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Evaluation of the Cost Impact and Benefit of 2021 IBC Prescriptive Code Changes

Presented to the

Florida Building Commission

And

University of Florida, Rinker School (RS)

R. Raymond Issa, Ph.D. Civil Eng., J.D., P.E., F. ASCE, raymond-issa@ufl.edu, (352) 273-1152
Kristin Weniger, P.E., Fire Protection Engineer, Koffel Associates, kweniger@koffel.com, (410) 750-2246
John Chyz, P.E., Affiliated Engineers, Inc (AEI), jchyz@aeieng.com, (352) 376-5500

Project Lead: R. Raymond Issa

1. Introduction

The University of Florida, Rinker School (RS) shall assess the cost impact and qualitative benefit of the 2021 International Building Code changes that are prescriptive in nature and that have the potential of adding cost to construction.

2. Relevant Sections of the Code (and related documents)

- 2018 International Building Codes as partially incorporated in 2020 Florida Building Code (effective December 31, 2020);
- 2021 International Building Codes (I-Codes) including International Building Code (IBC); International Residential Code (IRC); International Mechanical Code (IMC); International Plumbing Code (IPC); International Fuel Gas Code (IFGC); International Code for Existing Buildings (IEBC); and 2020 National Electrical Code (NEC); and
- Complete listing of all the approved changes to the 2021 IBC, IRC, IMC, IFGC, IPC and IEBC.

3. Statement of Work (SOW)

- (1) RS shall review/analyze the approved 2021 I-Code changes and changes to the NEC as listed in item (2) to identify those code changes/provisions that are prescriptive in nature and have the potential of adding cost to construction.**

The listed consultants shall participate in this process to assist the research team with the specifics of the design changes and their cost impacts as follows:

Koffel Associates shall conduct a review/analysis of non-structural fire protection and life safety requirements in IBC Chapter 3 through Chapter 10. This review shall be limited to applicable criteria affecting the five (5) different commercial building scenarios used for the 2015 I-Codes plus Florida Specific Changes (2020 FBC) (Reference – RINKER-CR-2016-101 Final Report). Koffel Associates shall also analyze means of Egress and Fire Prevention for the one-story and two-story homes

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of the 2021 IRC. In addition, Koffel Associates shall provide the cost for the prescriptive changes and their qualitative benefit.

AEI shall have primary responsibility in evaluating the applicable Mechanical, Electrical and Plumbing (MEP) related changes that have occurred between the 2018 Edition and the 2021 Edition of the I-Codes, as they relate to the seven building types which include five commercial buildings: 1) Small elementary school; 2) Stand-alone retail building; 3) Small hotel; 4) Small office building; 5) High-rise apartment and a one-story and a 2-story house on slab foundation.

AEI shall also provide the cost for the prescriptive changes and their qualitative benefit.

- (2) RS shall review available literature/studies on the subject of estimating the costs of the code changes to the 2021 I-Codes including the ICC code proceedings/code hearings. Information gathered from this task shall be used to document potential cost impacts and benefits for the code changes as identified in (1) and as applicable.**

In addition to ICC code, proceedings/code hearing transcripts, cost databases such as R.S. Means Cost Works, R.S. Means Building Construction Cost Data and AEI and Koffel Associates specific proprietary databases shall be used to estimate the potential cost impact of the applicable code changes.

- (3) RS shall estimate the construction cost impacts of those provisions that are not covered under (2) using good engineering judgment and feedback from general contractors and consulting engineers.**

The listed consultants and general contractors shall assist the research team with the cost estimates for these changes.

- (4) RS shall use the set of baseline residential and commercial building designs configured for the 2021 I-codes to determine the cost impact of code changes.**

For the purposes of this study the seven buildings include five commercial buildings used are: 1) Small elementary school; 2) Stand-alone retail building; 3) Small hotel; 4) Small office building; 5) High-rise apartment and a one-story and a 2-story house on slab foundation. These buildings previously used to cost out the 2015 I-Codes plus Florida Specific Changes shall be configured for the 2018 I-codes and used to study the cost impact.

- (5) RS shall use building information modeling (BIM) tools developed under the 2018 I-Codes “as amended via the 7th Edition (2020) FBC” and 2021 I-Codes to produce:**

- a. Schedule of Material Quantities (exported to MS Excel)
- b. Architectural 3D view and walk-through

- c. Isolated Structural 3D view and walk-through
- d. Isolated Mechanical Electrical and Plumbing (MEP)/Mechanical Electrical Plumbing and Fire (MEPF) 3D view and walk-through

(6) RS shall use the information in (5) and cost databases to produce cost estimates and extract cost impact of changes on the reference houses and commercial buildings.

Sources of cost data shall include R.S. Means Cost Data; distributors' or big box retailers' websites, and building contractors.

Cost estimates of the code changes that do not directly apply to the selected reference houses shall be listed separately and shall be added or subtracted from the aggregated costs for these reference houses.

4. Method of Payment

A purchase order will be issued to the University of Florida/Rinker School (RS). This project shall start on the date of execution of the purchase order and end at midnight on June 30, 2021 and shall not exceed \$99,898.00, and will cover all costs for labor, materials, and overhead. Payment will be made for the study after the Contract Manager and the Florida Building Commission's appropriate Technical Advisory Committee have approved the final report.

5. Deliverables

- An interim report providing technical information on the problem background, results and cost implications of the prescriptive Code changes shall be submitted by January 31, 2021. The report shall include documentation "in matrix format" delineating the sub-codes, code sections/changes, summary of the code change, type of the code change (editorial, alternative, prescriptive, or performance), link to relevant sources for each code change and whether prescriptive changes will result in increased, decreased or no cost. In addition, the qualitative benefits of the prescriptive changes shall be listed in the last column. The report will be presented to the Commission's appropriate Technical Advisory Committee at a time agreed to by the Contractor and the Department's Contract Manager.
- A final report comprised of the information in the interim report augmented by TAC feedback shall be provided by June 1, 2021. An analysis of individual code changes shall also be provided in the Appendix. The report shall be presented to the Commission's appropriate Technical Advisory Committee at a time agreed to by the Contractor and the Department's Contract Manager.
- A breakdown of the number of hours or partial hours, in increments of fifteen (15) minutes of work performed and a brief description of the work performed. The Contractor agrees to provide an additional documentation requested by the Department to satisfy audit requirements.

6. Performance Measures and Financial Consequences

RS is solely and uniquely responsible for the satisfactory performance of the tasks and completion of the deliverables as described in this SOW.

Failure to complete the task and deliverables in the time and manner specified in Sections 3 and 5 shall result in a non-payment of invoice until corrective action is completed as outlined in the work authorization.

7. Contract Manager

The Contract Manager for this purchase order is Barbara Bryant.

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8. Budget

| | | | Budget | |
|---|------------------|--------------------|-------------------------|---------------------|
| (a) Salaries and Wages (Prime) | | | 9/1/20 - 6/15/21 | |
| Name | Role in Study | Direct Hourly Rate | Hours | Cost |
| Raymond Issa | PI | \$120.00 | 150 | \$ 18,000.00 |
| Graduate Student | Research Assist. | \$ 26.50 | 800 | \$ 21,200.00 |
| Subtotal | | | 950 | \$ 39,200.00 |
| (c) Consultants (2) | | | | |
| <i>Koffell Associates and AEI</i> | | | | \$ 35,000.00 |
| | | | | \$ - |
| Subtotal | | | | \$ 35,000.00 |
| (d) Subcontracts (0) | | | | |
| | | | | \$ - |
| | | | | \$ - |
| Subtotal | | | | \$ - |
| (e) Tuition | | | | |
| <i>Graduate Student (1)</i> | | | | 8960 |
| | | | | 0 |
| Subtotal | | | | 8960 |
| (f) Materials and Services (Prime) | | | | |
| <i>N/A</i> | | | | 0 |
| | | | | 0 |
| Subtotal | | | | 0 |
| (g) Communications and Shipping (Prime) | | | | |
| <i>Printing</i> | | | | 70 |
| <i>Postage</i> | | | | 14 |
| | | | | 0 |
| Subtotal | | | | 84 |
| (h) Travel (Prime) | | | | |
| | | | | |
| Subtotal | | | | 0 |
| (i) Employee Benefit Plan & Payroll Taxes (Prime) | | | | |
| (1) Employee Benefit Plan & Payroll Taxes 29.7% | | | <i>Faculty</i> | 5346 |
| (2) Employee Benefits 10.5% | | | <i>Graduate Student</i> | 2226 |
| SUBTOTAL EMPLOYEE BENEFITS & PAYROLL TAXES (PRIME) | | | | 7572 |
| (j) Overhead (Prime) 10.0% | | | | 9082 |
| GRAND TOTAL PROJECT | | | 950 | 99898 |