

Independent Cost Estimate (ICE)

INDEPENDENT COST ESTIMATE SUMMARY FORM

Project Name:	Zero Emission Resilient Fleet
Project Number:	2023-FL-02
Date of Estimate:	6-27-2025
Description of Goods/Services:	Architectural and engineering services for battery electric bus charging equipment and related infrastructure. Services include basic design services from schematic to construction documents; basic construction administration tasks; resident engineer services; assisting with the solicitation of a CMAR contractor; coordinating with a CMAR contractor during design development; and securing permits.

- ☒ New Procurement
☐ Contract Modification (Change Order)
☐ Exercise of Option

Method of Obtaining Estimate:

- ☐ Published Price List (attach source and date)
☐ Historical Pricing (attach copy of documentation from previous PO/Contract)
☐ Comparable Purchases by Other Agencies (attach email correspondence)
☐ Engineering or Technical Estimate (attach)
☐ Independent Third-Party Estimate (attach)
☒ Other (specify) **typical market value of A&E contracts in relation to capital costs** _____ attach documentation
☐ Pre-established pricing resulting from competition (Contract Modification only)

Attach additional documentation such as previous pricing, documentation, emails, internet screen shots, estimates on letterhead, etc.

Summary of Method: The starting point for this estimate is the total estimated cost of construction for Battery Electric Bus (BEB) charging infrastructure from the RTA's 2023 Low No Grant application to the Federal Transit Administration. The total cost of construction is estimated to be \$37,361,907. Basic architectural and engineering (A&E) services for commercial or infrastructure projects are typically estimated as a

percentage of construction cost. Two resources—one from the City/County of San Francisco and a second from the Riverside County (CA) Transportation Department—provide a range of A&E costs as a percentage of total project cost. The former cited a standard range of 7-15% of capital costs, while the latter cited a range of 8-12%. While California typically sees construction costs that are higher than other areas of the country, there is no indication that A&E costs as a relative percentage of capital costs are exceptional in California markets. We therefore saw these figures as credible ranges.

Given the \$37.4 MM estimated cost of RTA's 2023 Low No infrastructure project, the above percentages would yield total A&E costs ranging from \$2,615,333 on the low end and \$5,604,286 on the high end, with an average figure of \$3,923,000. Given the fact that A&E services for BEB infrastructure are unique and an emerging market (as opposed to standard roadway engineering work, for instance), we used the 70th percentile of this range rather than the average as an estimate for basic A&E services. This premium—using the 70th percentile rather than the average—accounts for the unique nature of this work. The 70th percentile of this range yields an estimate of \$4,595,515 for basic A&E services.

However, the A&E scope for this project includes other design services that are not typically captured in a base A&E fee and scope. These additional services are:

- Assisting in the solicitation of a Construction Manager at Risk (CMAR)
- Collaborating with the chosen CMAR during the design process to arrive at a Guaranteed Maximum Price
- Securing permits from all permitting authorities
- Testing and commissioning of the newly installed infrastructure
- Resident engineer services during the construction phase

Using an estimated number of hours for each of these tasks and an hourly billable rate of \$200 per hour for these services (see attached table for a detailed breakdown and attached resources as backup), we calculated these additional services to come to \$294,400.

Adding these additional services to the basic services estimate of \$4,595,515 yields a total estimate of \$4,889,915, which we rounded up to \$4,900,000.

Through the method(s) stated above, it has been determined the estimated total cost of the goods/services is \$4,900,000

The preceding independent cost estimate was prepared by:

Rafe Rabalais, Director of Capital Projects

Name

A handwritten signature in black ink, appearing to read 'Rafe Rabalais', written over a horizontal line.

Signature

New Orleans Regional Transit Authority- Full Project Scope
FTA Low or No Emission Vehicle Program (Low-No) Program
FY 2023

USE OF FUNDS									
PROJECT BUDGET					LOW-NO BUDGET				
Item Description	Partner	Qty	Unit Cost plus Tax	Project Total	Federal Low-No Amount Requested	Local Low-No Match Amount	Total Cost		
Buses									
Buses	State Contract	20	\$ 1,560,854	\$ 31,217,086	\$ 26,534,523	\$ 4,682,563	\$ 31,217,086		
Pre/Post Buy America Audit	Jacobs/CTE	1	\$ 50,000	\$ 50,000	\$ 42,500	\$ 7,500	\$ 50,000		
QMS/QA Periodic Inspection	Jacobs/CTE	1	\$ 16,000	\$ 16,000	\$ 13,600	\$ 2,400	\$ 16,000		
<i>Insert new items above this line</i>									
Bus Subtotal				\$ 31,283,086	\$ 26,590,623	\$ 4,692,463	\$ 31,283,086		
Facilities									
Depot Charger - 180 KW Charging Cabinet	Heliox	7	\$ 78,695	\$ 550,865	\$ 495,779	\$ 55,087	\$ 550,865		
Dispenser Cabinet Pantograph	Heliox	20	\$ 24,500	\$ 490,000	\$ 441,000	\$ 49,000	\$ 490,000		
Depot Pantograph	Heliox	20	\$ 25,840	\$ 516,800	\$ 465,120	\$ 51,680	\$ 516,800		
Depot Charger - Service Level Agreement	Heliox	12	\$ 155,770	\$ 1,869,240	\$ 1,682,316	\$ 186,924	\$ 1,869,240		
En-Route Charger - 450 kW Charging Cabinet	Heliox	2	\$ 322,300	\$ 644,600	\$ 580,140	\$ 64,460	\$ 644,600		
En-Route Charger Mast	Heliox	2	\$ 127,665	\$ 255,330	\$ 229,797	\$ 25,533	\$ 255,330		
En-Route Pantograph	Heliox	2	\$ 60,925	\$ 121,850	\$ 109,665	\$ 12,185	\$ 121,850		
Dispenser Cabinet Pantograph	Heliox	2	\$ 24,500	\$ 49,000	\$ 44,100	\$ 4,900	\$ 49,000		
En-Route Charger Service Level Agreement	Heliox	12	\$ 107,080	\$ 1,284,960	\$ 1,156,464	\$ 128,496	\$ 1,284,960		
Smart Charging Management System Set-up Fees	Jacobs	1	\$ 34,302	\$ 34,302	\$ 30,872	\$ 3,430	\$ 34,302		
Smart Charging System (Per Charger # of Additional Years)	Jacobs	12	\$ 18,480	\$ 221,760	\$ 199,584	\$ 22,176	\$ 221,760		
Yard View (One for Depot)	Jacobs	12	\$ 10,800	\$ 129,600	\$ 116,640	\$ 12,960	\$ 129,600		
Smart Charging System (Per Bus # of Additional Years)	Jacobs	12	\$ 32,800	\$ 393,600	\$ 354,240	\$ 39,360	\$ 393,600		
Design, Construction, etc	Jacobs	1	\$ 7,927,691	\$ 7,927,691	\$ 7,134,922	\$ 792,769	\$ 7,927,691		
Microgrid	Jacobs	1	\$ 30,800,000	\$ 30,800,000	\$ 27,720,000	\$ 3,080,000	\$ 30,800,000		
<i>Insert new items above this line</i>									
Facilities Subtotal				\$ 45,289,598	\$ 40,760,638	\$ 4,528,960	\$ 45,289,598		
Workforce Development									
Bus OEM Operator, Maintenance, First Responder Training	State Contract	1	\$ 250,000	\$ 250,000	\$ 200,000	\$ 50,000	\$ 250,000		
Infrastructure Training	Heliox	1	\$ 250,000	\$ 250,000	\$ 200,000	\$ 50,000	\$ 250,000		
PPE, Tools, and Equipment	State Contract	1	\$ 250,000	\$ 250,000	\$ 200,000	\$ 50,000	\$ 250,000		
Training Aids, Simulators, Components, Equipment	State Contract	1	\$ 250,000	\$ 250,000	\$ 200,000	\$ 50,000	\$ 250,000		
Workforce Development Assessment	Agency	1	\$ 3,500,000	\$ 3,500,000	\$ 2,800,000	\$ 700,000	\$ 3,500,000		
<i>Insert new items above this line</i>									
Workforce Development Subtotal				\$ 4,500,000	\$ 3,600,000	\$ 900,000	\$ 4,500,000		
Professional Services									
Project Management and Technical Support	Jacobs/CTE	1	\$ 610,000	\$ 610,000	\$ 488,000	\$ 122,000	\$ 610,000		
<i>Insert new items above this line</i>									
Professional Services Subtotal				\$ 610,000	\$ 488,000	\$ 122,000	\$ 610,000		
Project Total				\$ 81,682,684	\$ 71,439,261	\$ 10,243,423	\$ 81,682,684		

not
cost less
design
not included
at
\$37,361,907

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Board of Supervisors

6. Capital Project Design Costs

- The Department of Public Works incurs increased construction costs for project design errors and omissions. Design errors and omissions, a preventable occurrence, accounted for \$2.1 million in increased construction contract costs for 49 construction contracts completed in 2004 and 2005, or approximately 2.9 percent of total construction costs of \$72.5 million.
- Despite the impact of design errors and omissions on construction costs, the Department does not measure the impact. Although the Bureau of Engineering previously had a performance goal to limit construction contract cost increases due to design errors and omissions to 3 percent, the Bureau does not currently measure such increases. The Budget Analyst found that more than 22 percent of contracts exceeded this goal. Eleven of the 49 construction contracts, or 22.4 percent, had cost increases of 3 percent or more due to design errors and omissions.
- The Department's Bureaus of Architecture and Engineering have project design quality assurance and control programs, but the Bureau of Engineering has not fully implemented their program. Further, the Department formed a task force to assess capital project quality assurance procedures but has not moved forward in evaluating or implementing the task force recommendations for the Department as a whole.
- Several common occurrences have contributed to the increased construction costs resulting from design errors and omissions. Projects designed by consultants can incur high costs. For example, the recently completed Juvenile Hall construction project, designed by a consultant, is expected to incur \$9.3 million in additional costs due to design problems, equal to 18 percent of the \$51.7 million construction contract. Although the Department intends to pursue a claim for professional liability against the architectural and engineering design contractor, in many contracts the City and not the consultant pays the increased costs
- The Department also needs to better coordinate with the Department of Building Inspection to ensure sign-off of construction projects and prevent delays.
- The Department needs to look at the costs of increasing site visits by the project designer and site testing during the design phase compared to the costs of contract change orders due to unforeseen site conditions to ensure that project designs are cost-effective.

Management of Capital Projects

The Department of Public Works manages most of the City's General Fund capital projects. The Charter authorizes the City's enterprise departments – the Port, the Airport, the Public Utilities Commission, and the Municipal Transportation Agency – and the Recreation and Park Department to manage their own capital projects. The Department of Public Works manages the capital projects of the remaining departments, including street and other projects under the jurisdiction of the Department of Public Works, and provides engineering, architectural, and construction management services to the enterprise as well as the General Fund departments.

The Department of Public Works' engineers and architects serve as project managers for capital projects. The project designer serves as project manager for single discipline projects, such as electrical or structural engineering projects. The Department has also formed a project management group, which assigns engineers and architects as project managers for a limited tenure.

Management of the Capital Project Design Process

The planning and design of projects is the key stage in determining the scope and costs of the capital project. The project designer drafts the construction specification documents that form the basis of the construction bid. The Department prepares construction cost estimates in-house or hires consultants specializing in construction contract estimation, depending on the type of project.

Client departments participate in planning most capital projects. The Department of Public Works' role is to support the planning process and execute the project plan. The Department's engineering and architecture staff design most of the Department's projects, although the Department will hire design consultants to design complex or specialized projects, such as health care or corrections facilities. The project design is the basis of the construction documents and construction cost estimates.

According to interviews with the Department of Public Works' engineers and architects, the capital project design is intended to meet Americans with Disabilities Act and building code requirements and industry standards. The designer needs to balance the client's project plans, code requirements and other standards, and cost restraints. The goal is to achieve a project design that balances design requirements and reduces the need for change orders during the construction phase of the project.

The Bureaus of Engineering and Architecture are responsible for the Department of Public Work's capital project design. Although project design can be complex and varies significantly by the type of project, design efficiency can be measured in part by the cost of the design compared to total construction costs, and the number of construction contract change orders attributed to design errors and omissions.

Capital Project Design Costs

Generally, the Bureaus of Architecture and Engineering senior architects and engineers are responsible for meeting with clients, developing the scope of work, and assigning design work to staff within their sections. The Bureau of Architecture has a pool of consultants to assign design work in addition to the Department of Public Works' architecture staff. The Department also contracts with outside consultants to design complex or specialized projects.

The Department of Public Works encounters specific issues when managing design costs as a portion of overall project costs. As a public agency, the Department lacks the budget constraints of a private firm that must absorb excess labor costs. The Department must pay for all labor hours charged to a project. Conversely, the Department cannot offer pay incentives or retain funds for delivering the project at lower than budgeted costs. The Department also encounters higher design costs due to the higher regulatory and design standards for many public projects.

The Department must balance the need to cost-efficiently design projects while ensuring design thoroughness to avoid later construction change order costs for design errors and omissions.

The Department of Public Works' engineers and architectures expect design costs to make up approximately 7 percent to 15 percent of a project's costs, as a general rule. Design costs constitute a larger percentage of small projects. Specific types of projects, such as curb ramp construction, have a higher percentage of design costs due to the special issues encountered in designing the curb ramp, such as the location of utilities and street lights, basements, and other structures.

Benchmarking Design Costs

Seven California agencies, including the San Francisco Department of Public Works, have been participating in an ongoing capital improvement program benchmarking study. The *California Multi-Agency CIP Benchmarking Study – Update 2005* found that, for projects completed between January 1, 1999, and January 1, 2005, the project delivery costs as a percentage of total construction costs increased over time. The *Study* considered that the increased project delivery costs resulted from improved data collection, which identified project delivery costs more accurately, greater community involvement and coordination, and more stringent regulatory requirements.

When compared to the *Study's* benchmarks, the Department of Public Works project planning and design costs as a percentage of total construction costs are not high.

Table 6.1

The Department of Public Works' Capital Project Planning and Design Costs as a Percentage of Total Construction Costs for Capital Projects Completed in 2005

Department of Public Works	
Average Costs for Department of Public Works Projects Completed in 2005	
Average Planning and Design Costs	
Average Total Construction Costs	
Planning and Design as Percent of Total Construction Costs	
<u>Sewer Projects</u>	
Sewer Projects Less than \$500,000	
	\$83,143
	\$451,788

Source:

Riverside County (CA)
Transportation Dept.

Estimating Guides

Contents

- Introduction
 - Estimate Stages
 - Conceptual & Planning Estimates
 - Preliminary Estimate
 - Engineers Estimate
 - Caltrans
- Attachments
 - Engineer Estimate Guide
 - Preliminary Estimate Template *(MS Excel)*
 - Engineer Estimate Template *(MS Excel)*
 - Engineer Estimate Template (Segmented) *(MS Excel)*

Introduction

The philosophy of project cost estimating is to produce the best cost estimates reflective of the project risks using the most accurate and complete project and pricing information available at the time the estimate is prepared.

It is difficult to generate cost estimates for transportation projects that remain accurate throughout the entire project life cycle, particularly when comparing early conceptual estimates to the actual final cost of the completed project. Project cost estimates, in a way, are never really completed; they essentially are continually being updated to keep them current. However, developing quality estimates that can be relied on is important for many reasons:

- RCTD's programming and budgeting depends on reasonable project estimates.
- The Transportation Improvement Program has limited funding and budgets all available dollars. Overruns on one project forces something else to be unfunded. Underruns leaves funding in the bank thereby neglecting potential important improvements.
- County budgeting affects local and regional planning.
- Budget estimates are widely circulated to the Board, media and public.
- Poor estimates can cause a loss of credibility

Applying consistent formatting and standardized processes to each estimate enhances the efficiency, accuracy, reliability, and credibility of cost estimates. It also improves the ability to review and compare estimates at different stages of the project life cycle. In the current economic climate of greater-than-ever strains on public funds, the pressure to accurately estimate the ultimate cost of a project is increasing. An accurate and complete cost estimate goes a long way toward supporting the successful delivery of a project within its approved budget.

In summary, good engineering estimates are important. Take the time to do a quality estimate, consistent with the need, and everyone benefits.

determine the need for mitigation. Estimates for the cost of preparing environmental documentation can be developed when a project has been field reviewed and it has been determined what type of environmental document is necessary and what special studies will be needed.

Design costs are calculated in various ways. Sometimes design budgets are created as a percentage of construction. Sometimes they are prepared by determining the number of plan sheets and assigning a cost per sheet. Sometimes a detailed list of tasks is prepared along with the man-hours required and an associated cost per man-hour applied. Using a percentage of construction is obviously easier than creating a list of tasks, however, when time permits it is recommend that costs be determined using the task/man-hour method. This is also consistent with the requirement of consultants submitting cost proposals in response to RCTD's Requests for Proposals.

Typical ranges for design costs as a percentage of construction.

- Total engineering: 8% to 12% of total construction cost
- Preliminary design: 1% to 3% of total construction cost
- Grading: 5% to 8% of estimated grade construction cost
- Paving: 4% to 7% of estimated paving construction cost
- Structures: 6% to 9% of estimated structural construction cost
- Geotechnical: can be a further 0.5% to 1.25% of total construction

Engineer's Estimates

The Project Engineer's Estimate of Cost serves two primary purposes:

- It estimates the fair and reasonable price RCTD should expect to pay for each of the items of work to be performed.
- It provides the ability to validate the adequacy of available funding.

There are two methods commonly used for estimating prices to be used in Engineer's Estimates. One method is to use previous bid prices as a basis for

Consulting Products & Services

2021 IEEE-USA Consultants Fee Survey Report – Median Billable Rates Up, Covid Affecting Short- and Long-Term Business

By Paul Lief Rosengren

🕒 19 October 2021 💬 0 🔥 5,772 📖 3 minutes read



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IEEE-USA Consultants Fee Survey
Report – 2021 Edition
MORE INFO

IEEE-USA has released its **2021 Consultants Fee Survey**, focusing on the compensation of consultants, as well as on the impact of COVID-19 on members who earn at least half of their income from engineering consulting. Starting in 1998, this survey has been conducted every other year — through 2008; and annually, starting in 2009.

Despite COVID-19, there was a rise in the amount that respondents to the survey were billing as consultants. ~~The~~ average consultant billing was \$170 per hour, up \$20 over the previous survey. This rate was consistent, regardless of years of experience — except for those with less than 15 years of experience, whose median hourly rate was \$158 an hour. The share of respondents with hourly rates at, or above, \$200 per hour increased to 36.4%, up from 32.1% in 2020.

Educational differences in billing rates were consistent with the 2020 survey. Having a Ph.D. translated into a \$45 higher median billing rate (\$215 an hour), with 17.5% of respondents holding a Ph.D., or its equivalent. There is virtually no difference in hourly rate between those with a

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CPI Inflation Calculator

CPI Inflation Calculator

in year1 month May ▼ year1 year 2021 ▼

has the same buying power as

in year2 month May ▼ year2 year 2025 ▼

adjusted for inflation
to \$203/hr.

About the CPI Inflation Calculator

The CPI inflation calculator uses the [Consumer Price Index](#) for All Urban Consumers (CPI-U) U.S. city average series for all items, not seasonally adjusted. [This data](#) represents changes in the prices of all goods and services purchased for consumption by urban households.

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2023 Low No - Budget Breakdown

6/27/2025

Total Facilities cost	\$	45,289,598
Less budget allocation for design/engineering	\$	7,927,691
Total Facilities hard cost	\$	37,361,907

Typical A&E percentage for large infrastructure projects		7 - 15%	Source
Base cost low (7%)	\$	2,615,333.49	City/County of SF
Base cost high (15%)	\$	5,604,286.05	City/County of SF
Alternative base cost low (8%)	\$	2,988,952.56	Riverside County Transportation Dept
Alternative base cost high (12%)	\$	4,483,428.84	Riverside County Transportation Dept

Additional Services	Estimated Hours	Hourly Rate	Total Cost	Notes
CMAR Solicitation	240	\$200	\$48,000	Assumes six weeks of work for 1 FTE (3 weeks for 2 FTEs) for organizing and participating in industry days, drafting CMAR solicitation, coordinating with client and Procurement to make edits, finalize solicitation, and respond to technical questions
CMAR collaboration	312	\$200	\$62,400	Assumes a 39 week design period in collaboration with CMAR contractor, 8 hour per week commitment (1 FTE) to coordinate with CMAR, make design changes, formulate and review proposed VE changes
Permitting	160	\$200	\$32,000	Includes submissions to permitting agencies, responding to permit reviews, adjusting design docs accordingly, and following up with permitting authorities. Four weeks of work with 1 FTE commitment
Commissioning	240	\$200	\$48,000	Assumes six weeks of work for 1 FTE (3 weeks for 2 FTEs) for commissioning of Battery Electric Bus charging equipment, charge management system, and equipment interface
Resident Engineering	520	\$200	\$104,000	Assumes two hour per day commitment of 1 FTE for resident engineering services over the course of a 52 week construction period
TOTAL			\$294,400	

Average range of basic A&E services	\$	3,923,000.24
70% percentile of range of basic A&E services	\$	4,595,514.56
plus additional services	\$	4,889,914.56

Sources:

https://trans.rctlma.org/sites/g/files/aldnop401/files/migrated/Portals-7/documents-Assets/Documents-Appendix_G.pdf

<https://sfbos.org/6-capital-project-design-costs#:~:text=The%20Department%20of%20Public%20Works%20engineers%20and%20architectures%20expect%20design,%2C%20basements%2C%20and%20other%20structures.>