



# City of La Quinta

## MEMORANDUM

TO: Honorable Mayor and Members of the City Council

FROM: Timothy R. Jonasson, P.E., Public Works Director/City Engineer

DATE: September 16, 2014

SUBJECT: CONSTRUCTION COST ESTIMATING FOR CIP PROJECTS

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In an effort toward continuous improvement of the City's Capital Improvement Program (CIP), staff has reviewed 40 pre-bid construction cost estimates (or engineer's estimates) over the past five fiscal years to gauge their accuracy and how they relate to the overall budget for the project (Attachment 1). While reviewing these projects, it is important to realize that the goal of estimating construction costs at the various stages of a CIP project is to keep the project costs within the adopted project budget. While important for determining probable costs when a project is advertised for bids, the engineer's estimate is only one of several construction cost estimates that are made during the life of a CIP project.

### **Life of a CIP Project**

The delivery of capital projects consists of four major components, which include:

- 1) Developing the project budget
- 2) Designing the project
- 3) Awarding the project
- 4) Accepting the project

### **Capital Improvement Program Budgeting**

The project budget begins with development of a scope of work. This scope of work is often defined by either client departments or outside consultants who may have performed a study for the City. When developing the scope of work, staff considers such things as the need for additional right-of-way, the level and type of environmental work required, impacts to existing utilities, and the funding being used (e.g., local, federal, state).

Soft costs for design and administration of the project are applied once the scope of work is developed and the cost of construction is estimated for the first time. Soft costs are typically based on historic averages and include: engineering/design

(10% of the estimated construction cost); project management costs (7.75% of the estimated construction cost); right-of-way costs, including utility relocations (best estimate based on type of project and complexity); inspection, testing and survey (9.75% of the estimated construction cost); City administration (5% of the estimated construction cost if permitted by the funding source); and contingency (typically 10% of the total of all budget items).

### Design Phase

The design phase is initiated with the development of a Request for Proposals for engineering, architectural or other design services. The scope of work is refined during this step and the project plans, construction details, and project specifications are prepared along with an estimate of probable construction costs or engineer's estimate. The engineer's estimate is revised at the 65%, 85%, and 100% plan completion submittals. Public Works staff and NAI (the City's CIP project management consultant) review these estimates for accuracy based on similar CIP projects and industry averages. Due to anti-collusion laws, staff and City consultants are not normally allowed to contact potential bidders to verify prices directly for publicly bid projects. If the City has not recently constructed a similar project, the consultant's estimate may be difficult to verify in which case a higher contingency is often used. Once the plans, specifications and engineer's estimate are complete, the project is advertised for construction bids.

### Project Award

Once bids are received and the lowest bidder is identified, staff reviews the low bid to ensure the contractor meets the minimum required qualifications for the project, including the appropriate contractor's license and adequate experience on similar projects. A bid comparison summary is prepared to evaluate the bids against the engineer's estimate checking for errors, pricing irregularities, and compliance with the bid instructions.

Contractor bids may or may not align with the unit prices in the engineer's estimate since contractor prices are often affected by economic factors such as the price of oil, cement, lumber, etc. While these factors are taken into account by the design engineer, there is normally at least 60 days between when the estimate is prepared and when bids are opened during which prices can be affected. The number of bids received for a project may also affect price, as greater competition enhances chances for a lower project price. Up to this point, the cost of construction is a theoretical estimate based on the engineer's knowledge of the project as well as the bidding climate. However, once the project is awarded, the cost of construction is known since a contractor is now obligated to construct the project for the bid amount.

### Project Acceptance

A project close-out report is prepared after a project is determined to be substantially complete. The close-out report considers any contract change orders issued for unanticipated additional work not included in the plans and specifications and/or for

adjustments necessary to reconcile bid quantities from what was actually installed by the contractor. Since the engineer must estimate quantities of work (such as square feet of asphalt, cubic yards of backfill, etc.) before the project is bid, it is unlikely that the exact same amounts will be used in the field. End-of-project quantity adjustments reconcile this difference before the final project cost is determined and the project is recommended for acceptance to the City Council.

#### How Close Have the Engineer's Estimates Been?

Based on staff's five-year analysis, the engineer's estimates made at the time projects were bid have been within 10% of the low bid 88% of the time with the average lowest bid being 13% below the engineer's estimate. Generally, the engineer is providing an estimate that is somewhat conservative without unnecessarily tying up more of the City's capital for projects than is necessary. The better measure of the overall CIP budgeting process is that 82% of the projects did not require an appropriation. The ones that did were usually due to unanticipated utility costs, changes in the project scope, or disqualification of the low bid where there wasn't enough time to rebid the project. Some of these items should have been identified by the engineer during design and some could not. The City has been able to recoup a portion of these appropriations in cases where the designer was at fault.

#### How Could the Process Be Improved?

Despite the best of planning, unforeseen circumstances will arise that may cause a project to go over budget. To help ensure this occurs less frequently in the future, staff offers the following suggestions:

- 1) Institute a 20% overall contingency (instead of 10%) at the Capital Improvement Program scoping/budgeting stage given all of the unknowns at that stage of the project.
- 2) Begin the CIP scoping process earlier in the budget preparation cycle in order to allow engineering staff sufficient time to better examine project proposals from departments.
- 3) Institute minimum amounts for project design (\$25,000) and contingency (\$10,000) since small projects (less than \$100,000) tend to have higher than normal soft costs than larger projects do on a percentage basis.
- 4) Institute a 20% construction contingency (instead of 10%) for specialty projects such as heating ventilation and air conditioner projects, and projects on school properties.
- 5) Include a specific line item for utilities in all cost estimates rather than lump the cost in with construction where it tends to get overlooked.

Attachment:            1. Pre-Bid Construction Cost Estimates Analysis



**ATTACHMENT 1**

| Project No.   | Project Description   | Engineer's Estimate (EE) | Lowest Bid Including Preurchased Equipment | % Difference | Higher or Lower than EE | <10% above EE | Additional Funds Required at Award | No. Of Bids | Addition Funds Required at Acceptance | Notes   |
|---------------|---|--------------------------|--|--------------|-------------------------|---------------|------------------------------------|-------------|---------------------------------------|---|
| 1997-02/03    | Jefferson Street Sidewalk Gap Closure                                 | \$ 16,533                | \$ 10,703                                  | -35.26%      | Lower                   | Yes           | \$0                                | 4           | \$0                                   |   |
| 2009-03       | Highway 111 Median Landscape  | \$ 952,339               | \$ 667,748                                 | -29.88%      | Lower                   | Yes           | \$0                                | 5           | \$0                                   |   |
| 2009-05       | Seasons Park Dog Park   | \$ 142,455               | \$ 143,205                                 | 0.53%        | Higher                  | No            | \$0                                | 5           | \$15,935                              |   |
| 2009-09       | Pioneer Park Improvements   | \$ 409,344               | \$ 217,951                                 | -46.76%      | Lower                   | Yes           | \$0                                | 9           | \$0                                   |   |
| 2009-10       | A Street Extension  | \$ 1,323,645             | \$ 1,155,686                               | -12.69%      | Lower                   | Yes           | \$171,234                          | 2           | \$53,000                              | Appropriation required for Coral Mountain Utilities               |
| 2009-14       | Highway 111 Utility Undergrounding                                    | \$ 92,700                | \$ 40,480                                  | -56.33%      | Lower                   | Yes           | \$0                                | 7           | \$0                                   |   |
| 2009-15       | Drainage Improvements (Washington at Simon)                           | \$ 199,050               | \$ 61,946                                  | -68.88%      | Lower                   | Yes           | \$0                                | 9           | \$0                                   |   |
| 2009-16       | Jefferson Street Landscape  | \$ 575,090               | \$ 299,133                                 | -47.99%      | Lower                   | Yes           | \$0                                | 9           | \$0                                   |   |
| 2009-16A      | Jefferson Street Landscape  | \$ 516,020               | \$ 377,103                                 | -26.92%      | Lower                   | Yes           | \$0                                | 8           | \$0                                   | Awarded to Second Lowest Bidder (amount listed)                   |
| 2009-17       | Lions Gate Sidewalk and Landscape                                     | \$ 46,097                | \$ 45,791                                  | -0.66%       | Lower                   | No            | \$0                                | 7           | \$0                                   |   |
| 2009-18       | Turf Reduction Green Projects   | \$ 274,919               | \$ 268,557                                 | -2.31%       | Lower                   | No            | \$0                                | 5           | \$0                                   |   |
| 2009-19       | Village Sidewalk In-Fill  | \$ 146,998               | \$ 107,992                                 | -26.54%      | Lower                   | Yes           | \$0                                | 12          | \$0                                   |   |
| 2009-21       | Monroe Street Pavement Rehabilitation                                 | \$ 185,630               | \$ 128,330                                 | -30.87%      | Lower                   | Yes           | \$0                                | 7           | \$0                                   |   |
| 2009-22       | Eisenhower Signal Interconnect  | \$ 309,945               | \$ 235,656                                 | -23.97%      | Lower                   | Yes           | \$0                                | 7           | \$0                                   |   |
| 2009-24       | Adams Street, Miles Avenue, and Dune Palms Signal Interconnect        | \$ 353,480               | \$ 261,256                                 | -26.09%      | Lower                   | Yes           | \$0                                | 5           | \$0                                   |   |
| 2010-01       | Ahmanson Drainage   | \$ 99,115                | \$ 87,794                                  | -11.42%      | Lower                   | Yes           | \$0                                | 7           | \$0                                   |   |
| 2010-02       | SilverRock Club House Drainage  | \$ 46,358                | \$ 112,600                                 | 142.89%      | Higher                  | Yes           | \$0                                | 7           | \$0                                   |   |
| 2010-04       | Avenue 48 at Jefferson Drainage & Landscape                           | \$ 237,350               | \$ 264,170                                 | 11.30%       | Higher                  | Yes           | \$0                                | 4           | \$0                                   |   |
| 2010-05       | Colonel Paige Middle School Restroom (installation only)              | \$ 47,320                | \$ 40,607                                  | -14.19%      | Lower                   | Yes           | \$15,000                           | 6           | \$29,000                              | City Preurchased Restroom for \$95,000                            |
| 2010-06       | Washington Street Improvement at Avenue 48                            | \$ 418,983               | \$ 429,559                                 | 2.52%        | Higher                  | No            | \$0                                | 4           | \$0                                   |   |
| 2010-08       | Washington Street Drainage Improvements Phase II                      | \$ 368,955               | \$ 252,486                                 | -31.57%      | Lower                   | Yes           | \$0                                | 3           | \$0                                   |   |
| 2010-09       | Washington Street Improvement at Eisenhower & Calle Tampico           | \$ 349,945               | \$ 294,000                                 | -15.99%      | Lower                   | No            | \$0                                | 5           | \$0                                   |   |
| 2010-11       | New Traffic Signal - Sinaloa at Eisenhower                            | \$ 522,631               | \$ 504,401                                 | -3.49%       | Lower                   | Yes           | \$464,019                          | 4           | \$70,444                              | Project scope changed mid-design                                  |
| 2010-13       | Miles Avenue Median Island Landscape                                  | \$ 187,894               | \$ 115,811                                 | -38.36%      | Lower                   | Yes           | \$0                                | 5           | \$0                                   |   |
| 2010-14       | Avneue 50 Widening  | \$ 233,100               | \$ 146,025                                 | -37.36%      | Lower                   | Yes           | \$0                                | 6           | \$0                                   |   |
| 2010-15       | Slurry Seal Project   | \$ 1,187,280             | \$ 869,460                                 | -26.77%      | Lower                   | No            | \$0                                | 8           | \$0                                   |   |
| 2011-01       | Highway 111 at Washington Street Intersection Improvements            | \$ 566,375               | \$ 730,136                                 | 28.91%       | Higher                  | No            | \$65,838                           | 2           | \$0                                   | Only two bids received w/higher mobilization & unit costs         |
| 2011-04       | Fred Waring Drive Median Island Landscape Improvements                | \$ 527,190               | \$ 578,279                                 | 9.69%        | Higher                  | Yes           | \$0                                | 2           | \$0                                   |   |
| 2011-11       | Avenue 50 Pavement Reconstruction                                     | \$ 146,263               | \$ 103,925                                 | -28.95%      | Lower                   | Yes           | \$0                                | 6           | \$0                                   |   |
| 2012-02       | Sports Complex Lighting Rehabilitation Expansion Improvements         | \$ 304,640               | \$ 339,900                                 | 11.57%       | Higher                  | No            | \$0                                | 5           | N/A                                   |   |
| 2012-03/04/05 | Miscellaneous Public Facility ADA Improvements (Civil Improvements)   | \$ 161,481               | \$ 150,166                                 | -7.01%       | Lower                   | Yes           | \$0                                | 2           | N/A                                   |   |
| 2012-03/04/05 | Miscellaneous Public Facility ADA Improvements (General Construction) | \$ 145,600               | \$ 146,013                                 | 0.28%        | Same                    | Yes           | \$0                                | 2           | \$0                                   |   |
| 2012-07       | Pavement Management Plan Street Improvements (Re-Bid)                 | \$ 1,613,903             | \$ 1,544,673                               | -4.29%       | Lower                   | Yes           | \$0                                | 2           | N/A                                   |   |
| 2012-08       | Calle Sinaloa & Avenue 52 Sidewalk Infill Improvements                | \$ 179,753               | \$ 138,127                                 | -23.16%      | Lower                   | Yes           | \$0                                | 3           | \$0                                   |   |
| 2012-09       | SilverRock Resort Parking Lot ADA Improvements                        | \$ 48,906                | \$ 45,912                                  | -6.12%       | Lower                   | Yes           | \$0                                | 3           | \$0                                   |   |
| 2013-06       | SilverRock Irrigation Relocation Improvements                         | \$ 409,500               | \$ 387,884                                 | -5.28%       | Lower                   | Yes           | \$0                                | 1           | \$36,666                              | As-builts did not show all facilities that required modification  |
| 2013-11       | Community Center Expansion  | \$ 3,308,725             | \$ 2,888,309                               | -12.71%      | Lower                   | Yes           | \$0                                | 10          | N/A                                   |   |
| 2013-13A      | Citywide Preventative Maintenance Improvements (HVAC 3)               | \$ 44,200                | \$ 28,258                                  | -36.07%      | Lower                   | Yes           | \$0                                | 1           | \$0                                   |   |
| 2013-13B      | Citywide Preventative Maintenance Imp. (HVAC 1-2) (Re-bid)            | \$ 139,000               | \$ 171,789                                 | 23.59%       | Higher                  | No            | \$63,350                           | 2           | \$0                                   | Could not reduce scope or increase EE due to funding restrictions |
| 2013-14       | City Hall Lighting Conversion   | \$ 121,346               | \$ 125,000                                 | 3.01%        | Higher                  | Yes           | \$0                                | 3           | \$0                                   |   |

\$14,516,819

-12.59%

\$779,441

\$205,045

**88%** Of the time no more than 10% above the Engineer's Estimate

**75%** Of the time the Engineer's Estimate was equal to or higher than Low Bid

**23%** Of the time the Engineer's Estimate was lower than Low Bid

**13%** On average the lowest bid is lower than the Engineer's Estimate for all bids

