases may be attributable to unfavorable market conditions, independent estimates – before subcontractor bidding; or cost analysis – after bidding, to verify reasonableness; were not obtained to substantiate the causes.

For the JCC, after additional value analysis and scope changes, the difference in subcontractor bids was reduced from \$15 million to just over \$9 million, as shown in the chart below. Subcontractor bids exceeded the iGMP amount by 23%.

Joint Communications Center

Subcontractor Bid Packages

September 2017

Bid Package	Description	iGMP	Bid Value	Difference
02A	Complete Sitework	\$4,283,169	\$6,250,000	\$1,966,831
02L	Landscape and Irrigation	351,272	440,190	88,918
03A	Complete Concrete	2,595,983	2,940,000	344,017
04A	Masonry	1,340,315	1,411,000	70,685
05A	Structural and Miscellaneous Steel	4,034,643	3,830,000	(204,643)
06C	Carpentry and Casework	240,220	245,775	5,555
07B	Waterproofing and Sealants	37,800	457,000	419,200
07C	Fireproofing	150,903	204,100	53,197
07E	Metal Panels Systems	791,764	1,845,200	1,053,436
07F	Roofing	683,499	903,968	220,469
08A	Glass Assemblies	5,224,448	7,842,995	2,618,547
08B	Passage Door Assemblies	217,608	274,670	57,062
08D	Interior Glazing	96,675	96,702	27
09A	Drywall Assemblies	2,482,131	3,162,843	680,712
09C	Acoustical Assemblies	514,514	356,900	(157,614)
09D	Hard Tile	245,052	305,500	60,448
09E	Floor Coverings - Resilient and	364,361	358,500	(5,861)
09F	Painting & Wall Coverings	190,880	322,650	131,770
09H	Access Flooring	361,925	348,500	(13,425)
10A	Specialties	228,109	282,234	54,125
10B	Signage	55,000	30,000	(25,000)
11B	Food Service Equipment	85,000	41,687	(43,313)
12A	Window Treatments	72,450	96,673	24,223
14A	Elevators and Escalators	458,000	415,000	(43,000)
18A	General Works	51,300	230,000	178,700
18B	Final Cleaning	45,000	60,368	15,368
15A	Fire Protection	530,563	538,800	8,237
15C	Plumbing Systems	691,317	922,600	231,283
15D	HVAC Systems	4,145,476	6,225,000	2,079,524
16A	Electrical	9,346,499	8,649,000	(697,499)
	Total	\$39,915,876	\$49,087,855	\$9,171,979

For the Convention Center Renovation project, subcontractor bids exceeded the iGMP estimate by 44% – with bids for ten trade packages (of 27) exceeding the estimate by over \$1 million, as shown in the table below.

**Convention Center Renovation
Subcontractor Bid Packages**

Trade Package	IGMP Estimate	Actual Bid	Difference
Structural/Misc Steel	\$14,003,946	\$14,102,400	\$98,454
HVAC	12,896,600	18,825,923	5,929,323
Electrical	7,969,087	9,250,000	1,280,913
Drywall	5,569,546	5,179,000	(390,546)
Glass/Glazing	3,152,387	4,890,300	1,737,913
Plumbing	2,645,476	4,967,390	2,321,914
Building Concrete	2,642,017	5,000,000	2,357,983
Roofing	2,079,556	2,124,700	45,144
Demolition	1,837,623	2,977,300	1,139,677
Metal Panels/Louvers	1,792,995	6,287,800	4,494,805
Spray Fireproofing	1,420,150	4,479,740	3,059,590
Conveying Systems	1,334,751	1,937,000	602,249
Fire Protection	1,158,574	1,738,900	580,326
Architectural Woodwork/Finish Carpentry	1,074,515	1,108,971	34,456
Truss Tensioning	938,143	1,776,000	837,857
Painting/Wallcovering	921,451	754,230	(167,221)
Hardscape	815,976	990,000	174,024
Interior Glass	725,642	786,200	60,558
Operable Partitions	703,907	468,950	(234,957)
Carpet	565,344	632,675	67,331
General Trades	493,356	435,000	(58,356)
Exterior CMU/Brick/Stome	481,526	825,000	343,474
Stucco/Plaster/EIFS	437,928	3,621,349	3,183,421
Waterproofing/Caulking	344,296	1,666,000	1,321,704
Deep Foundations	268,666	1,053,000	784,334
GFRC	111,160	236,775	125,615
Overhead Doors	86,485	56,753	(29,732)
Total	\$66,471,103	\$96,171,356	\$29,700,253

RSM review of Airport Terminal Lobby Expansion

During its review of the Airport Terminal Lobby Expansion project, external consultant RSM noted that 15 of 52 subcontractor bid packages received only one bid. No further analysis of the bids was performed. Aviation noted that independent cost estimates are not performed at the 100% construction documents stage as they believe obtaining subcontractor bids is the best determinant of market conditions and projected costs.

However, to ensure the reasonableness of subcontractor trade bids on CMAR projects, RSM recommends that the Owner (or Owner's representative) verify the validity of subcontractor bids, especially when a limited number of bids is received (see Appendix A and section E of this report).

Recommendation B4

Independent cost estimates should be performed on high-dollar or high-risk projects prior to submittal to Council for approval. Each department (or General Services for the projects they manage) should identify and determine when the use of independent cost estimates or analyses should be required, such as when CMARs are used to establish GMP amounts.

Management Response

General Services – We agree there is value added in seeking independent cost estimates (ICE) to validate the CMARs IGMP prior to City approval. However, even with an ICE, there is not a guarantee that any estimate is a cap on costs but will mitigate risk to the City.

Aviation – We do not see the value in performing an independent cost estimate (ICE) for a CMR project with a GMP, as the GMP will have most if not all packages bid at that point. If the department was to pursue a project and bring an initial GMP forward for City approval, an ICE may be appropriate.

Storm Water – Independent Construction Estimates (ICEs) are completed for all Storm Water projects estimated to exceed \$5 million. ICEs have not always allowed for an accurate estimate of construction expenses based on the changing market conditions.

Charlotte Water – ICE or Value Engineering exercises should be considered when a GMP significantly exceeds budget or concept design costs. These exercises should be performed before requesting City Council approval and used to justify higher than expected project costs.

Finding B5

The City has missed opportunities to revise professional services estimates in proportion to decreases in project scope.

Joint Communications Center

As noted in the Talson report (see Appendix B), the City did not change estimates for CMAR general condition (GC) costs as scope changes were made to the JCC project. As a result, projected GCs increased from \$42.04 per square foot to \$87.37 per square foot after the project was reduced from a 94,000 square foot building (as designed in 2014) to a 46,000 square foot building (per 2018 design).

Convention Center Renovation

For the Convention Center project, general conditions and construction requirements totaled \$14.6 million (nearly 15% of the \$98 million iGMP) when the CMAR contract was awarded in November 2018. In addition, the CMAR's fee was \$3.6 million (about 4% of construction costs)

for the project. After the trade packages were bid and a final GMP was determined, general conditions and construction requirements increased by \$2.3 million to \$20.6 million. This increase was negotiated despite the fact that the scope of the project was reduced, which should translate to less work and risk to the CMAR.

The JCC and Convention Center examples indicate that estimates may not be appropriately revised for scope changes, and project managers may need assistance to effectively negotiate professional services contracts. While the examples indicate that professional fees could have been reduced, there may be circumstances where adjustments to professional services fees are not directly proportional to adjustments in project scope. Substantial need for redesign or value engineering could potentially increase professional services expenditures on a project. However, this should be limited on CMAR projects where construction managers are engaged for preconstruction services. The Talson report (Appendix B) recommends that City project managers receive additional training to administer CMAR agreements.

Convention Center and Terminal Lobby Expansion GC/GR Rates

General conditions/general requirements costs: \$16.4M (11.8%) and \$50.3M (10.9%), respectively for both the Convention Center and Terminal Lobby Expansion projects exceed RSM's benchmark of 8% of construction costs. While unique circumstances may exist for individual projects to warrant percentages above the benchmark, the relatively high percentage of GCs/GRs increases the potential for overstated costs and the use of excessive GC/GR costs as additional contingency funding.

Recommendation B5

Professional Service Agreements should be written to support the adjustment of professional fees in proportion to scope changes. As significant project scope changes occur, the City should ensure that the CMAR's cost estimates for general conditions reflect the corresponding scope reduction.

Management Response

General Services – We agree. General Services will ensure that CMARs' cost estimates for general conditions reflect the corresponding reduction or addition and/or document the reasons why increases or decreases were not reflected.

Aviation – We agree and we are already utilizing this process. The amounts of GC/GR and CM Contingency are individually negotiated. Shifts from any excess GC/GR amounts are not allowed to be used as additional CM Contingency.

Charlotte Water – We agree and will work with the City Attorney's office to review the standard contracts and insert appropriate language to provide flexibility as necessary.

City Attorney – Attorney’s Office is available to advise department staff as substantive or material changes to project scope and costs are made that may warrant modification to contract terms. If and when changes to contract terms are foreseeable or known, staff should bring attorneys on board as soon as possible to advise in revising and negotiating contract terms.

C. Cost Management and Delivery

While management has stated that most projects are delivered on time and on budget, there is no formal system in place to assess this performance. Budgets often include undisclosed project or owner contingency amounts, and scope changes result in increased time allotted to projects. Auditors compared the City’s practices to the Project Management Institute’s Body of Knowledge (PMBOK) standards utilizing a judgmentally selected sample of projects throughout the City (see Appendix D for a list of projects reviewed). PMBOK has established standards for scope, time, cost, quality, resource, communication, risk and procurement management. Through review of project case studies and discussion with management, auditors noted that departments have established policies and procedures that adequately address the PMBOK standards.

McGraw-Hill Survey

Owners (government entities, corporations, and organizations seeking to acquire or build capital assets) can impact the efficiency, productivity and profitability of projects through the selection of a project delivery system (design-bid-build, design-build, construction manager at risk). In 2014, McGraw-Hill Construction (a subsidiary of research and publishing company McGraw Hill Financial, and in association with several partners, including the Design-Build Institute of America and the American Institute of Architects) surveyed architects, contractors and owners and found no consistent recommendation for the use of a specific delivery system. The survey concluded that delivery systems impact projects, but the perception of which system provides the best performance often varies by sub-group:

Architects

- Design-Bid-Build is the best delivery system to reduce costs
- Design-Build is the best delivery schedule to reduce construction time, improve process efficiency and create fewer change orders

Contractors

- Design-Build is best for reduced cost, reduced schedule, fewer change orders, improved construction quality and customer satisfaction
- Construction Manager at Risk (CMAR) also rated highly for reduced cost and schedule, fewer change orders and improved customer satisfaction.

Owners

- Construction Manager at Risk was associated with increased satisfaction
- Design-Build is the best system to reduce schedule

Owners stated that the most influential obstacles that prevent the use of a particular delivery system focus on three issues: costs, familiarity with the systems, and concerns about checks and balances. For example, the highest percentage of owners (43%) agree that lack of familiarity with CMAR, too few checks and balances, and additional costs due to project length are obstacles to further use of this delivery system.

Successful Project Delivery and Process/Management Examples

While this section of the report identifies opportunities for improvement in various project management areas, auditors recognized that departments have made significant efforts over the past several years to increase project management and deliver quality projects, as illustrated below:

- CATS' \$1.16 billion Blue Line Extension was opened in March 2018 and viewed as a significant accomplishment that will impact the community for years. The extension has strengthened neighborhoods by providing citizens with greater access to employment and educational opportunities.
- Aviation completed a \$200 million Concourse A Expansion which resulted in the addition of nine gates. Management, architects, designers, consultants and Aviation staff collaborated to make the 230,000 square-foot development a success. The expansion includes high-tech windows, digital artwork and new customer amenities.
- Charlotte Water has completed several large scale projects, including the Steele Creek Pump Station and Force Main, a \$40 million project to replace the existing station and add six miles of pipes that increased the capacity of wastewater flow to the McAlpine Creek Wastewater Treatment Plan. The project enables the City to provide reliable service to the growing Steele Creek area.
- General Services, formerly Engineering & Property Management, completed the University Point Boulevard (I-85 South Bridge) providing an important multi-modal connection across Interstate 85 in the University Area. The project opened in May 2017 and provided a needed east-west connection between the University Research Park, Belgate/IKEA developments, and the CATS Blue Line Extension on North Tryon Street. The project provided better access for businesses, ease of access between residential and shopping centers as well as additional access to James Martin Middle School which reduced fire response times. The project was completed for \$16.6 million.
- General Services also completed four individual projects that brought the Prosperity Village Area Plan to fruition. The plan was to create an interchange with a network of two lane streets that allowed vehicular traffic to get to destinations efficiently while being pedestrian and bicycle friendly. The series of projects opened up opportunities for retail and residential development. The interchange functions as planned, and the area has

seen significant growth since the projects have been completed. The project was completed for \$12.1 million.

- Previously (Audit Report 16-08 Construction Change Orders issued February 2016), Internal Audit recognized the use of eBuilder as an efficient and effective software tool to store project-related data (contracts, change orders, payment applications) and approvals. At the time, only CATS was utilizing the system. Subsequently, Aviation and Charlotte Water implemented eBuilder to record project data and establish workflow processes. It is anticipated that continued use and development of eBuilder will allow departments to retain project data in an organized manner and document workflow approvals.

Finding C1

The City has historically used the Design-Bid-Build project delivery method, and does not consistently document justifications for the selection of alternate methods, i.e., Design-Build and CMAR.

In 2017, audit consultant RSM conducted a review of the City's use of CMAR, and noted infrequent usage of the construction manager at risk delivery method. Since then, the City has increased the number of projects using alternate delivery methods, including the planned Joint Communication Center, Convention Center renovation, the Airport's Concourse A Expansion and Terminal Lobby Expansion. In addition, Charlotte Water has chosen the design-build method with more frequency.

Recently built Police stations have used both the Design-Bid-Build and the CMAR project delivery methods. Central, South and Westover projects are described below.

For the Central CMPD Division Station (2017), the City elected to use the CMAR delivery method because it was not a traditional project. This was a multi-story building and parking deck on a small site being constructed in a time of rising construction costs. The complexity of this project was high, and the City desired a construction expert to help review drawings for constructability, material delivery, construction sequencing and cost estimating. The project had an independent cost estimator and the CMAR cost estimator working in parallel. After each phase, both estimators compared notes and came to a mutual conclusion that helped maintain the budget during design.

CMAR was selected on the Independence and South CMPD Division Station projects in 2019 as a reaction to the rapid cost escalation in the construction market. The goal was to use a CMAR to increase certainty that the design was within the City's budget and improve competition in the subcontracts. Under a traditional construction market, both of these projects would have been delivered using Design-Bid-Build. However, in the previous few months, Building Services' projects were having difficulty finding three bidders and staying within budget.

Initiated in 2014, Westover was designed and built during a more stable construction cost environment. The traditional Design-Bid-Build was the only project delivery method considered at the time.

Although the Design-Build method has advantages for speed and cost, this method has the notable disadvantage of reduced owner control during the final design and construction process. Historically the City has put a premium on adapting project designs to conform to public expectations throughout the life of a project. Now that Design-Build has been made more accessible by the N.C. General Assembly, the City has been looking for projects to use this method that aren't exposed to the same level of risk of scope changes. General Services plans to use the design-build project delivery method on a pilot basis in FY 2021 for a limited number of suitable projects. It is anticipated that the pilot program will improve delivery times.

North Carolina state statutes (Section 143-128) detail the following requirements:

- Design/Build – governmental entities shall establish written criteria used for determining the circumstances under which the design-build method is appropriate for a project. Such criteria, at a minimum, shall address:
 - The extent to which the entity can adequately define the project requirements prior to the issuance of an RFQ
 - The time constraints for delivery of the project
 - The ability to ensure that a quality project can be delivered
 - The capability of the governmental entity to manage and oversee the project
- CMAR – may be used by a public entity only after concluding that the construction management at risk services is in the best interest of the project, and the entity has compared the advantages and disadvantages of the method in lieu of other delivery methods.

The City's Procurement Policy for Design and Construction Services states that:

"...the contracting officer and project manager are required to provide a detailed analysis to justify using a CMAR including budget/schedule constraints, suitability, and availability of potential CMARs to assess market competitiveness."

As noted by consultant Talson Solutions in its FY 2020 review of the Convention Center Renovation and Joint Communications Center projects, the City did not provide sufficient evidence that such analysis was performed.

A formal process to evaluate justifications for selecting project delivery methods would ensure that departments are following State requirements and utilizing the most appropriate delivery system for individual projects. Tracking the negative and positive impacts of selected delivery methods will help departments prepare and support more detailed justification statements in the future.

Recommendation C1

The City should establish criteria for selecting the appropriate construction delivery method for each project, considering project resources, design and construction complexity, budget and schedule. The City should formally evaluate justifications by a committee prior to selecting a project delivery method. The committee should be comprised of project team members, legal counsel, Finance and other City departments that are independent of project delivery.

In addition, post-completion evaluations should be completed regardless of delivery method. While beneficial for all types, the evaluation of those performing newer methods (e.g., CMAR) would aid in future decision making.

Management Response

General Services – In the past, justification for the delivery method was informally discussed within the department, and a high-level recap was included in the request for qualification. General Services does not agree that the committee has to include other departments on every project. General Services has convened a committee on the last two projects considered for alternative delivery methods to evaluate the criteria set forth in the North Carolina General Statutes. The committee was comprised of the project management team (which may or may not include other departments), legal, and procurement. The Design-Build approach was chosen for both the Northwest CMPD Station and Bryant Farms Phase 1 projects. If City guidelines were created to justify alternative delivery method, General Services would follow them.

Aviation – The Aviation Department has provided documentation of the delivery method for each of its CMAR projects. The decision on delivery method has been handled by an internal group within the Development division of the department. Moving forward, that function has been shifted to the Strategy Committee within the department's Capital Governance Process.

Charlotte Water – We do not agree that a committee approach that includes other departments for every project is the best way to handle this decision. Charlotte Water performs more alternate delivery projects than our peer departments. Most design build pipeline projects are selected due to a schedule driver to meet development timeframes. Project “drivers” that align with State statutes are identified, justified and approved by our director. A multi-department committee approach may provide some additional support and buy-in for the delivery method selected, but it will add time in decision making by coordinating schedules with committee members outside of Charlotte Water. As an alternative to a committee process, we recommend having a guideline approved that each department must follow in determining the justification to select the appropriate delivery method.

Finding C2

Significant scope change proposals should follow a defined process prior to submittal to Council for approval.

JCC

As noted by consultant Talson Solutions, the JCC project experienced changes to project scope in the planning/design phase that resulted in significant impacts to cost and schedule. Changes included the relocation and hardening of the building. Many requests were made by multiple members of management who became involved with the design, as turnover occurred within City leadership – including the Police Chief, Fire Chief, and City Manager – between the years 2011 and 2017. Talson noted that the project scope also changed as available budget amounts were adjusted and approved by City Council.

In addition, the scope and schedule delays pushed the project into a more competitive construction climate for owners, resulting in higher than expected construction costs.

Airport Terminal Expansion

This project is discussed in more detail in Section B (Estimating). The most recent cost estimates for the CMAR and related contracts, totaling about \$600 million, were approved by City Council in October 2019. The identification of desired changes was communicated to, and approved by, Aviation and its funding partners following a defined process. When Aviation sought Council approval, however, no reconciliation was provided to explain the increase from the \$247 million terminal expansion project presented in the FY 2017 – 2021 CIP. For the FY 2020 – 2024 CIP, the terminal lobby expansion, terminal canopy and central energy plant projects were combined for the CMAR contract.

Recommendation C2

The City should develop a formal change management process to evaluate, manage and coordinate changes to design scope, including the identification of funding sources before a significant change is formally submitted to Council for approval.

Management Response

General Services – We agree. A change management process is included in the Project Management Handbook. We will continue to follow this process and evaluate if changes are needed. A Change Control Board may be advisable for certain dollar threshold or complex projects.

Charlotte Water – We agree that a change management process is needed to provide consistency across departments. Significant scope changes result in increased time and

budget. The budget increase often exceeds any signature authority within the City and requires City Council approval.

Aviation – We use a Capital Governance Process that provides for the evaluation, management and coordination of changes in scope for design and construction of our projects. Changes are vetted through the Strategy, Construction and Finance committees to ensure that scope and fee are aligned with project goals and funding available.

Strategy and Budget – We agree that there should be a formalized, consistent process to evaluate and coordinate changes that affect project scope and budget. We will work to be a part of the process creation to assist with funding source identification. Additionally, as the coordinating office of the City Council Business Meeting Agenda, we can help ensure the process is followed by all departments.

Finding C3

The City has limited internal controls over quality of work products, e.g., plans, specifications and estimates.

PMBOK has established standards for project quality management, recognizing two elements of any quality management and control program:

- a. **Quality Control** – the actions which the owner, designer and contractor take in “real time” which are intended to maintain the desired quality over the “work” as it is in process. The quality control program covers every aspect of the scope of work from development of design documents, through final testing and start-up of the facility or structure. Quality control generally involves a formal program of reviews, inspections and immediate corrective actions during the actual execution of each element of the total scope of work.
- b. **Quality Assurance** – a program by which the owner, designer and contractor plan, execute and formally document the quality of the elements of work which have gone into the execution of the project.

Quality control and quality assurance are activities undertaken to ensure that the owner is receiving the quality which the owner has paid for under the contracts with designers, vendors, suppliers and constructors. Based on projects reviewed as a part of this audit (see Appendix D), only CATS has a formal quality assurance/quality control plans in place.

Although formal plans were not in place, departments generally performed sufficient reviews and inspections to help ensure warranty work is not necessary on a finished project. However, without formal quality control/quality assurance plans in place, management, and stakeholders cannot establish expectations and measure performance.

Actions Taken

General Services has recently created a Quality Assurance and Control (QA/QC) Plan and Estimate Review team to review work products for horizontal general fund project managed by General Services. As a result, the City anticipates increased accuracy in estimates and a sharing of lessons learned across projects and departments.

Recommendation C3

The City should establish policies pertaining to quality control and quality assurance, including documented practices and periodic evaluation of actual practices.

Management Response

General Services – A quality control/quality assurance plan should be part of the project plans generated at the start of a project. There are requirements for consultants and contractor to have QA/QC plan as part of their scope of services/specifications.

Charlotte Water – Sufficient inspection of projects with qualified, discipline-specific experienced inspectors will be necessary to ensure any QA/QC process. Charlotte Water has procured miscellaneous engineering inspection service contracts from two local firms to supplement our inspection team that are reviewing projects daily.

Finding C4

The City has not established formal project risk management processes.

Risk management programs are a critical tool for any owner attempting to maximize the probability of achieving objectives set for each capital project. The City has not provided uniform guidance to departments for risk management. The lack of specific processes and procedures means that there are no uniform, transparent or single point accountability requirements for project risk management.

Various departments have provided guidance to project managers related to risk management. For example, Engineering Services' PM Handbook outlines how to identify risks and project issues; how to weigh those issues against project success criteria; how to characterize the risk and how to develop response strategies and actions plan.

Back Creek Church Road

The Back Creek Church Road Farm-to-Market project included a risk management plan as part of the project plan. The risk management plan noted that the list of risks focused primarily on the planning phase, and other risks would be added as the project developed. However, there was no evidence that this plan was periodically monitored, tracked and updated as the project progressed. While revisions were made to the project plan over the years (the original was dated

September 9, 2009; a fourth revision was dated May 17, 2012), the risk management plan included in the document did not change.

A significant risk identified for the Back Creek Church Road project was:

“Disagreement/ Disapproval from the public regarding proposed improvements and project limits.”

The action plan to mitigate this risk stated:

“Gather input using public meetings and questionnaires. Communicate closely with neighborhood associations and concerned citizens.”

While there was evidence in the project files that public meetings were conducted, there was no formal documentation regarding the impact to the identified risk. Concerns expressed by a Council member resulted in additional public meetings after conceptual project plans were prepared for the City. The risk management plan was not updated to reflect the impact of the actions on the identified risk. Similar results were noted with the Westover Police Station project managed by General Services.

Other Projects

Other case study projects included the identification of risks, but it was not always evident whether these risks were evaluated for response planning. For several of the projects reviewed, it was not evident who was responsible for tracking, monitoring and updating the risk profile throughout the project. For example, in response to a survey for Aviation’s Concourse A Expansion and Concourse B Improvement projects, management indicated that risks were identified and addressed but there was no formal documentation to support this assertion. Similar responses were received from Charlotte Water (Wilmore Drive Sanitary Sewer Improvements and Steele Creek Lift Station Replacement projects). CATS provided detailed Risk and Contingency Management Plans and evidence indicating that risk spreadsheets were updated at monthly project meetings. While CATS utilized a more formal process to track risks and document mitigation efforts, the other departments stated that risks were identified, discussed and addressed informally during project meetings. Following specific project risk management guidelines would help ensure that project objectives are met with minimal disruption. Without formal processes in place, departments may not consistently report unmitigated project risks to City management.

Recommendation C4

The City should establish procedures for capital project risk management that addresses the identification and quantification of risk; the development of avoidance and mitigation plans; and the responsibility for periodically tracking, monitoring and updating the project risk profile. The procedures should include a protocol for communicating unmitigated project risks to City management and Council.

Management Response

General Services – A risk management plan should be part of the project plans generated at the start of a project. The new project updates report also has a section for project managers to document anticipated risks or challenges.

Aviation – We agree with General Services. Aviation is currently doing this for active projects.

Charlotte Water – This should be project specific and for qualifying projects. Risk registers are utilized on large capital projects to identify risks. Identified risks are mitigated throughout the design and construction of the project. On our largest project to-date, a team is developing a risk register and management plan.

Finding C5

The City's attempts to accurately and consistently reflect the cost of staff time on capital projects have been inadequate. Costs should not unnecessarily be shifted from the general fund to a capital project.

Government accounting standards require that capital assets be reported at historical costs. The cost of a capital asset should include "ancillary charges" necessary to place the asset into its intended location and condition for use. Ancillary charges include costs that are directly related to asset acquisition – such as freight and transportation charges, site preparation costs and professional fees. This can include the expenses of internal staff performing professional services in the capacity of an architect, construction manager, inspector, or any other function necessary to prepare a capital asset for service. It is common for governmental organizations to capitalize internal labor costs that are related to specific projects and appropriately tracked and documented. It is also allowable to apply multiplier factors to direct labor charges, to allocate associated fringe benefits and overhead to capital projects.

Federal Acquisition Regulations establish cost principles and procedures for government contracts. FAR Part 31.203 addresses indirect costs. While these requirements are only applicable to federally funded projects, the guidelines can be followed to equitably allocate indirect costs to final cost objectives. These provisions state that costs are allowable to the extent they are reasonable, allocable and determined to be allowable in accordance with cost accounting standards.

The City has not established a consistent methodology or guidelines for charging internal staff time to capital projects. Guidance is lacking in the following areas:

- Developing indirect cost rates
- Segregating staff charges for projects in the City's financial system
- Budgeting staff charges by project

Accounting Process

To determine direct labor costs, City departments have used various methods to track employees' time on projects and activities. Employees report their chargeable hours via weekly timesheets that are entered into PeopleSoft, Primavera and/or Excel systems. The individual's hourly rate (annual salary/2,080 hours) is applied to direct labor hours to yield reimbursable salary. Direct labor is multiplied by different factors in each department to add fringe benefits and other indirect costs. Although some of the departments have periodically reviewed and updated the factor, there has not been a recent calculation or verification of the adequacy of the indirect rates. For example, both CDOT and General Services use a factor of 2.5 (i.e., 250%) applied to direct labor charges. It is not known whether this factor accurately accounts for the indirect costs associated with the direct labor spent on capital projects.

The City does not use accounting codes to distinguish internal staff charges from other project costs. All project costs must be charged to object code 530500. This object code indicates that the expense should be recorded to a project. Generally, projects are segmented by Phase (Planning, Design, Real Estate, Construction and Closeout), Task and Sub-Task; but these are not required to be consistently followed and have not been used to segregate staff charges.

When reviewing MUNIS data, it is not evident how much staff time is being charged to any given project as these charges are transferred from the general ledger to object code 530500 through journal entries. The following charts (Staff Charges by Fund, and by Project) were prepared by identifying journal entries submitted to record internal staff labor to projects. The tables present the amount of internal labor by fund and project type for journal entries that could be identified as internal staff labor charges. Some journal entries for internal staff charges were not clearly identified as such. Therefore, the tables below show a *minimum* amount of internal labor transfers. For example, the tables do not include any staff time charged to Aviation projects. However, further review identified that Aviation's quarterly transfers for staff time are not distinguishable within Munis, as the comment field does not contain any specific identifier (for example, one Aviation transfer simply had "q3" in the comment field). Consistent identification and segregation of staff charges in the City's system of record (MUNIS) would increase accountability, and transparency, and would allow a historical comparison of staff time required to complete various types of projects, to assist with project planning and cost estimation.

Staff Charges by Fund						
FY 2015 to FY 2019						
Fund Name	2015	2016	2017	2018	2019*	Total
Capital Project:Convention Ctr	\$ -	\$ -	\$ 66,010	\$ 71,358	\$ 26,393	\$ 163,760
Capital Project:General	1,469,077	2,810,219	9,223,260	9,540,069	4,852,798	27,895,424
Capital Project:Tourism	-	-	28,275	11,096	2,712	42,083
CATS CIP:General	544,933	269,688	273,839	41,738	6,722	1,136,920
CATS CIP:North Corridor	50,000	4,094	134,333	6,214	-	194,642
CATS CIP:Northeast Corridor	1,020,578	3,188,168	7,280,452	2,048,444	264	13,537,907
CATS CIP:South Corridor	474,745	286,069	62,007	529	-	823,349
CATS CIP:Southeast Corridor	-	1,137	-	-	-	1,137
CDBG	-	29,466	-	61,387	(9,024)	81,829
Emergency Telephone System	-	-	240,047	226,508	148,716	615,271
General Grants & LTD Projects	849,669	2,302,006	1,874,330	2,351,719	1,390,879	8,768,603
Neighborhood Services Grants	26,243	339,637	297,957	338,383	186,227	1,188,447
Storm Water CIP	113,710	133,080	10,695,346	13,018,552	7,628,179	31,588,868
Water and Sewer CIP:Capital Financing	7,609,684	11,139,975	12,485,936	11,669,986	389,563	43,295,144
Water and Sewer CIP:Construction Deposits	47,084	11,995	87,362	43,785	418	190,643
	<u>\$ 12,205,723</u>	<u>\$ 20,515,534</u>	<u>\$ 42,749,154</u>	<u>\$ 39,429,768</u>	<u>\$ 14,623,847</u>	<u>\$ 129,524,027</u>

* Through March 2019

Staff Charges by Project Type						
General Projects						
FY 2015 to FY 2019						
Project Type Description	2015	2016	2017	2018	2019*	Total
Affordable Housing	\$ -	\$ -	\$ -	\$ -	\$ 25,732	\$ 25,732
Area Plans	1,725	1,476	229,478	53,864	41,290	327,833
Business Corridors	5,494	3,874	145,110	51,093	46,852	252,423
Economic Development Corridors	1,950	-	98,625	243,163	136,605	480,343
Environmental Services Program	-	-	367,288	309,618	204,368	881,274
Facilities Maintenance	-	(200)	-	70,125	21,526	91,451
Facility Renovations	-	-	169,321	168,847	105,418	443,586
Innovative Housing	-	19,130	20,996	26,423	(4,276)	62,273
Neighborhood Improvements	75,875	79,265	1,245,757	1,416,487	848,512	3,665,896
New Facilities	580	-	287,401	343,991	250,519	882,491
Non-Street Transport Infrastru	347,716	944,722	575,978	695,521	444,318	3,008,255
Pedestrian Safety	368,660	596,952	2,121,799	2,004,532	1,234,001	6,325,944
Street & Road Infrastructure	258,499	450,681	2,994,971	2,523,156	1,401,520	7,628,827
Technology	86,905	-	-	34,226	23,179	144,310
Traffic Control	291,972	442,154	75,136	427,134	(15,025)	1,221,371
Transit Corridor Development	25,225	270,305	853,852	1,143,708	56,325	2,349,415
Transportation Partnerships	4,477	1,860	333	230	-	6,900
Tree Program	-	-	37,215	27,952	31,933	97,100
Total	<u>\$ 1,469,078</u>	<u>\$ 2,810,219</u>	<u>\$ 9,223,260</u>	<u>\$ 9,540,070</u>	<u>\$ 4,852,797</u>	<u>\$ 27,895,424</u>

Although departments may be monitoring and controlling staff time via internal systems, budgets are not established in MUNIS for staff charges. Because only one object code is used to account for all project expenses, there is no transparency related to the amount of internal staff charges by project.

Citywide guidance regarding the calculation and use of indirect cost rates has not been provided to departments. Written policy and procedures increase administrative control by (a) ensuring that requirements are defined and communicated and (b) procedures are standardized and implemented in a consistent manner.

Note: According to multiple staff, some departments were historically encouraged by their managers to increase indirect cost rates in order to shift the expense burden from the general fund to the capital improvement program.

The City is not able to determine that the total cost of staff support for CIP projects has been accurately recorded in the financial system. The costs charged to CIP projects could therefore be inflated or under-reported. Under-reported costs could lead to the City requesting insufficient funding for some projects from grantors. When grants are not involved, the impact would be limited to inconsistent and possibly inaccurate financial records – assets and expenditures.

As noted earlier, General Services uses a multiplier of 2.5 when charging staff time to projects. However, because an “approved” General Services indirect cost rate was not sought from the federal cognizant agency, General Services used a multiplier of approximately 1.37 for charges to the Blue Line Extension Project, in accordance with federal requirements. In lieu of an approved actual indirect cost rate, federal regulations allow entities to use an overhead rate of 10%, plus certain fringe benefits. In the past, General Services has calculated fully burdened labor multiplier rates between 1.85 and 2.15.

Through March 2019, General Services’ records indicate that approximately 40,000 hours at an average \$38 per hour (including the FTA allowed 10% OH rate) were charged to the BLE project during the prior four fiscal years. While this equals approximately \$3.8 million using the 2.5 multiplier, it reaches only \$2.1 million using the 1.37 multiplier.

E&PM BLE Internal Staff Charges Indirect Rate Comparison			
Basis for Rate	Base Labor	Mutliplier	Total Charge
CIP Charge Rate	\$1,520,000	2.50	\$3,800,000
FTA Allowable Rate	\$1,520,000	1.37	<u>\$2,082,400</u>
Difference			\$1,717,600
 E&PM Actual Rate	 \$1,520,000	 1.85	 \$2,812,000
FTA Allowable Rate	\$1,520,000	1.37	<u>\$2,082,400</u>
Difference			\$729,600

If the 1.85 multiplier represents General Services’ true cost of providing services, then the department may have been able to request more than \$700,000 additional reimbursement from the FTA and NCDOT. According to General Services staff, the City has previously started but never completed the process to get an approved indirect cost rate at the City level.

The lack of established budgets in Munis may lead to an increased percentage of staff labor for some projects or project types. The projects listed below are nearly complete and included internal staff labor charges that exceeded 25% of total project costs. Although these percentages may be normal for sidewalk projects, it’s not possible to monitor and establish benchmarks for performance measurement without budgetary controls. A risk exists that increasing percentages

of staff labor may be charged inappropriately to capital projects and not be detected because no expectation exists as to what is reasonable.

Selected Sidewalk Projects Internal Labor Charges as a Percent of Total Expenditures As of March 2020				
Project Name	Project Budget	Project Total Actuals	Internal Labor and Overhead	Internal Labor and OH Pct.
Little Rock Rd Sidewalk	\$1,727,000	\$1,350,951	\$384,571	28.47%
Rea Road Sidewalk	\$817,000	\$764,749	\$210,380	27.51%
Bryant Farms Rd Sidewalk	\$1,679,540	\$871,174	\$223,820	25.69%
Graham St Underpass Sidewalk	\$926,000	\$887,543	\$238,324	26.85%

Action Taken

Strategy and Budget (S&B) staff accepted the responsibility to develop citywide guidance for charging staff time to capital improvement projects. S&B has met with departmental representatives to gain an understanding of the unique methods used by each to charge staff time to capital projects. S&B will perform analysis to determine the potential impact on the City's operating and capital budgets of proposed changes to existing practices.

Recommendation C5

In conjunction with representatives from affected departments, the City should develop written guidance detailing the calculation and use of indirect cost rates as it relates to the charging of staff time to capital improvement projects, including the following:

- A standard methodology for calculating indirect cost rates based on actual experience that can also be the basis of indirect cost rate proposals for federal projects. Costs should not unnecessarily be shifted from the general fund to a capital project.
- A requirement that internal labor be segregated from other project costs in the financial system. This can be accomplished by establishing additional object codes to account for internal labor, by requiring the use of specific comments when transferring internal staff charges or by establishing specific phases, tasks or sub task to record internal labor.
- A requirement that department users establish budgets for staff time for each project in Munis and periodically monitor performance by comparing to actual charges.

Management Response

Strategy and Budget – We will continue to work in partnership with departments towards establishing citywide guidance for the methodology of charging staff time. We will also work with the Finance Department to establish the appropriate accounting mechanisms in Munis to track staff time consistently, and then we will work with departments to institute the new tracking practice. Establishment of a methodology of charging staff time is anticipated to be completed within FY 2021. Any requisite adjustments to the percentage of staff time charged to the CIP is a longer-term goal that requires balancing service provision with this initiative.

Finance – Finance supports requiring that internal labor be segregated from project costs in the financial system by the use of a phase, task or subtask. Finance will work with S&B and departments to determine which segment is the most appropriate.

D. Performance Reporting

The City has historically followed a decentralized approach to accumulating capital project data. Multiple departments are involved in developing capital project priorities, plans, budgeting and reporting. These include the departments of Strategy and Budget (and its prior iteration as Budget and Evaluation), General Services (recently established, preceded by Engineering and Property Management), and CDOT. In addition, the enterprise funds/departments of Aviation, CATS, Water and Storm Water have separately managed significant capital programs, often following a “master plan” approach. The City’s use of multiple reporting systems (i.e., MUNIS, eBuilder, Primavera) has contributed to a delay in recognizing threats to cost estimates and expected delivery times.

The lack of a coordinated city-wide focal point for accumulating capital project monitoring and reporting (at both the project management and financial performance levels) has resulted in an occasional failure to escalate concerns timely – to top City management, and subsequently to Council and the public.

Developments among some high-profile projects in the past two years demonstrated the need for a well-defined, comprehensive performance reporting approach. Internal auditors and consultants (Talsen and RSM) gave particular attention to the following:

- Cross-Charlotte Trail
- Joint Communications Center
- Charlotte Convention Center Renovation

The City’s past experiences have been examined in comparison to Government Finance Officers Association (GFOA) best practices, resulting in the findings and recommendations in this section.

Actions Taken

General Services has established a new template for project reporting and is working with project managers and Primavera software to generate the report on General Fund projects on a monthly basis.

Finding D1

The City does not have the systems necessary to facilitate timely project reporting.

Often, more than one system or technological solution is required to properly address all informational requirements. According to GFOA, entities should select one system to be the primary system for storing capital project financial and operational data. For the City, the primary system for financial data is MUNIS, part of the City's ERP solution. Although MUNIS can be used for consistent reporting of project costs, it is not currently used to monitor or track scheduling information, contract requirements, scope changes or project completion status.

To prepare accurate project status reports requires manual effort, contrary to the recommended best practice. For example, project managers must provide the following estimated data for individual projects to compare to financial data:

- 1) costs to complete,
- 2) completion dates, and/or
- 3) percentage of completion.

In a January 2020 update to City Council, General Services identified projects with budget risk based on internal knowledge of the specific projects. An automated report that compares estimates at completion to budgeted expenditures does not currently exist. General Services is developing a Project Progress Report to share with other departments.

According to management, the most important components of timely and accurate reporting are a) identifying the key audiences, b) identifying their reporting needs, and c) adapting data collection and reporting practices to those needs. Because these needs have shifted in recent years, including increased reporting on contingency levels and more granular cost and project phases data, the reported data was not useful and became less reliable. Project reporting is now standardized with data that is tailored to better meet the needs of the CMO.

Cost estimates have been infrequently reported in the past, upon request. The lack of a proactive, timely approach can lead to inconsistent reporting if project managers are delayed in preparing estimates when responding to requests.

Recommendation D1

General Services should explore methods to achieve consistency when compiling project information from various sources, paying specific attention to reducing the amount of manual effort required. If possible, the City should use one technology system to provide comprehensive capital project financial and operational reporting capabilities.

Management Response

General Services – The department has established a new template for project reporting and is working with project managers and Primavera software to generate the report on General Fund projects on a monthly basis. We are open to evaluating different software, procedures or scripts that transfer data from one existing software to another; however, funding the implementation of any of these things may be a factor. Trying to find or create a system to manage all aspects of CIP project management would be difficult, especially for a municipality, where the financial management system has to meet a broad range of non-CIP needs, and is unlikely to ever be optimized to support CIP project management.

Strategy and Budget – We are supportive of opportunities for reporting efficiencies; however, it is important to understand the significant administrative and financial investment in an undertaking as large as identifying and implementing a centralized platform.

Finding D2

The City has not established policies and procedures that support effective capital project monitoring and reporting.

Project monitoring should include:

- Review of project-related financial transactions to support budget review, auditing and asset management
- A review of expenditures, both in relation to the current budget and over the entire project life
- Review of encumbrances and estimates of planned expenditure activity
- Results compared to established measures of performance, including, at a minimum, cost and schedule performance indices

MUNIS is not currently used to record estimated planned expenditures. Project progress (as a percentage of completion) is not recorded in MUNIS. As a result, there is no automated comparison of expected project performance, specifically for cost and schedule. One project impacted by the lack of efficient reporting capability is the Cross-Charlotte Trail. If viewed as a single project, estimates of planned expenditures (not just for funded segments) would have revealed a budget shortfall much earlier than disclosed. Although other factors contributed to the expected increased Cross-Charlotte Trail costs, regular and consistent monitoring of project

performance would help identify issues with high-profile projects that should be brought to the attention of management and Council.

Recommendation D2

To support effective capital project monitoring and reporting, the City needs to:

- a. Utilize MUNIS to record estimates of planned expenditures and project completion or establish alternative methods to report comparisons of expenditures to estimates and other performance measures.
- b. Establish triggers and protocols for identifying and addressing project cost overruns and schedule delays.

Management Response

General Services – We do not believe Munis is the answer. The department has established a new template for project reporting and is working with project managers and Primavera software to generate the report on General Fund projects on a monthly basis. We will need to evaluate whether or not a report out of Primavera can be created to report projects hitting identified triggers.

Charlotte Water – We implemented eBuilder to provide project tracking, documentation and reporting. Nearly all active projects in our CIP have been loaded in eBuilder at this time.

Finance – We do not believe that MUNIS has the functionality to record estimates of planned expenditures and project completion. Finance will support departments in helping to identify alternative methods to report estimates and performance measures compared to actuals.

Aviation – We implemented eBuilder to provide project tracking, documentation and reporting. All active projects in our CIP have been loaded in eBuilder.

Finding D3


The City has not established effective reporting tools that compare actual results to project plans.

High profile projects often require more extensive reporting of activity compared to more routine capital projects, and therefore may require more content and frequency. Reports should provide straightforward project information for Council, executive leadership, internal staff and citizens.

While various departments throughout the City have produced project reports meeting the criteria listed above, a consistent approach has not been established to report on all capital projects at a point in time. Progress is most often stated in terms of project phase (planning,

design, utility relocation, or construction) as opposed to a percentage of completion or percent of budget expended. Status reports are prepared that include revised budget amounts and schedules based on authorized changes. While this provides an up-to-date status of a project, it does not provide a comparison of results in relation to established performance measures.

The March 30, 2019 Project Strategy Report summarized 181 Economic Development, Facilities, Neighborhood, Storm Water and Transportation projects. The report was published on the General Services department's webpage, and is accessible to the public. A sample page from that report for the Convention Center Renovation project is presented below. While informative, the report does not provide a percentage of completion, percent of budget expended or comparison of results in relation to established performance measures.

Project Strategy Report		March 30, 2019												
<p>Project Number: PM51217007</p> <p>Project Title: Convention Ctr. Renovations</p> <p>Program Category: FACILITIES INVESTMENT</p> <p>Program Title: Renovations</p> <p>Project Mgr: Monifa Hendrickson</p> <p>Project Mgr: Phone: 704-432-2577</p> <hr/> <p>Project Summary: Renovations to the 850,000 SF Convention Center will provide significant improvements to meeting and breakout spaces, technology upgrades and the creation of pedestrian-friendly connections between the Convention Center and Center City.</p>														
<p>Project Update:</p> <p>Look Ahead: Begin bid process and finalize GMP negotiations.</p> <p>Current Status: March 2019: The project is finalizing the regulatory process with final code reviews and permitting. Construction documents are being advertised for bids and mobilization is being coordinated. Coordination with the CRVA, CATS, the Westin Hotel, and Crescent properties continue. The Public Art Commission approved the public art project. Construction is scheduled to begin in July 2019.</p> <p>Last Month: January 2019: Finalize construction documents. Finalize regulatory reviews. Continue stakeholder coordination with CATS, CDOT and Urban Forestry. Prepare for Council approval and continue GMP negotiations.</p>														
<p>Cost Schedule Commitments:</p> <table style="width: 100%; margin-top: 10px;"> <tr> <td style="padding-left: 40px;">Estimated Cost @ Completion:</td> <td>\$110,000,000.00</td> </tr> <tr> <td style="padding-left: 40px;">Planning Activities:</td> <td>In-progress/End 3rd Q 2019</td> </tr> <tr> <td style="padding-left: 40px;">Design Activities:</td> <td>In-progress/End 2nd Q 2019</td> </tr> <tr> <td style="padding-left: 40px;">Real Estate Activities:</td> <td>Complete</td> </tr> <tr> <td style="padding-left: 40px;">Bid Phas Activities:</td> <td>Start 2nd Q 2019/End 3rd Q 2019</td> </tr> <tr> <td style="padding-left: 40px;">Construction Activities:</td> <td>Start 4th Q 2019/End 2nd Q 2021</td> </tr> </table>			Estimated Cost @ Completion:	\$110,000,000.00	Planning Activities:	In-progress/End 3rd Q 2019	Design Activities:	In-progress/End 2nd Q 2019	Real Estate Activities:	Complete	Bid Phas Activities:	Start 2nd Q 2019/End 3rd Q 2019	Construction Activities:	Start 4th Q 2019/End 2nd Q 2021
Estimated Cost @ Completion:	\$110,000,000.00													
Planning Activities:	In-progress/End 3rd Q 2019													
Design Activities:	In-progress/End 2nd Q 2019													
Real Estate Activities:	Complete													
Bid Phas Activities:	Start 2nd Q 2019/End 3rd Q 2019													
Construction Activities:	Start 4th Q 2019/End 2nd Q 2021													
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During a January 2020 presentation to the Budget and Effectiveness Committee, management identified 178 projects in progress worth over \$1.1 billion. Management noted potential budget risk for eight of those projects, including the following:

- Potential need for \$2 – \$4 million more in City, State and Federal funding for the Gold Line Phase II project, initially approved for \$150 million.

- An additional \$1.5 – 2 million needed for widening Beatties Ford Road.
- An additional \$2 – \$6 million needed for pedestrian improvements on Beatties Ford Road.

Recommendation D3

The City should establish a percentage of project completion reporting requirement to guide resident and Council expectations following presentation of CIP proposals and subsequent approval.

To aid in reporting, an annual snapshot of key schedule, cost estimate, and available funding information should be taken to establish baseline data for performance measures and report components.

Management Response

General Services – The department has established a new template for project reporting and is working with project managers and Primavera software to generate the report for General Fund projects on a monthly basis. If this template needs to be revised or additional information included, we can evaluate how to collect the information. It may be that other reports can be developed for specific audiences to meet their information/decision-making needs. One report is not likely to be suitable for all needs.

Strategy and Budget – We are supportive of any efforts to make project tracking information more available and digestible to residents and City Council. The Capital Project Dashboard, which was created during FY 2020, is an online tool that contains project information including descriptions, budgets, and timelines which may be helpful to residents and City Council as they monitor capital project progress.

Finding D4

The lack of timely project closeout resulted in a delayed identification of significant available funds, and a misleading report of funding capability.

GFOA recommends confirming that all reporting requirements of grantors and bond covenants are completed and that project data is properly recorded on the fixed assets schedule and added to the entity's capital asset tracking system.

At management's direction, Strategy and Budget and Finance staff reviewed historical capital project data and determined many projects had not been closed timely in MUNIS. It is difficult to quantify the potential available funds because the City's financial reporting system (MUNIS) does not track the percentage completion of a project. Therefore, staff was required to contact project managers to determine whether a project met the criteria for closure.

In May 2019, approximately \$11.7 million in funds was identified through an annual effort of Strategy and Budget and Finance staff to identify existing programs or projects that should be closed or canceled. Through this process, staff was able to identify current and planned projects that had funding allocated but had not made a public commitment. Management chose to recommend application of those funds to Council to apply the Cross-Charlotte Trail project. The following schedule highlights the programs and projects for which \$200,000 or more was transferred as part of that effort. Many of the projects did not have substantial expenditures after December 2016, indicating that some of the projects could have been closed sooner.

End of Year Transfers			
FY 2019			
PL Project #	Project Description	Last Invoice Date	Transfer Amount
4288300000	Neighborhood Transportation Program	12/29/2016	\$1,193,323
4288650038	Brevard Street Improvements	4/21/2015	1,100,421
4292000052	Neighborhood Traffic Pilot Program	8/3/2015	996,183
4288550013	IBM Drive/North Tryon Connector	9/12/2018	668,300
4288300004	Ardrey Kell/US521 Ped	10/24/2017	513,279
4292000010	Public-Private Participation	4/26/2018	500,000
4292000059	Traffic Signals: Tyvola At Billy Graham	Prior to Munis	499,991
4288200011	Idlewild Road Widening	1/3/2018	378,893
4288200010	Arrowood/Nations Ford Rd Intersection	10/10/2018	362,450
4292000047	Prior Bike Program	12/13/2017	346,132
4288200005	Pete Brown Road Extension	6/24/2016	344,004
4292000167	Asphalt Widening Private	5/6/2015	314,331
4292000183	MLK Jr Boulevard Extension	9/9/2016	311,356
4288760003	Johnson Oehler Rd FTM	10/1/2018	303,414
4292000174	Charlottetown Av Complete	4/12/2018	285,356
4288650039	Stonewall Street Improvements	6/18/2014	268,897
4288200018	Old Statesville at Cox/Lakeview	11/15/2016	255,183
4288550009	Future Road Planning/Design	5/18/2019	250,000
4288200006	Traffic Calming Services	5/9/2016	220,399
4292000045	Pedestrian and Traffic Safety	7/20/2016	206,511
4292000064	Street Connectivity Program	3/3/2015	200,852
4288200019	Beam Roundabout at Shopton Rd	4/22/2019	200,000
4288300001	Carnegie Blvd Street Conversion	-	200,000
8010150059	CMGC Floor Renovations	4/26/2019	200,000
4292000429	Fairview and Sharon Corridor Analysis	-	200,000
	Total Transfer		<u>\$10,319,274</u>

In addition to not closing projects timely, Departments have not established effective controls over reconciling construction in progress. The FY 2019 external audit included a material weakness finding regarding the capitalization of assets. The audit noted that the City identified capital projects of \$34 million that had previously been reported as construction in progress but

had no expenditures in the current year. This construction in progress did not result in a capital asset and was recognized as expense in prior periods.

Actions Planned

At the January 2020 Budget & Effectiveness Council Committee meeting, the City's CFO reported plans to address the external audit recommendation. Finance will update capital assets procedures and develop a capitalization checklist to help departments gain a better understanding of the capitalization process.

Recommendation D4

After implementation of new policies and procedures to identify and close completed projects more timely, the CFO should monitor and periodically report progress by department to executive leadership.

Management Response

Finance – For several years it has been our practice to request information from departments regarding the potential closure of capital projects. This practice was strengthened by implementing annual, in-person meetings with each department to review their construction in progress listings and impress upon them the importance of closing and capitalizing projects in a timely manner and requiring Department Director signature on the final submitted report. Earlier this year, Finance identified additional opportunities to enhance efficiency as well as improve monitoring and reporting guidelines for capital assets. Finance is implementing the following measures as part of the FY 2020 audit:

- i. Updating and strengthening the capital asset policy.
- ii. Creating a separate capital asset procedure guide.
- iii. Developing an enhanced Project Capitalization Form in partnership with Strategy and Budget and departments.
- iv. Holding multi-departmental training sessions on the project closeout process.

Strategy and Budget – During the development of the FY 2020 CIP, Strategy and Budget implemented a new, more rigorous process to evaluate available funding on all active General CIP projects. Through this enhanced effort, we were able to identify \$11.7 million that was available to be reprogrammed. This included reprioritized funding, reallocated funding from completed projects or projects nearing completion, and clean-up of a few projects that had been completed in prior years. If the enhanced project close-out process had been implemented earlier, it is possible that some of the \$11.7 million may have been available to reprogram in prior budget cycles. However, it is important to note that FY 2020 was the earliest we would have reprogrammed funding for all projects listed in the End of Year table above with invoice dates of spring 2018 to present because of timing around the project close-out process.

Finding D5

The City should conduct a periodic review of capital project monitoring and reporting practices.

As part of ongoing monitoring and reporting activities, the GFOA recommends that entities:

- Periodically inspect reporting data for accuracy and completeness
- Solicit feedback from stakeholders on the adequacy and relevance of reports and reporting tools
- Compare the organization's report format and content to other agencies' practices
- Assess the adequacy of communication between various organizational units

A comprehensive report is not available that summarizes the status (budget, expenditures, estimate to complete, schedule) of projects from each prior CIP. For example, the Back Creek Church Road project was initially funded through the 2008 bond program. Although substantially complete, the project is still active in MUNIS. Per General Services, the status of projects that reach the warranty phase is not reported. Including all projects in standard reporting improves accountability and transparency by identifying the potential availability of funds from projects near completion.

Actions Taken

In the fall of 2019, General Services discontinued use of the Project Strategy Report in favor of a new Project Progress Report, which was developed to provide more relevant and accurate information to Departmental leadership, and in consultation with project and program managers who support it.

During early FY 2020, the City started work on a project dashboard with the intention of increasing access to project information. Staff presented the first version of the dashboard to City Council in October 2019 and it is now available to the public on the City's website.

Recommendation D5

To improve capital project monitoring and reporting:

- a. Continue to refine the project dashboard by soliciting feedback from stakeholders and periodically comparing the City's report content and format to other entities' practices.
- b. Conduct periodic reviews of capital project reporting practices (including the accuracy of data presented in the CIP) and modify reports as needed.

Management Response

General Services – If our Project Progress Report needs to be revised or additional information included, we can evaluate how to collect the information. It may be that other reports can be developed for specific audiences to meet their information / decision-making needs. One report is not likely to be suitable for all needs.

Charlotte Water – For Council and the public consumption a simple summary report that can be used a dashboard should be considered that combines the requests in this section. Internally Charlotte Water uses a “stop light” indicator to show project status for budget and schedule. Our projects have also recently been added to the CIP dashboard request that showed a map with projects identified.

Strategy and Budget – Strategy and Budget led the creation and implementation of the Capital Project Dashboard in partnership with Innovation & Technology and individual departments. We will continue to refine the Dashboard and work to make sure it continues to be an asset to the community.

E. Use of the Construction Manager at Risk Project Delivery Method

The City Manager requested that Internal Audit review the effectiveness of the CMAR approach after three CMAR projects were identified as problematic. Specifically, the Joint Communications Center (JCC), the Charlotte Convention Center Renovation and the Innovation Barn faced significant budgetary challenges and were being suspended or re-examined in August 2019.

CMAR Projects

A brief summary of the three projects noted by the City Manager follows:

- Joint Communications Center

Over a period of six years (FY 2011 – FY 2017), \$86.3 million was appropriated to secure land and build a facility that included Police 911, Fire 911, an Emergency Operations Center (EOC), CharMeck 311, Medic, Mecklenburg County’s Sheriff’s Office, and a Data Center. In FY 2011, Council approved the purchase of land and the city purchased seven acres for the JCC. In January 2014, a contract was approved for Architectural and Engineering Services (A&E) and to begin design of the building. Subsequently, with the scope changes, in August 2016, \$1.5 million was added for design and a \$53.0 million Construction Manager at Risk (CMAR) contract was approved. Since the initial cost estimate of \$74.0 million, the project had several revisions to the scope, programming, and overall functionality. These scope changes resulted in costs increasing to \$106.0 million, even with a reduced scope of only include Police 911, Fire 911, EOC and CharMeck 311. The project was suspended in August 2019.

- Charlotte Convention Center Renovation

In 2015, a consultant recommended nine modifications to the Charlotte Convention Center to make the facility more competitive and marketable. Due to expected budget limitations, design work proceeded with a focus on a reduced number of modifications. This project was approved by Council in November 2018 for \$115.0 million to add 12 meeting rooms and a pedestrian bridge over Stonewall Street. Of the 51 trade package bids received, 22 exceeded the original budget estimates. Delays in obtaining subcontractor bids and contracts after approval of the initial GMP contributed to the increased costs.

- Innovation Barn

In 2018, the City partnered with Envision Charlotte to create a community space for a circular economy – an alternative to the traditional linear economy (make, use, dispose) in which resources are kept in use for as long as possible. Envision Charlotte was responsible for the design of the facility and the City hired a Construction Manager at Risk to oversee construction.

Relying on a third-party building tenant for project design when the City holds the CMAR contract posed considerable risk to the City. The original project budget was \$3.6 million, which included \$2 million for the CMAR contract (approved by City Council in February 2019). As the project progressed, the need for a new roof, HVAC system, asbestos abatement and additional work was identified, but not funded. As of June 2020, the City and Envision Charlotte are re-scoping the project.

CMAR-Related Audits

RSM 2017 Report to Internal Audit

In January 2017, Internal Audit provided City departments with an assessment report for the Construction Manager at Risk (CMAR) project delivery method. External consultant RSM US LLP (RSM) summarized key controls deemed critical to mitigating the risks of CMAR projects. Using comparable industry experience, RSM applied relative risk ratings to each department on a control-by-control basis. As the City was just beginning to use CMARs on a more frequent basis, RSM reviewed projects at various stages of completion, none of which had progressed past the initial stages of construction.

A summary of risks identified by RSM in 2017 (attached as Appendix A) follow.

RSM's assessment generally indicated low to moderate risk for most categories, with the following exceptions:

- CMAR 19 (RSM designation) – Documentation of the review of supporting schedules/cost breakdowns which include unit prices, labor rates, and burden/fringe rates, etc. when negotiating fixed or lump sum GMP components.

The risk exists that negotiated rates may be overstated and not subject to “true up” to actual costs at the end of the contract. This will also apply to cost reimbursable agreements where labor rates are negotiated that include base salary, indirect costs and fringe benefits in a composite rate.

- CMAR 21 – For pay applications, monthly invoice packages include certified payroll records and supporting general conditions/general requirements invoices as evidence of actual costs incurred. Support reconciles to current billings.

In general, payroll records have not been required to support billings where labor rates have been negotiated. This creates a risk that support for actual labor costs will not reconcile to current billings for cost reimbursable agreements.

- CMAR 22 – Monthly invoice packages include invoices as evidence of actual costs incurred for bonds and insurance.

It has been common at the City to negotiate bond and insurance cost as a percent of construction costs, without requiring invoices as evidence of actual costs.

During RSM’s assessment, detailed documentation of negotiated amounts was not available and general condition/general requirement costs exceeded RSM’s benchmark threshold.

RSM 2020 Report to Internal Audit

For the current effort, RSM was engaged to conduct a follow-up to its 2017 best practices assessment, with a focus on Aviation’s Terminal Lobby Expansion project and the Convention Center Renovation.

Departments did not fully implement or adopt all the best practices provided by RSM in 2017. This resulted in several repeat observations. RSM’s assessment once again indicated low to moderate risk for most categories, with the following exceptions:

- CMAR 11 – Subcontractor bidding process includes owner involvement in the inspection of bid tabs and review of executed subcontracts.

Management and its third-party program manager noted that they attended bid openings but did not participate in the evaluation of proposals or final selection of subcontractors. Leading industry practice for CMAR projects includes an independent evaluation of subcontractor bids. Many Owner contracts specifically require Construction Managers to

provide all sub bids, evaluations, subcontracts, and other subcontract submittals to the Owner and/or its representatives for evaluation.

- CMAR 9 – Treatment of general conditions (GC) and general requirements (GR) costs, including supervisory labor, is explicitly defined in the contract. Preferred method: Cost reimbursable with a not-to-exceed (NTE).
- CMAR 20 – Cost components of the GMP are negotiated in alignment with the terms and conditions of the contract.

Contradictory to contract language, the GMP breakdown and the Contracts Manager for City Procurement indicated that labor and certain other costs will be treated as lump sum for the Convention Center Renovation project.

As noted in 2017 (Attachment A), detailed documentation of negotiated amounts (CMAR 19) was not available and general condition/general requirement costs exceeded RSM's benchmark threshold (CMAR 16). Payroll records have not been required to support billings where labor rates have been negotiated (CMAR 21). RSM recommends that management conduct in-depth evaluations of all non-competitive subcontract costs and require supporting documentation with each pay application for general conditions and requirements costs incurred.

Talson Report to Internal Audit

Talson Solutions was engaged to review the Joint Communications Center and Convention Center projects. (Note: For the Convention Center Renovation project, RSM reviewed specific controls and Talson focused on the GMP differences.)

Internal Audit reviewed the use of the CMAR project delivery method at the City with both consultants. (The consultants' complete results are included as appendices to this report.) While both consultants agree that the CMAR contract delivery method can be effective in decreasing project costs and time, both identified significant risks related to the City's administration of these contracts. Talson's report (included as Appendix B) details several recommendations, the most significant of which are addressed in the remainder of this section and in Section B of this report, pertaining to independent cost estimates and the negotiation of general conditions and general requirements costs.

CMAR-related Findings and Recommendations

While three projects (noted above) using the CMAR approach became problematic, auditors did not determine that the use of CMAR was the cause of budgetary challenges. However, as detailed below, the City needs to follow a more thoughtful approach (i.e., document that state statutes were followed) to its selection of project delivery methods (see E1). Also, regardless of the delivery method chosen, stronger negotiation support and more project management

oversight is warranted (see E2 and E3). Finally, finding E4 summarizes a 2017 RSM recommendation that was not implemented by City departments.

Finding E1

The City has not always documented its compliance with state regulations which require an analysis of alternate construction project delivery methods.

Under State law (N.C.G.S. §143-128), a CMAR can be used only after a public entity has taken certain steps. A municipality must:

- Compare the advantages and disadvantages of using the CMAR method to other delivery methods, and
- Conclude that a CMAR is in the best interest of the project.

The City's Policy for Procurement of Design and Construction Services (effective July 2014) prepared by Engineering and Property Management, now a part of the General Services Department, states that the contracting officer and project manager are required to provide a detailed analysis to justify using a CMAR. The policy requires departments to consider budget and schedule constraints, suitability, and the availability of potential CMARs to ensure adequate competition.

Note: The City did not provide Talson with detailed analyses to justify the use of the CMAR method for the Joint Communications Center and Convention Center renovation projects. General Services noted that the reasons for selecting the CMAR delivery method were documented in the RFQ to select the construction manager. Talson did not believe this met the requirement of preparing a detailed analysis. General Services provided similar documentation for the Bojangles Arena Improvements and two police station projects.

Innovation Barn

The CMAR project delivery method was selected for the Innovation Barn project. The Project Manager did not have a formal, detailed justification statement in accordance with the State statute. Although the size of the project would not indicate the need to use the CMAR delivery method, the desire for an expediated construction schedule and need for coordination with an external agency led the City to choose the CMAR method.

Aviation

In addition to the projects identified by the City Manager for review, auditors examined the use of CMAR for significant airport projects. Aviation provided detailed CMAR justification statements for the Concourse A and Terminal Lobby Expansion projects. Although not required by State law, there was no documented review and acceptance of the justification statement by an independent committee.

Charlotte Water

Charlotte Water provided detailed justification statements (including department head signature) for Design-Build and CMAR projects that met State requirements. Auditors reviewed justification statements for fifteen Design-Build projects (mostly sanitary sewer improvements) and two CMAR projects.

Recommendation E1

To document compliance with state regulations, the City should formally evaluate justifications by a committee prior to making decisions to utilize the CMAR approach. As noted in Recommendation C1 (which addresses Cost Management and Delivery), the committee should be comprised of project team members, legal counsel, finance and other City departments that are independent of project delivery. The City should determine criteria to evaluate the appropriateness of using a CMAR. Criteria should consider project resources, design and construction complexity, budget and schedule.

Management Response

General Services – The justification for the delivery method was discussed and a high-level recap was included in the request for qualification. General Services agrees that a committee shall convene to evaluate the criteria set forth in the North Carolina General Statutes when deciding on an alternative delivery method and document the decision. The committee shall be comprised of the project management team, legal, and procurement; this effort is already underway and was used on the last two projects considered for alternative delivery.

Aviation – We will use the Project Controls Team and Capital Governance Process that has recently been established for the department to evaluate and prioritize all capital projects.

Finding E2

More independent evaluation of subcontractor's bids for trade packages and review of subcontract agreements is needed to help ensure that the City negotiates fair GMP amounts.

In its 2017 assessment, RSM noted that the Airport's East Terminal contract did not include reference to the City's prequalification and subcontractor selection process and did not require departmental involvement or right of refusal regarding the selection of subcontractors. The recommended control includes more owner involvement, with the inspection of bid tabulations and executed subcontracts. The controls are intended to provide visibility into the bidding process to ensure fair and competitive solicitation of subcontractors and to serve as the basis for buyout savings tracking and reconciliation.

Recent CMAR projects experienced subcontractor trade package bids that exceeded initial GMP estimates.

- The Convention Center Renovation bids exceeded the budgeted trade package amounts by over \$29 million. Value engineering and scope reductions subsequently reduced the GMP variance to \$16.5 million (\$114.5M – 98M). While there is consensus among City staff that local market conditions led to reduced competition and increased costs, the audit consultants noted there were variances between estimated costs and subcontractor bids for some trade packages (see charts in finding B4) – which raises the possibility that some estimates were miscalculated. Trade packages that received only one subcontractor bid exceeded the iGMP estimate by 77%, as shown in the table below:

Convention Center Renovation Subcontractor Bid Packages with Only One Bid				
Trade Package	iGMP Estimate	Actual Bid	VE	Final GMP
Demolition	\$1,837,623	\$2,977,300	\$935,628	\$2,041,672
Deep Foundations	268,666	1,053,000	332,000	721,000
Spray Fireproofing	1,420,150	4,479,740	2,259,740	2,220,000
Truss Tensioning	938,143	1,776,000	31,017	1,744,983
Glass/Glazing	3,152,387	4,890,300	600,092	4,290,208
Stucco/Plaster/EIFS	437,928	3,621,349	2,672,349	949,000
Conveying Systems	1,334,751	1,937,000	1,329,329	607,671
Fire Protection	1,158,574	1,738,900	161,104	1,577,796
HVAC	12,896,600	18,825,923	(3,753,495)	22,579,418
Plumbing	2,645,476	4,967,390	4,967,390	-
Total	\$26,090,298	\$46,266,902	\$9,535,154	\$36,731,748

- RSM noted that Aviation did not execute a control to evaluate subcontractor bids that varied significantly from GMP estimates, specifically for trade packages that received a limited number of bids. While market fluctuations may be the contributing factor to increased bids, RSM advises that the owner must hold the CMAR accountable for performing sufficient due diligence to mitigate the risk of overcharge.

Prior to soliciting trade package bids, the projected GMP for the Terminal Lobby Expansion project was \$348.9 million, which was not validated through independent estimate. Subsequently, trade package bids totaled \$367.7 million. Each of the trade packages presented below received only one bid, totaling \$90.6 million compared to budget estimates of \$68.3 million, a 32.6% variance.

Terminal Lobby Expansion		
Trade Bid Packages with Only One Bid		
Trade Package	Estimate	Actual Bid
TLE Exterior Demolition	\$3,631,641	\$2,736,043
TLE Interior Demolition	3,419,682	5,880,910
TLE Airport Millwork	1,325,038	911,083
TLE Architectural Millwork	3,690,294	3,042,473
CEP Architectural Millwork	16,388	8,115
CEP Waterproofing	67,512	210,667
TLE Exterior and Interior Glass	7,083,718	6,715,651
TLE Doors, Frames, and Hardware	908,685	844,688
TLE Painting	1,471,788	1,734,000
CEP Specialties	33,105	25,000
TLE and CEP OH Doors and Loading Dock	1,117,792	356,986
TLE Elevators and Escalators	6,494,362	6,608,430
TLE Plumbing	4,884,870	12,941,523
TLE and CEP Security, Fire Alarm, BAS	11,051,573	20,705,000
CEP Turnkey Utility Route	23,129,096	27,900,701
Total	\$68,325,544	\$90,621,270

While scope changes to the Security, Fire Alarm and Building Automation Systems package explained the large variance for that item, Aviation did not document how the reasonableness of bids with variances was determined.

Recommendation E2

More independent evaluation of subcontractor's bids for trade packages and review of subcontract agreements is needed to help ensure that the City negotiates fair GMP amounts. Consider the following:

- Conducting independent evaluation of subcontractor bids, especially when a limited number of bids is received
- Requiring Construction Managers to provide all subcontractor bids, evaluations, subcontracts, and other subcontract submittals to the Owner to verify that terms match bids
- Interviewing subcontractors that pre-qualified and did not submit bids to verify the reason for non-participation

Management Response

General Services – We will ensure that the CMAR and any independent cost estimators evaluate bids and provide all information including reaching out to subcontractors pre-qualified if they do not bid why they did not.

Aviation – The department evaluates the entirety of the GMP for reasonableness and documents that evaluation. In looking at the packages for each project, the department does inquire about bids that look unreasonable, but it should be noted that the statutory authority for the CMAR delivery method expressly puts the CMR firm in the position of the owner and requires the CMR to prequalify subcontractors and perform the bidding and selection process. Based on our experience, inserting the department into the bidding process opens the door for the CMR to attempt to shift any subsequent risk in the selection or execution of the subcontractor work to the department. This risk can have significant negative implications, as additional cost could be shifted to the City rather than staying with the construction manager.

Charlotte Water – Risk mitigation in some cases is done by contractors by selecting subcontractors that they know can perform the scope on time and do it safely. This can impact pricing but it is one of the reasons why the City is utilizing CMAR.

City Attorney – In the statutory authorization for the use of a CMAR delivery method the CMR assumes the role traditionally played by the City. In this trade off of control for overall coordination and management of a project, the City is intentionally removed from the subcontracting process and relationship. It is the CMR firm that is responsible for the prequalification of subcontractors, selection of the subcontractors, and for holding the subcontracts with the selected bidders. Certainly, in the preparation of the construction budget and GMP, the CMR firm must keep the City informed and advised of subcontract issues. And, for purposes of performing our own construction administration and financial oversight, the City needs to be comfortable with the subcontract recommendations made by the CMR firm. However, we are hesitant to advise that the City take an active role in the subcontracting process, the review of subcontracts, etc., as it has the potential to create a risk that the City will be seen as voluntarily assuming some of the responsibilities and risks that were intentionally shifted to the CMR firm. In some instances, the CMR firm might be able to use the City's actions to avoid or deflect the responsibilities and liabilities that were supposed to be assumed by the CMR firm, or at least argue that the responsibilities and any corresponding liabilities are shared.

Finding E3

The City should allocate additional resources to support its negotiations of general conditions and general requirements (GC/GR).

As noted in RSM's best practice assessment of 2017, the preferred method for treating general conditions (GC) and general requirements (GR) costs is to explicitly define these as cost reimbursable with a not-to-exceed (NTE) limit defined in the CMAR contract. RSM further advises that management should "pre-audit" fixed price/lump sum items by inspecting supporting schedules and cost breakdowns prior to negotiating contract amounts.

By fixing cost categories as a lump sum (without the recommended pre-audit), the Owner increases its risk of paying for costs in excess of those actually incurred by the construction manager.

Projects reviewed by Talson and RSM did not have adequate documentation to support the negotiations related to cost components of GMPs. For example, Talson noted that a labor burden rate of 34.55% was negotiated for the Convention Center Renovation project. Although Talson was provided with a schedule indicating the composition of the 34.55%, the schedule included 13.90% for "project insurance – CCIP rate." (CCIP is Contractor-Controlled Insurance Program.) This insurance was also negotiated as a general conditions cost at a rate of 1.93% of the GMP (total estimate over \$2 million). There was no documentation that the 13.90% or the 1.93% rate was determined to be reasonable.

Recommendation E3

The City should allocate more resources to projects utilizing the Construction Manager at Risk delivery method. This should include:

- a. Support from external consultants to project managers, to improve negotiations.
- b. Construction audits at various stages of significant projects. Auditing can be obtained independently by each department or through joint contracting efforts overseen by General Services.
- c. Specific training for project managers and contract administrators.
- d. Development of a standard set of best practices to be consistently utilized by City departments. The previously issued control matrix from RSM can be used as a baseline in developing standard guidance.

Management Response

- a. General Services will determine whether or not the Cost Estimating and Analysis consultant can help / provide support for negotiations.
- b. General Services agrees there is value in ongoing audits during various phases of construction alternative delivery methods. We would support Internal Audit performing this work if it can be done timely and not impact the project schedule.
- c. General Services agrees there is value in training for alternative delivery methods. Several PMs have already attended Design Build training.
- d. General Services Project Management handbooks will be updated so that all recommendations can be evaluated holistically.

Finding E4

City Departments did not implement a previous consultant recommendation regarding the CMAR contracting approach, which could have prevented project delays and increased costs.

In its 2017 CMAR Assessment Report, RSM noted that it is common industry practice to execute a single CMAR agreement and amend it to incorporate the GMP after preconstruction services are completed. This approach provides transparency into the specific terms and conditions intended to govern the construction phase of the project at the inception of the Owner's relationship with the Construction Manager.

By executing a preconstruction services agreement only, and not exposing the Construction Manager to the terms and conditions intended to govern the construction phase, the Owner increases its risk of disagreement when attempting to negotiate CMAR terms. The impacts of this risk can be exacerbated by the Owner having already utilized the Construction Manager for preconstruction services and having a vested interest in continuing the relationship to avoid negative schedule impacts.

RSM recommended that departments utilize a single, standard CMAR contract (inclusive of both preconstruction and construction services) tailored as needed for project specific conditions. Once a GMP is established, the supporting schedule and total contract value can be incorporated into the document via amendment.

Both Aviation (Terminal Lobby Expansion) and General Services (Convention Center Renovation and JCC) signed preconstruction services agreements with Construction Managers that did not detail the specific terms and conditions that were intended to guide the construction services agreement. Aviation received Council approval for the \$3.5 million Terminal Lobby Expansion preconstruction services contract. The Convention Center Renovation pre-construction services agreement was between the Charlotte Regional Visitors Authority (CRVA) and the Construction Manager.

The Convention Center Renovation project experienced delays in prequalifying subcontractors and obtaining trade bids because of difficulties in negotiating terms and conditions with the City. As a result, the trade bids exceeded the \$98 million initial GMP (iGMP) developed by the Construction Manager in fulfillment of the preconstruction services agreement and approved by City Council. As noted in the Talson report, three months elapsed between the establishment of the iGMP and the initiation of subcontractor bidding, which may have contributed to the lack of bid responses and increased pricing due to local market activity. Trade package differences were nearly \$30 million, as shown in the table in Section B.

General Services needed to subsequently request council approval for the final GMP, resulting in the identification of a budget shortfall. Value engineering was performed and additional sources of funds were identified for the project.

Recommendation E4 (Repeated from 2017 RSM CMAR Assessment Report)

The City should utilize a single, standard CMAR contract (inclusive of both preconstruction and construction services) tailored as needed for project specific conditions. Once a GMP is established, the supporting schedule and total contract value can be incorporated into the document via amendment.

Management Response

Aviation – The department strongly disagrees with this recommendation. Separate agreements are better for a number of reasons:

- i. The preconstruction estimates can be produced by the CM based solely the content of the evolving contract documents independent of a preconceived iGMP contract amount
- ii. iGMP estimates which the combined agreement is based upon are not accurate because the design documents are early in development at the time of selection of the CM
- iii. Selection of an alternate CM if necessary for the construction phase or suspension of work during the preconstruction phase is less complicated with a separate preconstruction agreement
- iv. The terms of the main construction agreement can be presented to the CM during the RFQ process or during the preconstruction phase which seem to be the major point of the recommendation

General Services – If there is a template RFQ and Contract created we will utilize. The City Attorney's office should be involved in the creation.

Water – Standard contract language for CMAR projects is more desirable. A simple, overall contract or master services agreement with task orders issued for the various phases of work is an approach that seems reasonable.

City Attorney – The City Attorney’s Office is always available to advise in drafting RFQ and CMR contract terms for solicitation of preconstruction services contractors, as well as with CMR, if/when a different contractor is selected. We agree that contract terms (for preconstruction services, iGMP, GMP) should be shared upfront whenever possible, recognizing that with CMR construction delivery method, project scope and construction costs are established much later in process, often after preconstruction services begin, such that certain contract terms are necessarily renegotiated as costs and scope evolve and finalized when GMP is confirmed.

Each construction project for each City department is unique. While RSM recommends one single City contract template for CMAR projects, the City Attorney’s Office is not adamantly opposed to the use of separate and even slightly different contracts for preconstruction and construction. Departments benefit from their staff’s familiarity and experience with CMAR, and as individual departments develop their own experience, they gain confidence in that delivery method, and recognize opportunities to incorporate effective and efficient practices. We would also note that when COVID-19 forced departments to evaluate construction project priorities and decide whether to terminate or shelve some projects that could no longer be funded, the termination process was easier for one CMAR project that had a separate preconstruction agreement because that phase was completed and the contract could be closed out. When the time and market conditions are right, the GMP agreement can be negotiated. It will undoubtedly include costs that no one would have anticipated or envisioned if the entire contract had been executed in 2017.

Audit Summary for E4

Audit contractor RSM has recommended the use of a single, standard CMAR contract for preconstruction and construction services. While some City departments have accepted this approach, Aviation disagrees, and plans to continue the use of separate contracts. The City Attorney’s Office will support either approach. Internal Audit believes either approach could work, as long as construction terms are presented and agreed to early in the process.

Conclusion

The City has not consistently used best practices to manage large capital projects. Improvements should be made in the areas of Project Selection, Estimating, Cost Management and Delivery, Performance Reporting, and the Use of the Construction Manager at Risk Project Delivery Method.

Distribution of Report

This report is intended for the use of the City Manager's Office, City Council, and all City departments involved with the City's CIP and construction project management. Following issuance, audit reports are sent to City Council via the Council Memo and subsequently posted to the [Internal Audit website](#).

APPENDIX A

RSM CMAR FOLLOW UP REPORT



June 1, 2020

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Pursuant to our Statement of Work – CMAR Follow Up dated October 14, 2019, RSM is pleased to present the results of our follow up procedures.

Background

In 2016-2017, RSM performed an assessment of the City's planned approach to managing and controlling Construction Manager at Risk (CMAR) – Guaranteed Maximum Price (GMP) agreements. Our work included presentation of a Key Controls Matrix (Appendix A), which outlined various risk and cost mitigation strategies used by leading practice public sector entities for CMAR-GMP projects.

Objective

The objective of our follow up work was to determine if processes and controls executed by City management were in alignment with CMAR leading practices noted in Appendix A.

Scope

The scope of our work included review of documentation and interviews with members of City management responsible for the procurement of construction management firms on the following projects:

- City Aviation Department – Terminal Lobby Expansion
- City General Services Department – Convention Center

Approach

The approach to our work included interviews with management, and review of supporting documentation provided for the following processes:

- Procurement of the Construction Manager
- Contracting with the Construction Manager
- Negotiation of the Guaranteed Maximum Price
- Processing of monthly pay applications (invoices) submitted by the Construction Manager

Results

City Department	Aviation		
Project	Terminal Lobby Expansion		
Key Controls	Effective	Deficient	Not Applicable*
	23	2	4
Deficiency #1		Risk Rating	
CMAR 11 – Subcontractor bidding process includes owner involvement, including inspection of bid tabs and executed subcontracts.		High	
During our procedures we noted only one (1) bid was obtained for 15 subcontracted scopes of work totalling \$90,621,270. Management and their 3 rd party program manager noted that they attended bid openings, but did not participate in the evaluation of proposals or final selection of subcontractors. Leading industry practice for CMAR projects includes an independent evaluation of subcontractor bids. Many Owner contracts specifically require Construction Managers to provide all sub bids, evaluations, subcontracts, and other subcontract submittals to the Owner and / or its representatives for evaluation.			
Deficiency #2		Risk Rating	
CMAR 16 – For projects greater than \$10M, general conditions and requirements costs do not exceed 8% of the total GMP.		High	
During our procedures we noted general conditions and requirements costs were negotiated at approximately 10.06% of the total GMP value, or \$50,329,272. Management obtained a detailed estimate of general conditions and requirements costs, but cited “tense negotiations” as the basis for not providing the CMAR with requests for clarification or reductions to the estimate.			
RSM did not perform a detailed review of estimated general conditions and requirements costs, but noted the CM’s breakdown included indicators of potentially unreasonable or excessive costs such as a labor burden rate of 48%, more than \$55,000 for First Aid, and \$40,000 for Jobsite Wifi.			

* Certain pay application controls are not yet applicable to Terminal Lobby Expansion project.

Results - continued

Overall Assessment
<p>The current total estimated cost of the Terminal Lobby Expansion project is approximately \$478M. Our procedures indicate that more than \$140M (\$90M of subcontractor bids and \$50M of general conditions), or approximately 29% of these estimated costs were not bid competitively, and not subjected to a detailed review for accuracy and reasonableness.</p> <p>While the City implemented the majority of the key controls noted by RSM in Appendix A, the two controls deemed not to have operated effectively increase the potential for unreasonable or excessive costs on the project.</p> <p>To mitigate these risks, we recommend management conduct in-depth evaluations of all non-competitive subcontract costs, and be diligent in requiring supporting documentation within each pay application for general conditions and requirements costs incurred.</p>
Management Response
<p>CMAR 11 – Aviation does not see the value in performing an independent cost estimate (ICE) for a CMR project with a GMP, as the GMP will have most if not all packages bid at that point. If the department was to pursue a project and bring an IGMP forward for City approval an ICE may be appropriate.</p> <p>CMAR 16 – We disagree with this deficiency due to the reasons and justifications listed above. While it is a good “rule of thumb” that general conditions and requirements cost not exceed 8% of the GMP for projects over \$10M, it is just that – “a rule of thumb”. In this particular project, there are a number of factors that pushed the GCs to 10%. These factors include, but are not limited to, a 5 ½ year project duration, work in a challenging environment that requires multiple management teams to oversee work being completed during segments of the work that will run 24/7, and a complex phasing plan for the project to ensure the travelling public and our tenants can move through the facility throughout the duration of the project. The finding states that we did not request clarifications or reductions to the estimate due to “tense negotiations”. The reality is the reason the negotiations were tense at times was because we were pushing back on a number of things, including the GC costs.</p> <p>Further, there are some scopes with higher burden rates for some of the same reasons listed above. The \$55,000 cost for first aid includes traditional first aid supplies as well as water supplied by the CM for all workers on site for the next 5 ½ years, and the jobsite Wi-Fi cost includes high-speed service for the life of the project, which we did see as unreasonable.</p>

Results - continued

City Department	General Services		
Project	Convention Center		
Key Controls	Effective	Deficient	Not Applicable*
	14	10	5
Deficiency #1		Risk Rating	
CMAR 11 – Subcontractor bidding process includes owner involvement, including inspection of bid tabs and executed subcontracts.		High	
During our procedures we noted only one (1) bid was obtained for ten (10) subcontracted scopes of work totaling \$46,266,902. We noted four (4) additional bid package line items appeared to have one (1) subcontractor bid on the bid master. After review of the bid tabs, we noted not all bids received were included on the bid master spreadsheet, resulting in an incomplete record. The Contracts Manager for the Department of General Services noted that they do not participate in the evaluation of proposals of subcontractors. Additionally, we noted one (1) instance where a subcontractor's bid (\$4,333,700) did not tie to the amount recorded in the bid master tabulation (\$1,937,000).			
Deficiency #2		Risk Rating	
CMAR 9 – Treatment of general conditions (GC) and general requirements (GR) costs, including supervisory labor, is explicitly defined in the contract (Preferred Method: Cost reimbursable with a not-to-exceed (NTE))		High	
CMAR 20 – Cost components of the GMP are negotiated in alignment with the terms and conditions of the contract			
During our procedures we noted contract article 6.2.2 and 6.2.3 reference that labor is treated as a reimburseable cost. Contradictory to the contract language, the GMP breakdown and Contracts Manager for City Procurement indicated labor and certain other costs will be treated as lump sum.			

* Four pay application controls are not yet applicable to the project, and one outstanding control request has been outlined on the next page of this report.

Results – continued

Deficiency #3	Risk Rating
<p>CMAR 21 – Assuming cost reimbursable, monthly invoice package includes certified payroll records and supporting GC / GR invoices as evidence of actual costs incurred. Support reconciles to current billings.</p> <p>CMAR 29 – Supporting documentation provided with the pay application aligns with the relevant terms and conditions of the agreement</p>	High
<p>During our procedures we reviewed two (2) preconstruction invoices and four (4) construction pay applications, noting that the Construction Manager provided a lead schedule for labor costs, but no corresponding timesheets, pay stubs or other source documents in support of labor billings. As of pay application #4 dated August 31, 2019, Construction Manager has billed the City for \$1,079,843.88 of labor using this approach.</p>	
Deficiency #4	Risk Rating
<p>CMAR 17 – For projects greater than \$10M, bond standard costs do not exceed 1% of the total GMP.</p> <p>CMAR 18 – For projects greater than \$10M, GL insurance standard costs do not exceed .75% of the total GMP.</p>	Low
<p>During our procedures we noted that bonds and insurances in the GMP estimate for the project totaled approximately 4% of total project cost. As noted in the controls listed above, bonds and insurances typically do not exceed 1.75% of total estimated project cost. As noted in the agreement, bonds and insurances are reimbursable, and billings on the first pay applications submitted by the CM were supported by third party invoices. Management should continue to require support for these reimbursable costs, and track the use of any savings from this line item.</p>	
Deficiency #5	Risk Rating
<p>CMAR 3 – Objective scoring / ranking system (Preferred Method: numeric, multi-criteria scoring)</p> <p>CMAR 5 – Audit trail / documented evaluation process through short listing / oral presentations</p> <p>CMAR 6 – Audit trail / documented evaluation process from oral presentations to selection</p>	Low

Results – continued

During our procedures we noted that there was not a quantitative scoring / ranking system utilized for short listing, oral presentations and selection of the CMAR firm. Per inquiry with management, legal counsel advised a non-quantitative scoring system be used for selection. This advice is contradictory to the quantitative scoring approach taken by Aviation, which RSM supports as a more transparent procurement process.

Outstanding Requests

As of the date of this report, General Services management had not provided evidence to support execution of the following key controls:

CMAR 19 – Detailed, formally documented review of supporting schedules / cost breakdowns which include unit prices, labor rates, burden / fringe rates, etc. prior to negotiating fixed amount

Overall Assessment

The current total estimated cost of the Convention Center project is approximately \$111M. Our procedures indicate that more than \$46M, or approximately 41% of these estimated costs were not bid competitively, or subjected to a detailed review for accuracy and reasonableness. To mitigate these risks, we recommend management conduct in-depth evaluations of all non-competitive costs.

We recommend City management and legal counsel address the disparity in the scoring and evaluation approaches used (quantitative vs non-quantitative). As noted herein, RSM recommends a quantitative approach to mitigate the risk of perceived favoritism or bias.

The outstanding request for CMAR 19 represents a control that mitigates the risk of overcharge for a large portion of the overall project cost. If not already completed, management should obtain and evaluate a detailed general conditions estimate to ensure sufficient competition and reasonableness of pricing.

Currently, labor costs are being invoiced without supporting timesheets or pay stubs, which is further complicated by the conflicting contract and GMP guidance noted in Deficiency #2 above. This increases the risk to the City of being overcharged for CM salaries, which are currently estimated at \$6,558,045 for the project.

Results - continued

Management Response
<p>CMAR 11 – While Procurement is not directly involved in this process apart from reviewing the prequalification criteria and matrix, General Services’ project team is very involved in assessing bid packages, bid openings, and signing off on all first-tier subcontractors. The CMAR followed state law and prequalified all first-tier subcontractors. The CMAR is not required by law to have minimum of three bids to open and subsequently award.</p> <p>CMAR 9 / CMAR 20 – General Services’ Project Management team does complete a detailed review of the General Conditions and the General Requirements. While the costs are estimates, the City pays actuals with appropriate supporting documentation. While certain items may be listed as lump sum, those are estimates and referred to as reimbursable costs in the contract.</p> <p>CMAR 21 / CMAR 29 – A manifest billing is required. While certified payrolls are a best practice when auditing a project, General Services agrees time sheets should be included in the monthly progress billing. The City and CMAR agree to rates attached as an Exhibit to the contract, with those rates included is a level of effort for each person. At the onset of the contract, the rates are reviewed to determine if they are within an acceptable range based on title and years of experience. To satisfy best practices and minimize risk to the City, General Services agrees that the City should either 1) verify the rates in the Exhibit multiplied by the approved burden rate is the actual rate for the CMAR rate or 2) agree to pay the rates in the exhibit of the contract and if Audit finds a difference the CMAR will owe the City the difference if any.</p> <p>CMAR 17 / CMAR 18 - General Service agrees that this is a baseline to start with when assessing the bonds and insurance on a CMAR project. For the Convention Center, we would expect the GL and Bonds to be higher than the baseline as the CMAR utilized CCIP. With CCIP GL and Bonds were wrapped up in one policy for most subcontractors. Subcontractors that did not participate in CCIP would show GL and Bonds as a line item on their respective bids. Insurance is a reimbursable expense and General Services will continue to require supporting documentation of these costs.</p> <p>CMAR 3 / CMAR 5 / CMAR 6 - While RSM has identified quantitative scoring as a best practice, there is no legal requirement to do so. General Services does agree that the City should adopt a consistent practice that is objective. Whether a selection is derived from a quantitative or qualitative analysis, City departments are reaching their respective decisions to select a CMAR by consensus and generally strive to minimize vendor protests or questions by focusing on objective, rather than subjective, selection criteria.</p>

Appendix A

Process	Sub-process		Control ID	Key Control
Procurement	Request for Qualifications (RFQ)		CMAR 1	CMAR experience incorporated into scoring criteria
			CMAR 2	Transparency into terms and conditions of planned CMAR agreement
			CMAR 3	Objective scoring / ranking system (Preferred Method: numeric, multi-criteria scoring)
	Evaluation / Selection		CMAR 4	Selection committee comprised of CMAR experienced personnel and members outside of direct project management team
			CMAR 5	Audit trail / documented evaluation process through short listing / oral presentations
			CMAR 6	Audit trail / documented evaluation process from oral presentations to selection
Contracting	Standard Template		CMAR 7	Use of a standard contract template generally recognized within the construction industry for CMAR, tailored for project specific needs (AIA, Consensus Docs, etc.)
	Key Terms and Conditions	CM Fee	CMAR 8	Explicitly defined in contract (Preferred Method: Calculated as a percentage of the Cost of Work)
		GC & GR	CMAR 9	Treatment of general conditions (GC) and general requirements (GR) costs, including supervisory labor, is explicitly defined in the contract (Preferred Method: Cost reimbursable with a not-to-exceed (NTE))
		Bonds & Ins.	CMAR 10	Treatment of bonds and insurance costs are explicitly defined in the contract (Preferred Method: Cost reimbursable with a not-to-exceed (NTE))
		Bids & Subs	CMAR 11	Subcontractor bidding process is well defined in contract, includes owner involvement, and owner inspection of bid tabs and executed subcontracts

Appendix A

Process	Sub-process		Control ID	Key Control
		Pay Apps	CMAR 12	Invoicing process and required supporting documentation to be provided with each pay application well defined in contract
Contracting	Key Terms and Conditions	Audit	CMAR 13	Right to Audit article explicitly defines types of supporting documentation that may be required, and provides clear indications of what costs are fixed / un-auditable. Management regularly exercises the right to audit as a preventative and / or detective control.
		Buyout, Savings, & Contingency	CMAR 14	Accounting methodology for tracking buyout / savings / contingency is defined in contract (Preferred Method: Adjustments made monthly to individual schedule of values line items for buyout, transferred to contingency, use subject to owner approval)
GMP Negotiation	Fee		CMAR 15	For projects > \$10M – Fee standard < 5%
	GC & GR		CMAR 16	For projects > \$10M – GC/GR standard < 8%
	Bonds		CMAR 17	For projects > \$10M – Bond standard < 1%
	GL Insurance		CMAR 18	For projects > \$10M – GL Insurance standard < .75%
	Fixed / Lump Sum Components		CMAR 19	Detailed, formally documented review of supporting schedules / cost breakdowns which include unit prices, labor rates, burden / fringe rates, etc. prior to negotiating fixed amount
	Contractual Alignment		CMAR 20	Cost components of the GMP are negotiated in alignment with the terms and conditions of the contract
Pay Applications	GC / GR / Labor		CMAR 21	Assuming cost reimbursable (See CMAR 9), monthly invoice package includes certified payroll records and supporting GC / GR invoices as evidence of actual costs incurred. Support reconciles to current billings.
	Bonds & Insurance		CMAR 22	Assuming cost reimbursable (See CMAR 10), monthly invoice package includes invoices as evidence of actual costs incurred. Support reconciles to current billings.

Appendix A

Process	Sub-process	Control ID	Key Control
	Subcontractor Billings	CMAR 23	Subcontractor pay application or invoice required to support current period cost of work billings
Pay Applications	Subcontractor Affidavit	CMAR 24	Subcontractor signed affidavit required to confirm CM payment of subcontractor (through the prior period)
	Subcontractor Lien Release	CMAR 25	For private sector construction, required with each monthly pay application (conditional / unconditional)
	Contingency Use Request / Log	CMAR 26	Contingency transfer requests and log required, and log reconciles to schedule of values
	Buyout Use Request / Log	CMAR 27	Buyout transfer request and log required, and log reconciles to schedule of values and is supported by bid tabulations / executed subcontracts
	Allowance Log	CMAR 28	Allowance log required and reconciles to allowance lines on schedule of values
	Contractual Alignment	CMAR 29	Supporting documentation provided with the pay application aligns with the relevant terms and conditions of the agreement

APPENDIX B

TALSON SOLUTIONS REVIEW OF CMAR IMPLEMENTATION



Review of CMAR Implementation

Joint Communications Center (JCC)
Project

and

Charlotte Convention Center
Phase 1 Renovation Project

MAY 28, 2020

Prepared for:
INTERNAL AUDIT
CITY OF CHARLOTTE, NORTH CAROLINA



Review of CMAR Implementation

Joint Communications Center (JCC)
Project

and

Charlotte Convention Center
Phase 1 Renovation Project

May 28, 2020

Prepared for Internal Audit
City of Charlotte, North Carolina

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EXECUTIVE SUMMARY

Talson Solutions, LLC (Talson) conducted a review of the development activities surrounding the City of Charlotte's (City) Joint Communication Center (JCC) and Convention Center Phase 1 Renovation projects. In particular, Talson focused on the procurement and work activities of the Construction Manager At Risk (CMAR) for each project. Talson's objective was to assess the City's procurement policies and procedures including the oversight of the CMAR for each project.

Talson assessed the CMAR's work activities and costs with respect to pre-construction services, financial obligations, and execution under the contractual agreements. Talson also assessed the services provided by the architectural consultants including compliance with financial obligations under contractual agreements. Additionally, Talson reviewed City Council approval and the appropriateness of various changes in project scope and requests for additional funding. Lastly, Talson compared the City's policies and procedures and use of CMAR agreements against industry best practices.

Talson's review identified the City's lack of standardized practices for the use of the CMAR delivery method and oversight during the pre-construction phase. Contract compliance by the City and CMARs could be improved by training and improved CMAR contract provisions for invoicing and insurance costs. The lack of budget and scope management against the initial basis of design for the JCC project was particularly evident during the pre-construction phase. Although the Initial Guarantee Maximum Price (IGMP) budget was approved for both projects, the selected CMARs were unable to fully predict or estimate the impact on costs from extenuating construction market conditions in the Charlotte regional area.

Each project experienced delays in the CMAR bidding from the approved IGMP authorization that resulted in higher than anticipated pricing or "bidding surprises" from the subcontractor market that were not accounted for in escalation, design growth, and contingency adjustments. Critical construction trades (e.g., HVAC) exceeded costs estimates and/or the CMARs did not receive competitive bids for numerous trades. JCC experienced an increase in costs from the IGMP value of \$637 to \$877 per square foot, or a 38% increase.

Talson recommendations include the following:

- Establish internal "Scope or Change Management" procedures to address material changes to the initial Basis of Design that is used to establish project budgets.
- Revise City's Project Management Handbook
- Enhance staff training including project delivery methods and project/contract oversight
- Standardize reviews for the determination of the CMAR project delivery methods
- Consider use of independent cost estimates to justify CMAR cost estimates
- Develop risk profile for capital project and conduct contract compliance audits on select CMARs
- Review contract provisions for benefits and insurance provisions

BACKGROUND

Construction Manager At Risk (CMAR)

Talson understands that the City of Charlotte (Owner) decided to utilize the CMAR delivery method to ensure that cost estimates and design documents were representative of the approved budget and schedule. Effective implementation of the CMAR helps mitigate construction cost overruns, change orders, and schedule delays. The CMAR achieves this by collaborating with the Owner and the design team through design development and construction documents during the pre-construction phase. The IGMP establishes a target contract price but does not put the CMAR at risk for any cost overruns, design changes, or schedule delays. The CMAR is not at risk until the GMP contract value is approved and the CMAR assumes the project's construction risk. Additionally, the Owner and other project team members should carefully evaluate construction and related design if the CMAR's cost estimates significantly differ from the actual bidding received from subcontractors. However, the cost risk can be reduced through the use of independent cost estimates that can be compared against the cost estimates produced by the CMAR. Differences in cost estimates can be reconciled for potential changes in budget, schedule and design, if needed.

Joint Communications Center (JCC)

In 2014, the City of Charlotte engaged architectural services from Little Diversified Architectural Consulting and pre-construction services from Rodgers Leeper I - a Joint Venture between Rodgers Builders Inc. and RJ Leeper Construction under a CMAR agreement. In 2015, the Project's approved capital budget was \$78 million. The JCC was initially designated for the City's combined 911 operations for police and fire services, CharMeck 311 call center, a data center and the Emergency Operations Center (EOC) for a total square footage of approximately 94,000 as noted in Rodger Leeper's July 2014 schematic cost estimate.

City Council approved an additional \$8.3 million for the project in FY 2017, bringing the total budget to \$86.3 million. As of May 2019, the JCC was a planned 46,600 square foot, two-story building projected to house the City's 911 communications operations for police and fire services with a revised total budget of \$72 million (\$86.3 million less \$14.3 million spent to date). The IGMP within the CMAR was not to exceed \$53.0 million. The construction costs presented by Rodgers Leeper I after subcontractor bidding exceeded the approved budget and contracts were not awarded to trade subcontractors. In August 2019, the City Manager, citing the project's reduced scope and cost exceeding \$100 million, announced that the City could meet its needs by adding space to a planned police or fire station to house the 911 centers.

BACKGROUND

Charlotte Convention Center (CCC) Phase 1 Renovation

The Charlotte Convention Center (CCC) opened in 1995 and is a 550,000-square foot facility owned and maintained by the City of Charlotte. In 2015 the Charlotte Regional Visitors Authority (CRVA) contracted with Jones Lang LaSalle to develop recommendations to make the facility more competitive and marketable.¹ In January 2017, the CRVA awarded a contract to TVS North Carolina for design and cost estimates for the Phase 1 renovations to the CCC. TVS considered nine modifications to the CCC as recommended by Jones Lang LaSalle.

In June 2017, the CRVA entered into a contractual agreement for pre-construction services with Holder-Edison Foard-Leeper (HEFL) as the CMAR. HEFL is a joint venture between Holder Construction, Edison Foard Construction, and RJ Leeper Construction. In September 2017, the City Council appropriated \$110 million from the Convention Center Tax Fund for Phase 1 renovations to expand meeting space, create a pedestrian bridge between the CCC and a nearby hotel and light rail station, and upgrade building/technology systems. Subsequently, HEFL informed the CRVA the approved budget could not support the recommend nine modification.

In November 2018, the City approved an IGMP with HEFL not to exceed \$98.0 million. The approved project budget was increased from \$110 million to \$115 million to include upgrades to the chiller plant. Following the bidding of construction packages, subcontractor negotiations, and value engineering to lower project costs, the project construction cost increased to \$114.5 million. In September 2019, the City Council authorized the City Manager to negotiate and award a construction contract to HEFL with a GMP contract value not to exceed \$114.5 million.

CMAR Projects Reviewed

Project	Client(s)	Start Date (Pre-Con)	Pre-Con Contract Amount	IGMP Approval	IGMP Amount (millions)	City Budget for GMP (millions)	Current Status (October 2019)
Public Safety Communications Building	Fire, Police, 311	April 2014	\$321,591	August 2016	\$53.0	Not Established	Project Terminated – adding space or new fire/policy facility (August 2019)
Convention Center Phase 1 Renovation	Charlotte Regional Visitors Authority	June 2017	\$777,898	November 2018	\$98.0	\$114.5	Waiting on GMP

¹ The Charlotte Regional Visitors Authority (CRVA) is an independent authority established under the Charlotte City Charter that is charged with managing City-owned assets such as the Convention Center.

AUDIT PROCESS

WORK PERFORMED

Review Process

On July 2019, Talson commenced its activities with the City's Internal Audit group with a discussion on the audit process, expectations, and documentation required for the review. Talson's conducted an extensive review of project documentation, and interviewed City and CMAR personnel.

Documentation reviewed related to the CMAR procurement and work activities for the JCC and CCC Phase 1 Renovation projects include, but is not limited to, the following:

- CMAR pre-construction and construction contractual agreements, invoices, and cost studies / estimates
- Architectural / design consultant contractual agreements, reports, invoices, meeting minutes, and design drawings
- Procurement documentation, bid package documents, and select email correspondence regarding subcontractor bids
- City Council actions, presentations, meeting minutes, and notes / memos
- City policies and documents with respect to procurement, capital budgeting, finance, engineering services, and construction management

A complete list of documents reviewed and interviews conducted is included in Appendix A

Talson in conjunction with Internal Audit facilitated six (6) interviews in Charlotte, North Carolina on October 29th and October 30th, 2019 with staff from the City's Department of General Services (Engineering and Property Management); City Attorney's Office; and CMAR representatives for both the JCC and the CCC Phase 1 Renovation projects.

AUDIT OBSERVATIONS

Talson's General Observations identified issues consistent with the review of both the JCC and CCC Phase 1 projects. Additional Observations specific to each project are also detailed below. Talson recommendations (if applicable) follow each Observation.

GENERAL

1. ***Lack of CMAR Justification:*** Talson was unable to confirm if a detailed analysis to justify the use of the CMAR method was performed for the JCC and Convention Center Phase 1 Renovation projects. Under State law (N.C.G.S. §143-128), a CMAR can be used only after a public entity has concluded that a CMAR is appropriate for the project and has compared the advantages and disadvantages of using the CMAR method as opposed to other delivery methods. Furthermore, the City's Procurement Policy for Design and Construction Services states that the contracting officer and project manager are required to provide a detailed analysis to justify using a CMAR including budget/schedule constraints, suitability, and availability of potential CMARs to assess market competitiveness.

Talson, for example, was told by a City contracting official that the CMAR justification was part of the Request for Qualifications (RFQ) for the CCC Phase 1 Renovation project. However, the RFQ, only contained a summary of the project and a brief narrative on the objectives and benefits for using the CMAR delivery method.

Recommendation: The City should implement a formal process to ensure compliance with State law and procurement policy. The City should formally evaluate justifications by a committee prior to making decisions on CMAR. The committee should be comprised of project team members, legal counsel, finance and other City departments that are independent of project delivery. The City should determine criteria (e.g., matrix or scorecard) to evaluate the appropriateness of using a CMAR. Criteria should consider project resources, design and construction complexity, budget, schedule, etc.

Management Response:

The justification for the delivery method was informally discussed and a high-level recap was included in the request for qualification. General Services agrees that a committee shall convene to evaluate the criteria set forth in the North Carolina General Statutes when deciding on an alternative delivery method. The committee shall be comprised of the project management team, legal, and procurement; this effort is already underway and was used on the last two projects considered for alternative delivery.

AUDIT OBSERVATIONS

2. ***Compliance and Responsibilities under CMAR are not Defined:*** The City's project manager's role and responsibilities for implementing the CMAR agreement are not defined. The applicability of the Engineering Services Division Project Management Handbook (Handbook) for project managers with respect to CMAR project delivery is inadequate. The Handbook, which was last updated in 2011, outlines the project manager's roles and responsibilities for construction projects. However, the Handbook does not reference the project manager's responsibilities under a CMAR project delivery.

In discussion with the JCC project manager, Talson noted that the project manager was unaware of the invoicing requirements under the contractual agreement for pre-construction services. The CMAR agreement required services were to be invoiced on a unit rate basis (cost per hour for personnel), but the CMAR invoiced for the four (4) contractual cost estimates on a lump sum basis.

In anticipation of receiving an approved GMP, the CMAR performed pre-construction services for more than three (3) years beyond the contract expiration date of December 2015. The CMAR continued to provided pricing information through February 2019. The architect's contract was awarded in January 2014; however, it was amended in September 2016 and June 2018 to reflect changes in the project's scope.

Recommendations:

- (1) The City should revise the Project Management Handbook in order to clarify the City's project manager's role regarding the CMAR delivery method.
- (2) Talson also recommends the development of an in-house training on management and oversight and the use of the CMAR delivery method. The training should include a review of key financial and business controls such as change management, invoice review, contingency management, subcontract management, reporting, key contract deliverable, and other topics. The training program should provide project management staff with an understanding of the CMAR delivery method as well as other alternative project delivery methods (i.e., design-build) in addition to providing an overview of the City obligations, financial controls, industry practices, contract compliance, and criteria for determining when to use CMAR.
- (3) The City should conduct periodic or interim compliance audits of the project development team including the CMAR during the pre-construction and construction phase. The audits would assist in the early identification of project risks and serve as a preventive measure for non-compliance to financial obligations, funding sources and contract deliverables. Internal Audit should develop the criteria for a capital program risk profile in order to determine the internal or external resources needed to a conduct an effective capital program auditing program. Project delivery methods such as CMAR and

AUDIT OBSERVATIONS

Design-Build are key criteria for consideration. Additionally, Talson recommends a minimum of three audits; (1) Initial, (2) Interim and (3) Pre-close-out during the construction period.

Management Response:

- 1) General Services Project Management handbooks will be updated as part of the Consultant Services related to Construction and Project Management so that all recommendations can be evaluated holistically.
 - 2) General Services agrees there is value in training for alternative delivery methods. Several PMs have already attended Design Build training.
 - 3) General Services agrees there is value in ongoing audits during various phases of construction alternative delivery methods. We would support Internal Audit performing this work if it can be done timely and not impact the project schedule.
3. ***Initial Approved Budgets Not Based on Sufficient Design and Cost Contingencies:*** The initial approved budgets for the JCC and CCC Phase 1 Renovation projects were based on available funding approved by the City Council and without sufficient design progress and cost contingencies leading to increased risk for additional funding. Both projects received additional budget funding upon further design progress and after approval of the IGMP contract values. For example, the Charlotte City Council approved the IGMP for the JCC in August 2016, but bidding exceeded the estimated costs by \$15 million. Additionally, the City Council approved the IGMP for the CCC Phase 1 Renovation in November 2018, but the project costs increased to \$114.5 million.

Recommendations:

- (1) The City should consider formalizing a “Phase” approval and budgeting process that would allow an intermediate approval for a project to move forward prior to full funding. The two primary Phases for consideration are:
 - a. *Pre-Project Development Phase:* Focus on developing initial staffing and consultants for preliminary work and developing an initial project allocation and project delivery method.
 - b. *Project Development Phase:* Focus on various studies, alternative developments and the project design documentation are sufficient for full funding approval. This phase would allow for established minimum contingency amounts (e.g., 25% at the project initiation) assessed against the base design and cost estimate developed during the pre-construction phase. The Project Development Phase process would formally consider any changes in scope to the initial Basis of Design.

AUDIT OBSERVATIONS

- (2) The City should consider obtaining independent cost estimates or secondary estimates to validate the CMAR's IGMP estimate prior to City approval.

Management Response:

- 1) The budgeting of projects is a recommendation from the Budget Office to the City Manager. Budget would need to vet and implement this.
 - 2) General Services agrees there is value added in seeking independent cost estimate (ICE) to validate the CMARs IGMP prior to City approval. General Services will work with Procurement to prepare RFQ to select on-call estimating consultants to be part of the project team for larger projects. We will strive to get the RFQ out by summer 2020. However, even with an ICE, there is not a guarantee that any estimate is a cap on costs but will mitigate risk to the City.
4. ***Extended Delays after IGMP Approval Impacted Subcontractor Pricing:*** The JCC project received subcontractor bids more than eight (8) months after the IGMP was established which may have contributed to the lack of bid responses and increased pricing due to local construction market activity. The IGMP was approved in August 2016, but the bid opening did not occur until April 2017. Subcontractor bids received by the CMAR were significantly higher than the cost estimates and the IGMP. In September 2017, the CMAR's construction cost summary was \$7.4 million (14%) greater than the IGMP estimate of \$53.0 million. Bid packages for certain trades significantly differed from the estimates. For example, bids for sitework were \$2.0 million or 46% above the CMAR's estimate. In addition, 80% of the bid package in the initial opening did not receive the required three (3) bids, and therefore were not opened.

The extended delays also resulted in the CMAR being unable to award bid packages within the established timeframe and had to seek bond extensions at a premium from the low bid subcontractors to hold pricing.

Similarly, the CMAR for the CCC Phase 1 Renovation initiated bidding approximately three (3) months after the IGMP contract authorization. Twenty-two (22) of the fifty-one (51) bid packages were significantly over budget and fourteen (14) bid packages received only one (1) bid or none. Bids for mechanical services were \$5.9 million or 46% above the CMAR's estimate. The City and CVRA worked with HEFL and TVS worked to reduced forecasted project costs. As noted in the detailed observations, design development to complete bid drawings and contract negotiations contributed to the delay in the CMAR's subcontractor procurement.

AUDIT OBSERVATIONS

Recommendation: The City should require the CMAR to obtain subcontractor bids within an agreed upon timeframe following IGMP approval. The design team should support the timeframe with nearly 100% construction documents for the bid process. In addition, the City and CMAR should agree on contract terms and conditions prior to the IGMP approval by City Council.

Management Response:

We agree that the practice of moving from final cost estimate, to contract award, to bid phase should be done as quickly as possible. General Services strives to reduce this time. However, there are circumstances, outside of General Services control, that create a delay. We will evaluate what time is appropriate. In both the JCC and Convention Center projects, for various reasons, it took longer to move through the City's internal approval process, contract negotiations and ultimately Council approval than a typical project.

AUDIT OBSERVATIONS

JOINT COMMUNICATIONS CENTER

5. ***Lack of Scope Management – Leadership Changes:*** Although Rodgers Leeper was generally compliant with its pre-construction services agreement to produce cost estimates/studies, the project experienced changes to project scope in the planning/design phase resulting in significant impacts to cost, budget, procurement and schedule. Significant scope changes included the relocation of the project to front Statesville Avenue and the requirement for building hardening.

Additionally, over the course of the project from the start of the design process in 2010 through 2019, JCC experienced multiple changes in City leadership or clients/stakeholders (i.e., Police Chief, Fire Chief, City Manager, etc.) involved in the design. This contributed to the lack of a formal scope/ design management process to address decision-making that fully considered cost and schedule impacts. The project scope changed from an initial 94,000 square foot building in 2014 to approximately 46,600 square foot in 2018. The project scope continued to change (i.e., square footage reduction) to comply with the available budget amounts and align with the various funding sources approved by the City Council. The following highlights some of the more significant scope changes and related impacts:

- Revised IT specification to support 20 kw per rack in lieu of initial design of 5 kw per rack resulting in additional costs for cooling. Data center was subsequently removed from project scope.
- In 2011, Police and Fire recommended the building be placed in the middle of the parcel of land. In 2014, after the project was 30% designed, the City Manager requested to move the building towards the street similar to most typical buildings in an urban setting.
- At approximately 80% design, the Police and Fire departments recommended the building be “hardened” against a bomb blast. The City Manager agreed to the change.

Recommendation: The City should develop a change management process/procedure to evaluate, approve, manage and coordinate changes to design scope during the CMAR pre-construction phase services. The process should be performed by a Change Control Board comprised of City Departments (e.g., Finance, General Services) and project team to review the change justification and impact of proposed changes to cost, budget, and schedule.

AUDIT OBSERVATIONS

Management Response:

General Services agrees that a change management process is a good process and one is included in the Project Management Handbook. This process will be evaluated as part of the Consultant Services related to Construction and Project Management. A Change Control Board may be advisable for certain dollar threshold or complex projects.

6. **No Consistent Cost Estimating Methodology:** Talson observed that there is a lack of consistency or an established basis in the cost estimating methodology for pre-construction, design contingency, fee and permit allowances at various design phases. The fee percentage varied from 4.0% in the schematic design cost estimate (2014) to 3.5% in the design development cost estimate (2015) and eventually to 3.0% in the 80% document estimate (2015/2016/2018). The permit allowance varied from 0.40% to 0.45% during the estimating period.

Additionally, Talson observed potentially excessive general conditions cost (i.e., construction management staffing) of \$87.37 per square foot that is contained in the revised 2018 design or two-story, 46,640 square feet, as compared to the \$42.02 per square foot contained in the initial 2014 design of the 94,000 square feet building.

Although the design / owner contingency remained a fixed 3.0% contingency at each cost estimate submittal, Talson believes the contingency percentage should be higher at the early design phases and gradually reduce as the design evolves. Talson has observed in the industry at the bid phase, the overall project contingency for the Owner should be a minimum of 10%.

Recommendation:

- (1) Upon CMAR selection, the City should request a cost estimating basis documentation for those items such as the fee that are contained in the cost estimate. The City should review the appropriate level of contingency that is applied at various design phases. For example, the design contingency for the conceptual cost estimate should be no less than 20% in order to account for design uncertainty and lack of definition.
- (2) As significant project scope changes occur, the City should ensure the CMAR's cost estimates for general conditions reflect the corresponding reduction or addition.

Management Response:

- 1) When projects are initially budgeted, General Services recommends 20-25% project budget contingency within the funded amount. This amount is outside any contingency within the initial estimate. As the design progresses, the initial contingency for the owner should remain between 3-5%. The project budget

AUDIT OBSERVATIONS

contingency may be reduced if the project budget is reached. There may be a misunderstanding between Talson's understanding of General Service's contingency calculation and the way General Services actually does it. We will review our practices and document in a template how we generate initial budgets.

- 2) Agree. General Services should use guidelines to confirm the reasonableness of the amount of general conditions proposed by the CMR.

7. ***Incomplete Construction Drawings (CDs):*** Talson observed that the 80% CDs used to support the IGMP (not to exceed \$53.0 million) did not include drawings or specifications for protective measures (e.g., curtain wall blast hardening). The 80% CD's were submitted in June 2016 and included protective design measures costs from February 2016, but the scope was conceptual only. As a result, curtain wall subcontractors were unable to provide reliable bids near the CMAR initial estimate costs. Additionally, this underscores the fact that the IGMP was not an accurate reflection of the project's construction cost.

Recommendation: The City should develop an internal process or require the design team to perform an additional review of CDs for completeness and accuracy prior to executing contractual agreements and releasing of subcontractor bid packages.

Management Response:

General Services agrees. However, sometimes exceptions must be made if General Services is told to do something quickly. The JCC was an exception, once the decision to harden the building was made, the project team was directed to provide a new cost estimate quickly to get the project re-started. The project had been stalled pending costs review and the request was to get the building in construction as quickly as possible. This clearly was not the best practice, but that was the direction given.

8. ***Cost Study Delays and Cost Concerns:*** The CMAR's April 2014 contractual agreement for pre-construction phase services included a schedule of project milestones requiring the CMAR to deliver four (4) construction cost studies: Conceptual, Schematic, Design Development, and Construction Document / GMP on or before October 2015. The CMAR met the first two milestones for the Conceptual and Schematic cost studies but subsequent design changes and cost concerns delayed the Construction Document / GMP cost study until June 2016 on which the IGMP was determined. The CMAR indicated the June 2016 estimate contained several design elements that were conceptual and required final design.

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Recommendation: Same as Observation No. 4.

Management Response:

See response to #4

9. ***CMAR Unable to Negotiate Curtain Wall Bid Package:*** The City advised the CMAR that it could not utilize a design-assist procurement method to award the curtain wall package, which carried specific performance requirements (e.g. testing and thermal requirements). Under a design-assist procurement, subcontractors are selected based on qualifications to assist in the development of design and construction documents. This method can be beneficial for awarding complex and highly specialized trades because potential bidders may be hesitant to spend significant time and resources to prepare bids that meet the performance specifications. As a result of not using a design-assist delivery method, the CMAR was unable to attract bidders for the initial bid opening. The inability to attract bids affected both the project's cost and schedule. Talson, however, learned that the CMAR for the City's NASCAR Hall of Fame project was able to utilize a design-assist procurement method.

Recommendation: The City should evaluate the policy/procedures for attaching qualifications and implement a process to allow for negotiations with specialty trade subcontractors. The City should obtain a list of the most likely bidders prior to developing the IGMP and should establish a timeline to establish the GMP after an IGMP has been established. If unable to obtain a list of competitive bidders and establish a timeline, the City should make Terms and Conditions negotiable.

Management Response:

General Services will evaluate the policy/procedures for the design-assist delivery method to determine if it can be used in the future.

AUDIT OBSERVATIONS

CHARLOTTE CONVENTION CENTER PHASE 1 RENOVATION

10. ***Holder Edison Foard Leeper's Compliance to Pre-construction Services Contract:*** Talson observed that HEFL was compliant with the pre-construction contractual agreement, which stated that all pre-construction services were to be completed by December 31, 2018. Talson reviewed documentation and meeting minutes confirming HEFL's involvement in project design, schedule, subcontractor bids, and value engineering.

No Recommendation

11. ***Delays Due to Negotiation of Terms and Conditions Impacted Subcontractor Bidding:*** Negotiations between the City and HEFL over the IGMP Terms and Conditions (T&Cs) were not finalized until approximately three (3) months after the award of the IGMP. The negotiations involved damages due to delays and other hold harmless provisions. As a result, bid openings were delayed, which exposed the project to adverse fluctuations in subcontractor pricing.

Recommendation: The City should provide the draft contract including the T&Cs and request comments from potential CMAR bidders during the procurement phase or as part of the Request for Qualifications.

Management Response:

As part of issuance of the RFQ, a sample contract was attached for pre-construction services. The AIA133 was referenced in the RFQ as the document to be used for the construction phase, but not attached to the RFQ. General Services agrees both sample contracts need to be attached at the RFQ stage.

12. ***Contractor Controlled Insurance Program Costs and Billings Unclear:*** Talson obtained information on the primary components comprising the burden multiplier but identified a potential overlap with the insurance cost contained in HEFL's Contractor Controlled Insurance Program (CCIP) costs in the CMAR agreement. The CMAR agreement allows for a CCIP reimbursable cost of 1.93% of the IGMP value for a cost of approximately \$1.9 million. However, the burden rate also contains CCIP rate of 13.9% to be applied against eligible HEFL personnel that are also included in the IGMP value.

Additionally, the CMAR agreement (Section 11.7.3 - CCIP Costs) allows HEFL to select which subcontractors are enrolled in the CCIP program. Although there are no trade subcontractors working on the project as indicated on HEFL invoices through August 2019, HEFL has invoiced the City \$459,434 for CCIP costs at a rate of \$84,234 per month plus payment of the total umbrella premium. Talson is unclear on the basis for these CCIP billings on the project and believe there is potential for cost recovery and reduced cost risks.

AUDIT OBSERVATIONS

Recommendations:

- (1) Internal Audit should immediately conduct a review on all HEFL billings in particular, all insurance and personnel charges under the IGMP.
- (2) The City's Contract Manager or Procurement Manager should obtain clarification on the CCIP component contained in the burden multiplier against the overall project CCIP allowable reimbursable costs. It should be noted that the allowable percent of 1.93% for CCIP costs against the GMP value is not subject to audit.

Management Response:

- 1) General Services supports Internal Audit conducting reviews of HEFL's billings.
- 2) After further review the City is able to confirm there is no overlap of the 1.93% charges for the CCIP of the GMP and the 13.9% within the labor burden rate. The 1.93% accounts for insurances such as auto, general liability, and worker's compensation for all enrolled subcontractors and HEFL employees for onsite coverages. Any subcontractors not included in the CCIP will show insurance as a line item on their bid. HEFL billed for CCIP prior to the subcontractors being on site because coverage had to be in place prior to the subcontractors mobilizing.

The 13.9% in the burden rate covers HEFL employees for auto, general liability and worker's compensation for offsite coverages.

APPENDIX A

DOCUMENTS REVIEWED AND INTERVIEWS CONDUCTED

City Policies and Documents

1. Citywide Policy for Procurement of Design and Construction Services, dated July 14, 2014
2. City Pre-qualification Policy for Bidders on Construction Projects, dated October 26, 2015
3. Engineering Services Division Project Management Handbook, dated June 19, 2008, and revised September 27, 2011
4. Financial Policies from FY 2020 Budget Book, dated May 8, 2019
5. Project Accounting Policy, dated July 14, 2014
6. Capital Asset Policy, dated July 14, 2014
7. Strategic Operating Plans (FY 2013 – FY 2018)
8. City Engineer Project Updates, dated June 21, 2018, September 24, 2018, December 17, 2018, and May 2, 2019

Joint Communications Center (JCC)

Architect / Engineer Documents (Little Diversified)

9. Executed Contract for Architectural Services, dated January 13, 2014
10. City Council Request for Council Action (RCA) for Contract Amendment 1, dated August 22, 2016
11. Contract Amendment #1, dated September 28, 2016
12. Contract Amendment #2, dated June 11, 2018
13. Application for Payment (AFP) #21, dated June 2, 2014 and AFP #68, dated November 5, 2018

CMAR Procurement

14. RFQ for CMAR Services, dated December 17, 2013
15. Rodgers Leeper Proposal, dated January 23, 2014
16. Evaluation Committee Memo, dated January 24, 2014
17. Committee Questions and Schedule for Rodgers Builders, Balfour Beatty Construction, and Ajax Building Corporation, dated February 21, 2014
18. City Consolidation Evaluation Matrix, dated February 28, 2014
19. Rodgers Leeper Selection Letter, dated March 31, 2014

Pre-Construction Services Documents

20. Contract for Pre-Construction Services, dated April 14, 2014
21. Application for Payment (AFP) #1, dated October 22, 2014; AFP #2, dated October 16, 2015; and AFP #3, dated May 23, 2018
22. Client meeting minutes between Architect, City, and CMAR, multiple dates
23. Email Correspondence between Architect, City, and CMAR, multiple dates

APPENDIX A

Estimates and Cost Studies

- 24. Conceptual Estimate (Draft), dated April 25, 2014
- 25. Schematic Estimate (Base Building), dated July 10, 2014
- 26. Schematic Estimate (Without Data Center), dated September 11, 2014
- 27. Conceptual Estimate, dated November 21, 2014
- 28. Design Development Estimate, dated January 20, 2015
- 29. Design Development Estimate, dated February 12, 2015
- 30. 80% Construction Documents, dated September 18, 2015
- 31. 80% Construction Documents (Revised), dated June 22, 2016
- 32. Protective Design Mitigation Measures (Revised), dated February 1, 2016
- 33. Conceptual Estimate (Two Story Version), dated August 29, 2018

Construction Documents

- 34. City Council Request for Council Action (RCA) for Rodgers Leeper IGMP, dated August 22, 2016
- 35. Executed IGMP, dated August 26, 2018

Bid Package Documents

- 36. Construction Bid Package Values, dated September 6, 2017
- 37. Construction Packages Estimate vs Low Bid, dated May 3, 2017
- 38. Select email correspondence between Charlotte Project Manager, Rodgers Builders, and Little Diversified regarding status of bid packages and rebid, various dates ranging from April 20, 2017 and October 26, 2017
- 39. Construction Packages Estimate vs Revised Low Bid, dated February 7, 2019

City Council Presentations and Documents

- 40. JCC Power Hour Minutes, dated February 4, 2019
- 41. City Council Questions and Answers from EPM, Fire, Police, and Finance, dated February 4, 2019
- 42. City Council Presentations on Joint Communication Center, dated November 16, 2018 and February 4, 2019
- 43. JCC Power Hour Presentation, dated May 6, 2019
- 44. JCC Progress Report and Contact Note, dated May 31, 2018
- 45. JCC Meeting Notes with Ron Carlee and Department Heads, dated June 21, 2014
- 46. Status Memo on JCC following Design Charrette, dated November 6, 2017
- 47. Project Update Template for City Engineer Agreement to remove EOC, dated November 19, 2018

Convention Center Phase 1 Renovation

Architect / Engineer Documents (TVS)

- 48. Executed Contract, dated November 26, 2018
- 49. Applications for Payment (AFP) and invoices, dates ranging from August 2019 – May 2017

APPENDIX A

Pre-Construction Services Documents

- 50. CRVA and Holder-Edison-Foard-Leeper contract for pre-construction services, dated June 1, 2017
- 51. Application for Payments, dated December 2017 and July 2019
- 52. Value Engineering Meeting Minutes, dated July 17, 2019
- 53. OAC Meeting Minutes, dated October 2, 2019

Estimates and Cost Studies

- 54. Schematic Design Proposal, dated August 22, 2017
- 55. Reconciled Design Development Proposal, dated June 14, 2018
- 56. Project schedule updates, dated September 2017, February 2019, September 2018, and October 2019

Construction Documents

- 57. Executed IGMP, dated November 6, 2018
- 58. City and CRVA Interlocal Agreement, signed April 22, 2019
- 59. Component GMP, dated June 19, 2019
- 60. Applications for Payment, dated May 2019 – August 2019

Bid Package Documents

- 61. Compiled Bid Tabs, dated April 29, 2019 – July 10, 2019
- 62. Advertisement for Bids, dated April 30, 2019
- 63. Subcontractor bid package, undated

City Council Presentations and Documents

- 64. City Council Contract and Budget Approvals, dated January 9, 2017, September 25, 2017, and November 26, 2018
- 65. Charlotte Convention Center Development Study, dated September 12, 2016
- 66. Dinner Meeting Update, dated July 24, 2017 and September 11, 2017
- 67. Convention Center Expansion Update, dated October 22, 2018 and September 23, 2019
- 68. City Council Meeting Minutes, dated September 23, 2019

Interviews Conducted

Six (6) interviews in Charlotte, North Carolina on October 29th and 30th, 2019:

- 1. Maria Miles (Contracts Manager, City of Charlotte) and Lina James (Senior Assistant City Attorney)
- 2. Shaun Haycock (Director, Holder Construction Company)
- 3. Jennifer Trevisol (Senior Vice President, Rodgers Builders)
- 4. Monifa Hendrickson-Woodside, AIA, (Project Manager, City of Charlotte)
- 5. Bruce Miller (Senior Project Manager, City of Charlotte)
- 6. Will Hass (Division Manager, Building Services, City of Charlotte) and John Mrzygod (Assistant Director, Building Services, City of Charlotte)

APPENDIX C

BIG IDEAS

CIP "Big Idea" Summary List for Manager's Cabinet Retreat

Big Idea 1:	Southeast Corridor - Independence	\$ 178,394,000
1.1	Land Acquisition and Street Connections	\$ 25,000,000
1.2	Monroe Road Streetscape	\$ 10,000,000
1.3	Farmers Market	\$ 20,000,000
1.4	Amateur Sports	\$ 50,000,000
1.5	Storm Water Projects	\$ 41,394,000
1.6	Private Development Leverage Fund	\$ 20,000,000
1.7	Idlewild Road/Monroe Road Intersection	\$ 4,000,000
1.8	Sidewalk and Bikeway Improvements	\$ 8,000,000
Big Idea 2:	Research and Innovation Corridor (URP and Applied Innovation Corridor)	\$ 263,500,000
2.1	Research Drive - J.W. Clay Connector over I-85 (North Bridge #1)	\$ 12,000,000
2.2	University Pointe Connection - IBM Drive to Ikea Blvd (South Bridge #2)	\$ 17,000,000
2.3	University Research Park Streetscape (improve streets within URP)	\$ 20,000,000
2.4	University Research Park Greenway Bridge	\$ 3,500,000
2.5	Mallard Creek Road - IBM Drive Connector	\$ 18,200,000
2.6	Brevard Street Extension (30th to 36th Street)/Relocate AC&W Railroad	\$ 20,400,000
2.7	Woodward Avenue & 24th Street Alignment	\$ 2,500,000
2.8	Northeast Corridor Infrastructure (NECI)	\$ 115,000,000
2.9	Private Development Leverage Fund (Includes Energy Accelerator)	\$ 15,000,000
2.10	Water Quality	\$ 3,300,000
2.11	Sugar Creek Road Widening	\$ 36,600,000
Big Idea 3:	Airport Business Zone (Infrastructure in Support of CLT Intermodal)	\$ 108,264,507
3.1	Central Dixie Berryhill Infrastructure (Walker's Ferry to Garrison Road)	\$ 22,416,012
3.2	Steele Creek Road Improvements (widening)	\$ 6,309,736
3.3	Southern Dixie Berryhill Infrastructure (Dixie River Road to Berewick)	\$ 20,358,645
3.4	Northern Dixie Berryhill Infrastructure (Walker's Ferry Road to Old Dowd Road)	\$ 15,631,855
3.5	Garrison Road Extension (Southern Dixie Berryhill II)	\$ 9,248,259
3.6	Arrowood Road/Whitehall Park Drive Connector	\$ 8,000,000
3.7	Brown-Grier Road/Steele Creek Road Intersection	\$ 4,600,000
3.8	Sam Neely Road/Steele Creek Road Intersection	\$ 3,700,000
3.9	Private Development Leverage Fund	\$ 10,000,000
3.10	Sidewalk and Bikeway Improvements	\$ 8,000,000
Big Idea 4:	Pennies For Progress	\$ 1,000,000,000
4.1	Managed Lanes on State Highways (I-77, I-485, US 74)	\$ 700,000,000
4.2	Local Projects Selected by 7 Municipalities	\$ 300,000,000
Big Idea 5:	Charlotte Gateway Station	\$ 43,000,000
5.1	Bus Transfer Station	
5.2	Station Concourse	

CIP "Big Idea" Summary List for Manager's Cabinet Retreat

Big Idea 6:	Access To Jobs	\$ 200,000,000
6.1	Various FTMs and Intersections to create/improve access to Employment Centers	
Big Idea 7:	Infrastructure Safety & Hazard Mitigation	\$ 104,500,000
7.1	Upgrade Aging Underground Storage Tanks	\$ 1,200,000
7.2	Remove Asbestos from City Buildings	\$ 1,300,000
7.3	Upgrade Landfill Gas Control Systems	\$ 1,500,000
7.4	Environmental Assessment/Remedial Support for CIP Projects and Facilities	\$ 3,500,000
7.5	Upgrade Traffic Signal System Coordination	\$ 22,000,000
7.6	Upgrade Traffic Control devices	\$ 26,000,000
7.7	Repair and Replace Bridges	\$ 24,000,000
7.8	Upgrade Railroad Crossings and Signals	\$ 1,000,000
7.9	Implement Pedestrian and Traffic Safety Projects	\$ 10,000,000
7.10	Partner with NCDOT to Improve State Road Projects	\$ 14,000,000
Big Idea 8:	Northeast Corridor Infrastructure (NECI)	\$ 115,000,000
Big Idea 9:	Managed Lanes (I-485 and US 74)	\$ 70,000,000
Big Idea 10:	26-Mile Cross Charlotte Multi-Use Trail	\$ 35,000,000
Big Idea 11:	Streetcar Extension Benefitting Corridor Redevelopment, Multi-modal Transportation, and Sustainability	\$ 200,000,000
Big Idea 12:	Complete Communities	\$ 180,000,000
12.1	Specific geographies and projects to be determined	
Big Idea 13:	Public Safety Facilities	\$ 201,228,570
13.1	Joint Communications Center, 8 Police Division Stations, 6 Fire Stations	\$ 201,228,570
Big Idea 14:	My Charlotte Delivers: Building Services that Meet Expectations	\$ 129,850,420
14.1	Community Service Agency Inventory	\$ 250,000
14.2	On-going Facilities Improvements to assist Community Agencies	\$ 10,000,000
14.3	Sweden Road Maintenance Yard Replacement	\$ 30,000,000
14.4	Northeast Equipment Maintenance Facility	\$ 11,000,000
14.5	Energy Efficiency Upgrades	\$ 3,000,000
14.6	Re-programming office space	\$ 15,000,000
14.7	Stormwater Treatment Structure - CDOT Street Maintenance Southwest District & BSS Heavy Equipment Maintenance Shop, 4600 Sweden Road	\$ 400,000
14.8	Stormwater Treatment Structure – CDOT Street Maint. NE, 6001 General Commerce Dr.	\$ 200,000
14.9	Stormwater Treatment Structure - CMU Zone 4 Field Operations, 4100 W. Tyvola Rd.	\$ 450,000
14.10	Public Safety/Public Service Metropolitan Area Network	\$ 50,000,000
14.11	Rebuild Aging GIS Infrastructure	\$ 600,000
14.12	Citizen Relationship Management System Upgrade (Emerald Replacement)	\$ 8,650,420
14.13	Mobile Application Development Services	\$ 300,000

CIP "Big Idea" Summary List for Manager's Cabinet Retreat

Big Idea 15:	Affordable Housing	\$	81,120,000
15.1	Housing Locational Policy Land Acquisition Program	\$	4,800,000
15.2	Tax Credit Set Aside Program	\$	16,000,000
15.3	Supportive Housing Program	\$	12,000,000
15.4	Incentive-Based Inclusionary Housing Program	\$	16,320,000
15.5	Single-Family Foreclosure Acquisition Program	\$	8,000,000
15.6	Multi-Family Rehabilitation and Acquisition Program	\$	24,000,000
Big Idea 16:	Green Community Partners Fund	\$	16,000,000
Big Idea 17:	100,000 Trees For Charlotte	\$	16,000,000
Big Idea 18:	LED Streetlight Retrofit	\$	24,000,000
		Total Estimated Cost	<u>\$ 2,965,857,497</u>

APPENDIX D

Case Study Projects

Department

Aviation

Project

Concourse A Expansion

Concourse B Renovation

Terminal Lobby Expansion

CATS

Blue Line Extension

Blue Line Capacity Expansion

Charlotte Water

Steele Creek Pump Station and Force Main

Wilmore Drive Sanitary Sewer Improvements

General Services

Back Creek Church

CMPD Westover Station

Convention Center Renovations

Cross Charlotte Trail

Innovation Barn

Joint Communications Center