

## APPENDIX C – COST ESTIMATING

### C.1 Introduction

A cost estimate for each property's selected mitigation measure should be developed to make a decision on the most appropriate mitigation measure. The cost estimate describes all anticipated costs associated with the proposed mitigation measure and represents the approximate price of the proposed activity. The cost estimate should typically reflect the activities described in the scope of work prepared for the activity and be prepared with adequate documentation.

The cost estimate documentation should include the following:

- Detailed information for all project costs, including materials, labor, equipment, and subcontract costs, in addition to maintenance costs over the useful life of the project
- The source of the estimate (e.g., documented local cost, previous similar projects, bids from qualified professionals, published national or local cost-estimating guides, etc.) and documentation supporting each source
- Other related construction, demolition, relocation, maintenance, environmental, and/or historic preservation costs (i.e., survey, permitting, site preparation, and material disposal)
- Base year of all cost estimates provided
- Anticipated date of construction
- Potential impacts to estimated costs resulting from any delay to the anticipated start of construction

**NOTE:** Some situations will require more complicated comparisons (e.g., comparing the cost of implementing a regional solution barriers or drainage improvements - with the cost of mitigation measures on a structure by structure basis). In this case, it is recommended that accurate cost estimates be performed so that a comprehensive decision can be made.

### C.2 Options to Creating a Cost Estimate

The following options should be used to develop preliminary cost estimates for each appropriate mitigation measure. These options are listed in order of increasing cost and level of effort based on the reliability and level of detail of the cost estimate. For example, the first option is the least expensive way to conduct a cost estimate; however, it only provides an approximate cost of the project.

- **Determine costs for similar projects in the area.** Consulting with contractors and building permit officials may yield a list of similar projects in the area. Verify that site and structure conditions are similar before using these costs.
- **Determine costs for similar projects per staff at the State Hazard Mitigation Office or FEMA Regional Office.** State and Federal level staff are involved with a number of

mitigation projects funded by Federal programs (see Appendix E, Hazard Mitigation Assistance Programs) and may be able to provide cost information for similar projects. As with the first option, ensure that the projects are similar in nature.

- **Conduct Preliminary Cost Estimates using assistance from local community agency staff, if available.**
- **Conduct Preliminary Cost Estimates using qualified consultants.**

One of these methods may identify the appropriate mitigation measure. However, if this is not the case, it may be necessary to perform some level of benefit/cost analysis (BCA) to comparatively evaluate mitigation measures (see Appendix D, Determining Cost-Effectiveness).

### C.3 Process to Develop a Cost Estimate

**Table C-1. Steps to Develop a Cost Estimate**

	<b>Step</b>	<b>Task</b>
1.	<b>Break out the work into smaller tasks</b>	Smaller tasks can be quantified in terms of materials and/or labor requirements. This can be organized by using a tool such as the <i>Preliminary Cost Estimating Worksheet</i> in Appendix B.
2.	<b>Estimate the quantities of materials and labor</b>	For example, tasks required to elevate a structure include: <ul style="list-style-type: none"> <li>▪ Design, engineering, and permitting</li> <li>▪ Mobilization</li> <li>▪ Site preparation (including establishing access, disconnecting utilities)</li> <li>▪ Excavation</li> <li>▪ Demolition and hauling</li> <li>▪ Jacking and cribbing</li> <li>▪ Masonry or cast-in-place concrete</li> <li>▪ Carpentry</li> <li>▪ Utility hook-ups</li> <li>▪ Site restoration and landscaping</li> </ul>
3.	<b>Determine the unit cost for materials and labor for each task</b>	Use a resource such as the <i>RS Means Building Construction Data</i> or <i>Marshall and Swift</i> (see also Subsection C.4, Available Resources)
4.	<b>Record costs on the Preliminary Cost Estimating Worksheet</b>	
5.	<b>Compute cost per task and the total cost estimate</b>	

For each of the five steps, there are associated labor, material, and equipment costs. Indirect costs required to complete a project can include administrative costs. These costs are allowable under FEMA hazard mitigation assistance grants and can be a significant determination factor in

selecting the preferred mitigation activity. For example, relocation costs for residents involving temporary displacement or moving to another structure should be included in the cost estimate. The relative cost of replacement housing in the area should be considered, particularly where acquisition is the preferred alternative. Also remember the contractor needs to earn a profit. Thus an estimate of cost should include a profit-factor of about 10 to 15 percent of the total estimated cost.

As much detail as possible must be included when preparing a construction cost estimate. Pertinent details for a construction cost estimate can include the amount of dirt to be removed (in cubic feet), weight of steel to be purchased (in tons), amount and type of lumber needed (in linear feet), and type and quantity of concrete needed (in cubic yards).

## C.4 Available Resources

Detailed construction cost estimating appears to be a time-consuming task. However, there are two reliable estimating handbooks to help streamline the process.

The RS Means' *Building Construction Cost Data* is an industry standard. It covers every aspect of construction pricing needed to prepare detailed project estimates, including the following:

- Unit costs (lists construction items from site work to finish work)
- References (includes backup information on how the costs are developed and what they include)
- Unit costs for thousands of residential building components
- Location cost adjustment factors
- Daily productivities and standard crews
- Overhead and profit guidance

Additional information on RS Means products and order forms may be found on the website: <http://www.rsmeans.com/>.

The Marshall & Swift's *Residential Cost Handbook* provides an in-depth description of the costs involved in different types of residential structures, including site-built and modular housing. With six classifications for building quality, ranging from low to excellent, this extensive handbook helps eliminate the guesswork of construction quality with corresponding descriptions and photographs. The *Residential Cost Handbook* and additional resources are found on the Marshall & Swift website (<http://www.marshallswift.com/>).

**NOTE:** RS Means and Marshall & Swift also produce cost estimating handbooks for other types of construction (e.g., heavy construction of dams).

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