

Evaluation of an approach to verification of financial assurance estimates

Problem

Determining whether the proposed financial assurances for compensatory mitigation projects are sufficient to fund the repair or replacement of those projects has been a challenge for regulators in many districts. Many regulators do not have the knowledge or experience to evaluate the adequacy of proposed assurance amounts submitted by compensatory mitigation providers.

Options

There are a number of approaches that have been used to evaluate proposed financial assurance amounts including use of:

- Replacement credit costs at an approved bank or ILF program in the same service area
- Readily available open source applications
- Proprietary software applications to evaluate assurance

One common approach for verification of proposed financial assurance amounts is to base it on the cost of replacement compensation at a mitigation bank or In-Lieu Fee (ILF) program whose service area includes the permitted project. If there is an approved ILF program serving the vicinity of the permitted project then the ILF advance credit fee schedule can be used to calculate the cost of replacement compensation. When there are no approved ILF programs providing suitable compensation the purchase price of mitigation bank credits can be used. The price of mitigation bank credits may be more difficult to determine because prices may vary considerably depending upon credit demand and availability, economic conditions, the financial status of the mitigation bank sponsor(s), the number of credits needed, etc. Estimates based on purchase price of mitigation credits tends to be higher than basing assurances on the cost of corrective actions on an approved mitigation project site because the price of mitigation bank and ILF credits typically include land costs.

There are available open source applications like The Nature Conservancy (TNC)'s Stewardship Calculator that can be used to verify proposed financial assurances. However, the regulator has to be familiar with the application and has to determine and then enter labor, material amounts, and cost data into the application. This information can be obtained from a project schedule or generated from review of project drawings. A version of the calculator which utilizes TNC labor rates is also available but it still requires the user to enter material costs and quantities. Some have noted that TNC's labor rates are often lower than those often encountered in the private sector.

Proprietary software such as the Center for Natural Lands Management's Property Analysis Record (PAR) can be used to evaluate the adequacy of proposed financial assurances. These proprietary applications are typically purchased or licensed. They utilize some standardized data sets such as Department of Commerce regional cost data for labor and materials which must be updated periodically. The user typically needs training in the use of the application. Accurate verification of assurances requires the mitigation provider to submit a schedule of the proposed compensatory mitigation activities (surveys, grading, control structures, as-built surveys, planting, monitoring, etc.). If

a project schedule is not available, it can be developed from project plans with additional time and expense.

One proprietary cost estimation application used by Corps cost engineers to estimate costs of military construction, civil works, and hazardous and toxic waste removal projects is called MII (pronounced M-Two). MII is the second generation of MCACES (Micro-Computer Assisted Cost Estimation System), a cost estimation application developed for Corps internal use by the private sector. There is no charge for the MII software application, although the cost book used with the software is a licensed product that has an annual fee.

This pilot was an effort to evaluate whether MII used by Corps district Cost engineering staff might be useful in the verification of financial assurance amounts for Regulatory compensatory mitigation projects.

Approach

Jacksonville District's Regulatory Division oversees a large and active mitigation banking program and a number of very large permittee-responsible compensatory mitigation projects. It approached IWR for assistance in developing an approach to verification of financial assurances for compensatory mitigation. A pilot effort was undertaken. Regulatory engaged the District's Cost Engineering Section to evaluate financial assurances for a mitigation bank. Brandy Branch, a 700+ acre wetland mitigation bank approved in 2015 was selected for the pilot. This bank was selected because 1) the bank had already been approved by the District so approval of the mitigation bank instrument (MBI) would not be delayed by this evaluation; and 2) a thorough and detailed schedule of tasks associated with bank development (Appendix A) was provided by the bank sponsor as an exhibit to the approved MBI.

District Regulatory staff provided the project schedule and a labor cost code to the District Cost Engineering Section to charge time spent evaluating the financial assurance estimate in the MBI. The cost engineering staff utilized MII and the associated cost book to provide an independent evaluation of projected costs for each of the 25 identified tasks associated with development and management of the mitigation bank. Then the cost estimate for each task developed in MII was compared to the estimates provided by the mitigation bank sponsor in the approved MBI.

The type and amount of materials identified in the schedule from the MBI were used for estimation purposes. Where materials or equipment were not specified, District engineers identified likely materials or equipment based on their professional experience and knowledge of construction practices. Those specifications were also recorded in the notes for each line item.

The Engineering Cost Section evaluated whether the bank sponsor's estimate was considered reasonable and balanced. For civil works projects the cost is considered reasonable if it is within 125% of the Corps' independent government estimate (IGE). A proposal is considered balanced if the difference in the pricing distribution between the mitigation bank sponsor and the IGE is less than 5% for each line item. Appendix B is a summary of this evaluation including all assumptions.

Results

The analysis conducted by the Cost Engineering Section required approximately 40 hours of labor.

The total estimated cost provided by the mitigation bank sponsor was 75% of the Independent Government Estimate (IGE) as estimated by the Cost Engineering Section. That is considered reasonable for civil works projects. That difference was attributable primarily to 2 line items, tree installation and field work for vegetative and wildlife monitoring. In both cases, the government's estimated costs were higher than the sponsor's.

The IGE for the entire project was approximately \$560,000 more than the sponsor's estimate. Depending upon the proposed method of financial assurance (performance bond, letter of credit, or casualty insurance) the additional financial assurance coverage would cost the sponsor between \$11,000 and 58,000 which is a relatively small amount (0.6 to 3.3%) when compared to the sponsor's total cost estimate for development of the mitigation bank of \$1.78 million.

The difference between the sponsor and IGE estimates for 23 of the 25 line items were within 5% and are considered balanced. The 2 line items considered unbalanced were tree installation where the sponsor's estimate was 75% of the IGE and invasive species control where the IGE was only 75% of the sponsor's estimate.

It is likely that the IGE could have been further refined with better knowledge of the actual practices planned by the sponsor. For example in Line item 5, installation of piezometers the sponsor did not provide specifications for diameter or depth of piezometers so the cost engineers assumed piezometers installed to a depth of 30 feet. It is likely that the sponsor planned to use much shallower wells which would cost less to purchase or install.

Lessons learned

The use of MII by a district's Cost Engineering Section seems to be a useful approach for evaluating financial assurance proposals for mitigation banks, ILF projects, and large permittee responsible mitigation projects. The pilot results were reasonable and generally balanced when compared to the sponsor's estimates.

Relying upon district cost engineers to evaluate financial assurances eliminates the need to train Regulatory staff in the use of cost estimation applications and reduces over estimates of assurances that are based on replacement compensatory mitigation provided by an ILF program or mitigation bank. MII allows for district-specific practices and standards to be developed and loaded into the system which could facilitate future analyses and subsequently lower labor costs for subsequent evaluations.

In districts that require submittal of detailed estimated costs of construction, monitoring, and management of mitigation projects (mitigation banks and/or PRM) in support of the proposed amount of financial assurances (i.e. Buffalo, Charleston, Fort Worth, Huntington, Mobile, New England, Pittsburgh, and Seattle) MII could be used to verify at least a sample of the submitted estimates. Other districts (Baltimore, Chicago, Kansas City, New Orleans, Rock Island, Saint Louis, Savannah, and Wilmington, etc.) indicate that the amount of financial assurances should be based on the estimated cost of project construction, monitoring, and management. MII could be used to verify the assurance amounts in those cases although if an itemization of tasks is not provided then a schedule would have to be developed before MII could be used.

If a schedule or itemization of project elements or tasks are available an IGE could be prepared in 40 hours or less. If a projects schedule (itemization of tasks) is not available, a schedule can be prepared

from project plans by cost engineers but will require additional labor (40-60 hours of additional labor). Because of the labor costs associated with MII, it might not be used to evaluate financial assurances or long-term management costs for every mitigation project in a district. Instead a sample of proposals could be selected or perhaps it could be used to evaluate larger and more problematic or complex compensatory mitigation projects.

MI could also be used to provide verification of cost estimates for long-term management of compensatory mitigation projects.

Construction and Implementation Cost Estimates:
Phase 1

Brandy Branch
Mitigation Bank

Phase 1		Phase 2 (add more as needed)								
Acreage =	393	370.41								
Date Active										
Planting		74,982.00								
Culverts	N/A	N/A								
Low water crossings	1	1.00								
Burn acreage	84	83.86								
Fire Line mileage										
Road mileage	N/A	N/A								
Ponds	N/A	N/A								
Gates	0	1.00								
Fencing	N/A	N/A								
Signs	28									
Bedrow Removal		37.80								
Pine Thinning req'd	N/A	N/A								
	393	96.18	50.44	127.93	95.96					
Construction & Structures	Phase 1	Phase 2 Island	Phase 3 WHE zone	Phase 4 South	Phase 5 South	Units	Number of Units	Cost/Unit	Total Line Item Cost	Comments/Notes
Mobilization	1		1			total cost	2.00	\$800.00	\$1,600.00	
Construction Monitoring	N/A					per hour	0.00	\$0.00	\$0.00	
Gate Installation	N/A					per gate	0.00	\$0.00	\$0.00	
Fence Installation	N/A					per lf	0.00	\$0.00	\$0.00	
Gabion LWC Installed	2					each	2.00	\$5,273.00	\$10,546.00	Brandy Branch and Deep Creek
Loose Rock LWC	6		66			cy	72.00	\$76.51	\$5,508.72	One LWC 30 feet each
GeoWeb LWC	350		4200			sf	4,550.00	\$3.00	\$13,650.00	One LWC 30 feet each
Monitoring Equipment Piezometer Includes Installation	N/A		10			per item	10.00	\$1,000.00	\$10,000.00	
Monitoring Equipment Staff Gauge Includes Installation	N/A					per item	0.00	\$0.00	\$0.00	
Culvert Removal	N/A					per culvert	0.00	\$0.00	\$0.00	
Culvert Installation	N/A					per culvert	0.00	\$0.00	\$0.00	
Concrete Weir Installation	N/A					per lf	0.00	\$0.00	\$0.00	
Liner Installation	N/A					per lf	0.00	\$0.00	\$0.00	
Structure Demolition	N/A					total cost	0.00	\$0.00	\$0.00	
Structure Installation	N/A					total cost	0.00	\$0.00	\$0.00	
Solid Waste Disposal	N/A					total cost	490.00	\$5.00	\$2,450.00	
Ditch Fill	N/A					per lf	0.00	\$0.00	\$0.00	
Ditch Plug Installation	N/A					per lf	0.00	\$0.00	\$0.00	
Restoration Grading	N/A					per acre	0.00	\$0.00	\$0.00	
Berm Construction	N/A					per cubic yard	0.00	\$0.00	\$0.00	
Berm Removal	N/A					per cubic yard	0.00	\$0.00	\$0.00	
Berm Maintenance	N/A					per cubic yard	0.00	\$0.00	\$0.00	
Beds and Furrows (Flattening)		38.70				per acre	38.70	\$400.00	\$15,480.00	
Pine Clearing - Premerch	3					per acre	2.56	\$1,800.00	\$4,608.00	
Pine Clearing - Merch	N/A					per acre	0.00	\$0.00	\$4,608.00	
Surveying	2		6			per hour	8.00	\$120.00	\$960.00	
Low Water Crossing Installation	\$750.00		\$10,500.00			total cost	11,250.00	\$1.00	\$11,250.00	
Creek Restoration	\$15,000.00		\$5,000.00			total cost	1.00	\$20,000.00	\$20,000.00	
Pond Creation	N/A					per cubic yard	0.00	\$0.00	\$0.00	
Floating Turbidity Barriers	N/A					per lf	0.00	\$0.00	\$0.00	
Silt Fence	60			840		per lf	900.00	\$1.50	\$1,350.00	
Erosion Control						each	0.00	\$20.00	\$0.00	
Seed and Mulch	N/A					per acre	0.00	\$0.00	\$0.00	
Sign Installation	28					total cost	28.00	\$25.00	\$700.00	
Security	N/A					total cost	0.00	\$0.00	\$0.00	
Total							0.00		\$102,710.72	
Planting	Phase 1	Phase 2				Units	Number of Units	Cost/Unit	Total Line Item Cost	Comments/Notes
Tree Cost - RPM Installation	40,500.00	9,440	4,950	12,556	9,418	per tree	115,482.00	\$9.25	\$1,068,208.50	
Tree Cost- Installation						Lot	0.00	\$0.00	\$0.00	
Herbaceous - Plugs Installation				15,392.00		per plug	15,392.00	\$2.15	\$33,092.80	
Seeding						per acre	0.00	\$0.00	\$0.00	
Total		\$0.00							\$1,101,301.30	
Vegetative, Wildlife & Hydrologic Monitoring and Reporting (short term - until success criteria are achieved)	Phase 1	Phase 2				Units	Number of Units	Cost/Unit	Total Line Item Cost	Comments/Notes
Establish Transects/Photo Stations	20	5	5	5	5	per transect	35.00	\$80.00	\$2,800.00	
Field Work - Vegetative & Wildlife Monitoring	20	5	5	5	5	years	35.00	\$3,000.00	\$105,000.00	
Field Work - Hydrologic Monitoring	0		24			per hour	96.00	\$80.00	\$7,680.00	
Travel Expenses	1600	\$400.00	\$400.00	\$400.00	\$400.00	per mile	2,800.00	\$2.00	\$5,600.00	
Data Analysis & Report Preparation	20	5	5	5	5	years	35.00	\$2,500.00	\$87,500.00	
Report Preparation Materials	20	5	5	5	5	years	35.00	\$200.00	\$7,000.00	
Total	0	\$0.00							\$215,580.00	
Burn Management										
Burning	1						0.00	\$0.00	\$0.00	
Shrub Reduction	0	1				lf	1,000.00	\$0.30	\$300.00	
Fireline maintenance							0.00	\$0.04	\$0.00	
Total									\$300.00	
Nuisance and Exotic Species Control										
Chemicals	5	1	1	1	1	years	8.00	\$5,000.00	\$40,000.00	
Labor	5	1	1	1	1	years	8.00	\$20,000.00	\$160,000.00	
Total									\$200,000.00	
	Phase 1	Phase 2							Total Line Item Cost	Comments/Notes
Total cost	1619592	\$0.00							\$1,619,592.02	
Total @110%	\$1,781,551.22	\$0.00							\$1,781,551.22	

Note: All costs should include mobilization, labor, materials, etc.
Note: All costs should be presented on a per unit basis and the number of units, as per approved mitigation bank plan
Note: Enter N/A and leave at \$0.00 in the line items not applicable to this bank and add line items needed
Note: Add or delete phase columns as needed
Note: All costs should reflect the total fair market value cost to complete the construction and implementation and the perpetual management.

Note: This worksheet is only intended to provide guidance to applicants regarding typical costs associated with construction and implementation and perpetual management costs of mitigation banks.

MEMORANDUM FOR RECORD

SUBJECT: Cost Estimate for the Brandy Branch Mitigation Bank Project

PURPOSE. The purpose of this MFR is to 1) describe what is included in the cost estimate that was completed by the USACE Jacksonville District Cost Engineering Section (ENTC) for the Brandy Branch Mitigation Bank project, and 2) to analyze the pricing of the cost estimate included in the Mitigation Banking Instrument (MBI) document.

SCOPE OF WORK. ENTC's cost estimate's scope of work is based on the MBI, Brandy Branch Mitigation Bank which was submitted to the Jacksonville District's Regulatory Division on February 24, 2015. ENTC's cost estimate is organized into 25 Line Items which is based on the spreadsheet "Construction and Implementation Cost Estimates" found in the MBI (pg. 289), Appendix H – Financial Assurance section. A copy of this spreadsheet is enclosed with this MFR. Table 1 below shows the cost estimate done by ENTC and the cost estimate in the MBI. Table 1 also shows data from the pricing analysis, which is explained later in this MFR.

Table 1. ENTC and MBI Prices

LINE ITEM #	DESCRIPTION	ENTC		MBI			
		PRICES	DISTRI- BUTION	PRICES	CHECK (≤ 125% OF SAJ)	DISTRI- BUTION	CHECK (≤ +/- 5% OF SAJ)
1	Mobilization	\$2,689.39	0.1%	\$1,760.00	65.4%	0.1%	0.0%
2	Gabion LWC Installed	\$9,317.82	0.4%	\$11,600.60	124.5%	0.7%	-0.3%
3	Loose Rock LWC	\$6,428.75	0.3%	\$6,059.59	94.3%	0.3%	-0.1%
4	GeoWeb LWC	\$18,378.36	0.8%	\$15,015.00	81.7%	0.8%	-0.1%
5	Monitoring Equipment Piezometer Includes Installation	\$13,960.19	0.6%	\$11,000.00	78.8%	0.6%	0.0%
6	Solid Waste Disposal	\$7,568.47	0.3%	\$2,695.00	35.6%	0.2%	0.2%
7	Beds and Furrows (Flattening)	\$13,628.65	0.6%	\$17,028.00	124.9%	1.0%	-0.4%
8	Pine Clearing - Premerch	\$6,364.45	0.3%	\$5,068.80	79.6%	0.3%	0.0%
9	Pine Clearing - Merch	\$6,364.45	0.3%	\$5,068.80	79.6%	0.3%	0.0%
10	Surveying	\$887.80	0.0%	\$1,056.00	118.9%	0.1%	0.0%
11	Low Water Crossing Installation	\$12,252.24	0.5%	\$12,375.00	101.0%	0.7%	-0.2%
12	Creek Restoration	\$18,212.06	0.8%	\$22,000.00	120.8%	1.2%	-0.5%
13	Silt Fence	\$1,630.38	0.1%	\$1,485.00	91.1%	0.1%	0.0%
14	Sign Installation	\$1,235.22	0.1%	\$770.00	62.3%	0.0%	0.0%
15**	Tree Cost - RPM Installation	\$1,704,434.08	72.3%	\$1,175,029.35	68.9%	65.9%	6.3%
16	Herbaceous - Plugs Installation	\$53,046.80	2.2%	\$36,402.08	68.6%	2.0%	0.2%
17	Establish Transects/Photo Stations	\$3,880.80	0.2%	\$3,080.00	79.4%	0.2%	0.0%
18	Field Work - Vegetative & Wildlife Monitoring	\$186,278.40	7.9%	\$115,500.00	62.0%	6.5%	1.4%
19	Field Work - Hydrologic Monitoring	\$10,644.48	0.5%	\$8,448.00	79.4%	0.5%	0.0%
20	Travel Expenses	\$7,322.52	0.3%	\$6,160.00	84.1%	0.3%	0.0%
21	Data Analysis & Report Preparation	\$77,616.00	3.3%	\$96,250.00	124.0%	5.4%	-2.1%
22	Report Preparation Materials	\$9,424.80	0.4%	\$7,700.00	81.7%	0.4%	0.0%
23	Shrub Reduction	\$556.26	0.0%	\$330.00	59.3%	0.0%	0.0%
24	Chemicals (Nuisance and Exotic Species Control)	\$53,856.00	2.3%	\$44,000.00	81.7%	2.5%	-0.2%
25*	Labor (Nuisance and Exotic Species Control)	\$131,788.80	5.6%	\$176,000.00	133.5%	9.9%	-4.3%
	TOTAL (Line Item 1 thru 25)	\$2,357,767.17		\$1,781,881.22	75.6%		

* MBI's price is greater than 125% of ENTC's, in this Line Item;

** MBI's price distribution is greater than by 5% of ENTC's price distribution;

LINE ITEM 1: Mobilization. In this line item, ENTC's price includes the cost to mobilize/demobilize one 25 ton crane, one 200 HP bull-dozer, one 11 ton truck mounted drill, one 28 ton hydraulic excavator, and one on-road dump truck. The estimate in the MBI does not specify what equipment will be mobilized.

LINE ITEM 2: Gabion LWC Installed. In this line item, ENTC's price includes the cost to install gabion boxes as a low water crossing (LWC). Based on the cost estimate in the MBI (Line Item 4: GeoWeb LWC), ENTC assumes that each LWC is about 12' wide and 30' long, and two sets of Gabion LWC will be installed. Since the depth of the Gabion could not be found in the MBI, ENTC assumes a depth of 18".

LINE ITEM 3: Loose Rock LWC. In this line item, ENTC's price includes only the material cost of the loose rock. Like the cost estimate in the MBI, ENTC uses a total of 72 cubic yards of rock.

LINE ITEM 4: GeoWeb LWC. In this line item, ENTC's price includes only the material cost to of the GeoWeb. Like the cost estimate in the MBI, ENTC uses a total of 4,550 square feet of GeoWeb. The GeoWeb design cross-section is found in the MBI page 283.

LINE ITEM 5: Monitoring Equipment Piezometer Includes Installation. In this line item, ENTC's price includes the cost to install piezometers. Like the cost estimate in the MBI, ENTC uses a total of 10 piezometers. Since the depth and diameter of each piezometer could not be found in the MBI, ENTC assumes a monitoring well depth of 30 feet and a diameter of 1.5 inches.

LINE ITEM 6: Solid Waste Disposal. In this line item, ENTC's price includes the cost to haul and dispose waste in a land-fill. The estimate in the MBI uses the unit price of \$5.00 per EACH and the quantity 490 EACH. ENTC assumes a unit of measurement of cubic yards instead of EACH, based on the unit price and how the unit of measurement is commonly used for waste disposal fees. ENTC assumes that the waste will be made up of mostly pine trees.

LINE ITEM 7: Beds and Furrows (Flattening). In this line item, ENTC's price includes the cost to flatten bedding and furrows. Like the cost estimate in the MBI, ENTC uses a total of 38.7 acres of bedding and furrows to be flattened. ENTC assumes that such task will be done by the use of a bull-dozer.

LINE ITEM 8: Pine Clearing – Premerch. In this line item, ENTC's price includes the cost to clear pine trees. Like the cost estimate in the MBI, ENTC uses a total of 2.56 acres of pine trees. ENTC assumes that such task will be done by the use of a bull-dozer, an excavator, and a dump truck.

LINE ITEM 9: Pine Clearing – Merch. In this line item, ENTC's price includes the cost to clear pine trees. ENTC assumes that this is identical to Line Item 8, since the cost estimate in the MBI uses a lump sum of the same price in Line Item 8.

LINE ITEM 10: Surveying. In this line item, ENTC's price includes the cost to do land survey work. Like the cost estimate in the MBI, ENTC uses a total of 8 hours of survey work. ENTC assumes that such task will be done by one surveyor, three laborers, and one pick-up truck.

LINE ITEM 11: Low Water Crossing Installation. In this line item, ENTC's price includes only the labor and equipment cost to install the Loose Rock and GeoWeb LWC. It is based on a recent vendor's quote in dollars per square feet. ENTC assumes the same total square feet used in Line Item 4: GeoWeb LWC. The cost estimate in the MBI uses lump sum pricing.

LINE ITEM 12: Creek Restoration. In this line item, ENTC's price includes the cost to remove the logging debris within the creek. Since the cost estimate in the MBI uses lump sum pricing, ENTC assumes that the required task is similar to removing 6 inch diameter tree stumps with an excavator and dump truck. ENTC assumes that a total of 800 tree stumps will be removed.

LINE ITEM 13: Silt Fence. In this line item, ENTC's price includes the cost to install and later on remove silt fence. Like the cost estimate in the MBI, ENTC uses a total of 90 linear feet of silt fence. ENTC assumes that such task will be done by two laborers and one skid-steer loader.

LINE ITEM 14: Sign Installation. In this line item, ENTC's price includes the cost to install signs. Like the cost estimate in the MBI, ENTC uses a total of 28 signs to install. ENTC assumes that the size of the signs is 4 inch by 4 inch, since a size was not found in the MBI. The task will done by one laborer.

LINE ITEM 15: Tree Cost – RPM Installation. In this line item ENTC's price includes the cost to plant various types of trees. Like the cost estimate in the MBI, ENTC uses a total of 115,482 trees. ENTC assumes that such task will be done by two laborers.

LINE ITEM 16: Herbaceous - Plugs Installation. In this line item ENTC's price includes the cost to plant herbaceous plugs. It is based on recent vendor quotes in dollars per each plug. Like the cost estimate in the MBI, ENTC uses a total of 15,392 plugs.

LINE ITEM 17: Establish Transects/Photo Stations. In this line item ENTC's price includes the labor cost to establish transects/photo stations. Like the cost estimate in the MBI, ENTC uses a total of 35 transect/photo stations. ENTC assumes that this work requires one scientist spending two hours to establish each station.

LINE ITEM 18: Field Work - Vegetative & Wildlife Monitoring. In this line item ENTC's price includes the labor cost to perform vegetative and wildlife monitoring. Like the cost estimate in the MBI, ENTC uses a total of 35 years of monitoring. ENTC assumes that this work requires one scientist spending one 8-hour work day per month or 12 work days per year.

LINE ITEM 19: Field Work - Hydrologic Monitoring. In this line item ENTC's price includes the labor cost to perform hydrologic monitoring. Like the cost estimate in the MBI, ENTC uses a total of 96 hours of monitoring. ENTC assumes that this work requires two scientists.

LINE ITEM 20: Travel Expenses. In this line item ENTC's price includes the cost to travel for the scientists in Line Items 17, 18, and 19. Like the cost estimate in the MBI, ENTC uses a total of 2,800 miles of travel. ENTC assumes that the travel expenses include the mileage charge for one vehicle (car or van) and the labor (driving) cost for two scientists.

LINE ITEM 21: Data Analysis & Report Preparation. In this line item ENTC's price includes the labor cost to perform data analysis and to prepare reports. Like the cost estimate in the MBI, ENTC uses a total of 35 years of data analysis and report preparation. ENTC assumes that this work requires one scientist spending one 40-hour week per year.

LINE ITEM 22: Report Preparation Materials. In this line item ENTC's price includes the material cost to prepare the reports in Line Item 21. Based on the 40 hours per year, ENTC assumes that only one report is completed every year. Similar to the cost estimate in the MBI, ENTC uses a total of 35 years of report preparation supplies and uses the cost rate of \$200 (before mark-ups) of supplies per report or per year. ENTC assumes the supplies consist of mostly printer paper and ink toner.

LINE ITEM 23: Shrub Reduction. In this line item ENTC's price includes the cost to cut shrubs. The shrubs will be cut with a mower, as described in the MBI page 68. Like the cost estimate in the MBI, ENTC uses a total of 1,000 linear feet of length. ENTC assumes a width of 500 linear feet, since such dimension is not found in the MBI. It is also assumed that this work requires one 32" power push mower.

LINE ITEM 24: Chemicals (Nuisance and Exotic Species Control). In this line item ENTC's price includes the material cost for the chemicals used for species control. Similar to the cost estimate in the MBI, ENTC uses a total of 8 years of species control supplies and uses the cost rate of \$5,000 (before mark-ups) of supplies per year. This cost rate was compared to the cost of tree maintenance pest control at \$25 to treat three to six trees, which equates to 600 to 1,200 trees treated per year for \$5,000 in material cost.

LINE ITEM 25: Labor (Nuisance and Exotic Species Control). In this line item ENTC's price includes the labor cost to perform species control. Like the cost estimate in the MBI, ENTC uses a total of 8 years of species control. ENTC assumes that this work requires one technician spending two 8-hour work day per week or 104 work days per year.

MARK-UPS. ENTC's cost estimate uses the following markups:

Job Office Overhead =	20% (running percentage)
Home Office Overhead =	10% (running percentage)
Profit=	NONE
Bond=	2% (running percentage)

PRICING ANALYSIS. Reasonable and balanced pricing will be evaluated within this analysis. Price analysis techniques for determining reasonable and balanced pricing are defined in FAR 15.404. The proposal is considered to be reasonable if it is no greater than 125% of the IGE, and it is considered to be balanced if the difference in the distribution of pricings between the proposal and the IGE is no more than 5%.

PRICES IN THE MBI. As shown in Table 1, the MBI's total price is within 125% (75.6%) the ENTC's total price. This implies that the total price in the MBI is reasonable.

When the line items are evaluated separately, there is one line item, Line Item 25, where the MBI's price is above 125% of ENTC's price. This implies that, for Line Item 25 the price in the MBI seems high. Secondly, there is one line item, Line Item 15, where MBI's price distribution is significantly different (>5%) from ENTC's price distribution. This implies that, for Line Item 15 the price in the MBI seems unbalanced.

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Joseph Joson, E.I.
Cost Engineer (CESAJ-EN-TC)

Enclosures:

1. "Brandy Branch Construction and Implementation Cost Estimate.pdf"