

**REIMBURSABLE/NON-REIMBURSABLE COSTS  
For The  
ELECTRONIC BAGGAGE SCREENING PROGRAM**

June 2008

VERSION 1.0

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# Table of Content

Table of Content .....	i
Table of Figures .....	ii
Table of Tables .....	ii
1.1. Overview.....	1
1.2. Purpose.....	1
1.3. Allowable/Allocable and Reasonable Costs .....	1
1.3.1. Typical Reimbursable and Non-Reimbursable Costs for TSA Baggage Screening Projects.....	2
1.4. Cost Estimating.....	5
1.4.1. Purpose:.....	6
1.4.2. Executive Summary .....	6
1.4.3. Project Scope Description:.....	6
1.4.4. Methodology used to prepare the Estimate.....	6
1.4.4.1. Work Break down Structure (WBS).....	6
1.4.4.2. Tools and Data Bases.....	6
1.4.4.3. Major Cost Components: Labor, Equipment, Material .....	6
1.4.4.4. Sub Contractor and Prime Contractor Markups and Fees .....	7
1.4.4.5. Allowances.....	7
1.4.4.6. Other Factors.....	7
1.4.4.7. Schedule Requirements:.....	7
1.4.4.8. Assumption / Exclusions/ Exemptions .....	7
1.4.4.9. Areas of Risks .....	8
1.5. Cost Estimate Breakouts .....	8
1.5.1. Project Management/Construction Management.....	10
1.6. Determination of Funding Level.....	10
1.6.1. Contingency .....	11
1.6.1.1. Design Contingency.....	11
1.6.1.2. Construction “Contingency” .....	12
1.7. Escalation.....	12
1.7.1. Current Escalation.....	12
1.7.2. Forward Escalation .....	12
1.7.3. Cost Estimate Currency/Age.....	13
1.7.4. Estimate Reconciliation .....	14
1.7.5. Estimate Trending.....	14
1.8. Facility Costs .....	14
1.9. TSA Reimbursement.....	15
1.10. Invoicing and Earned Value Management (EVM) .....	16

## Table of Figures

Figure 1: Areas of Risk Breakout Sample .....	8
Figure 2: Sample Cost Estimate Breakout .....	9
Figure 3: RSMEANS Building Construction Cost Index (CCI).....	13
Figure 4: TSA Reimbursable Funding Breakout Sample .....	16
Figure 5: EVM Graph .....	17

## Table of Tables

Table 1: Allowable Fee Percentages .....	10
Table 2: Allowable Design Contingency Percentages by Design Phase .....	11

## ACRYONYM LIST

ACWP	Actual Cost of Work Performed
ATR	Automatic Tag Reader
BAC	Budget at Completion
BCWP	Budgeted Cost of Work Performed
BCWS	Budgeted Cost of Work Scheduled
BDR	Basis of Design Report
BHS	Baggage Handling System
BHSC	Baggage Handling System Contractor
BOE	Basis of Estimate
BSIS	Baggage Screening Investment Study
CBIS	Checked Baggage Inspection System
CBRA	Checked Baggage Resolution Area
CCI	Construction Cost Index
CPI	Cost Performance Index
CSI	Construction Standards Institute
CWE	Current Working Estimate
EAC	Estimate at Completion
EBSP	Electronic Baggage Screening Program
EDS	Explosive Detection System
ETD	Explosive Trace Detection
EVM	Earned Value Management
HVAC	Heating, Ventilation and Cooling
IATA	International Air Transport Association
LOI	Letter of Intent
OSR	On Screen Resolution
OTA	Other Transaction Agreement
PGDS	Planning Guidelines and Design Standards dated October 10, 2007
PLC	Programmable Logic Controller
PMO	Program Management Office
PSP	Passenger Screening Program
ROM	Rough Order of Magnitude
SV	Schedule Variance
TEC	Total Estimated Cost
TSA	Transportation Security Administration
VAC	Variance at Completion
WBS	Work Breakdown Structure

## **1.1. Overview**

The Transportation Security Administration (TSA) Electronic Baggage Screening Program (EBSP) is currently responsible for the deployment and installation of Explosive Detection Systems (EDS) at airports across the nation. As part of the deployment program, EBSP may issue Letters of Intent (LOI) or Other Transaction Agreements (OTA) to provide funding to support facility modifications and/or provide equipment to airports implementing checked baggage inspection systems (CBIS) that comply with the TSA's Planning Guidelines and Design Standards (PGDS) for CBIS, issued October 10, 2007, as well as maximizing the number of projects that can be executed during any given fiscal year through ensuring the level of funding provided to airports is only that required to fund the changes to the Baggage Handling System (BHS) necessary comply with TSA requirements for CBIS.

## **1.2. Purpose**

This document is provided as a tool to identify allocable and allowable costs associated with awarded OTAs, which are potentially reimbursable by the TSA during the review of funding applications or requests submitted by airports or projects sponsors. It also proposes draft policies and procedures for submittals required from the airports or project sponsors seeking TSA funding that more clearly indicate portions of the project potentially eligible for TSA funding, as well as establishing submittal guidance that allow for more accurate tracking and correlation of project progress to invoice submittals by the airport sponsor.

The processes and procedures outlined in this document for are based on industry accepted standard practices for cost estimating, and are representative of the processes and procedures already in use by the airports, airlines or project sponsors in estimating proposed baggage handling system projects.

## **1.3. Allowable/Allocable and Reasonable Costs**

As used in this document allowable, allocable and reasonable costs are referred to as reimbursable costs. Non-reimbursable costs, as used in this document are costs that are not currently deemed allowable, allocable or reasonable costs by TSA.

To be allowable, costs must be necessary and reasonable for proper and efficient performance of federal awards, be allocable (see next paragraph), and be authorized by state and/or local regulations. Additionally, the costs must conform to any limitations or exclusions set forth in federal funding guidelines, federal laws, terms and conditions of any federal awards, or other governing regulations as to the types or amounts of costs. The costs must be consistent with polices, regulations and process that apply uniformly to both federal awards and other activities of governmental units, and must be determined in accordance with generally accepted accounting principles. Allowable costs must be accorded consistent treatment and may not be assigned to a federal award as a direct cost if

any other cost incurred for the same purpose in like circumstances has been allocated to the federal award as an indirect cost. Finally, allowable costs must be adequately documented and cannot include or be used to meet cost sharing or matching requirements of any other federal award in either the current or prior period, except as specifically provided by federal law or regulation.<sup>1</sup>

Per OMB A-87, costs are allocable to a particular cost objective if the goods or services involved are chargeable or assignable to such cost objective in accordance with the relative benefits received. Additionally, OMB A-87 does not allow allocable costs identified or submitted to TSA to be charged to other federal agencies to overcome funding deficiencies or to avoid restrictions imposed by law or terms of the award<sup>2</sup>.

A cost is reasonable<sup>3</sup> if, in its nature and amount, if it does not exceed that which would be incurred by a prudent person under the circumstances prevailing at the time the decision was made to incur. In determining reasonableness of a given cost, consideration is given to:

- a. Whether the cost is of a type generally recognized as ordinary and necessary for the operation of the governmental unit or the performance of the Federal funding.
- b. The restraints or requirements imposed by such factors as: sound business practices; arms length bargaining; Federal, State and other laws and regulations; and, terms and conditions of the Federal funding;
- c. Market prices for comparable goods or services;
- d. Whether the individuals concerned acted with prudence in the circumstances considering their responsibilities to the governmental unit, its employees, the public at large, and the Federal Government; and
- e. A significant deviation from the established practices of the governmental unit which may unjustifiably increase the Federal funding (i.e., deviation from standard agencies practices, that will increase the cost to the government, without providing adequate justification).

FAR 31-302.2 identifies allowability in the following terms:

1. Reasonableness (cost is reasonable if, in its nature and amount, it does not exceed that which would be incurred by a produce person in the conduct of competitive business. FAR 31.201-3)
2. Allocability (cost is allocable if assignable or chargeable to one or more cost objectives on the basis of relative benefits received; incurred specifically for the effort, & necessary to the operation)
3. Cost Accounting Standards
4. Terms of the Contract

### **1.3.1. Typical Reimbursable and Non-Reimbursable Costs for TSA Baggage Screening Projects**

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<sup>1</sup> OMB Circular A-87, Section C-1, Factors affecting allowability of costs.

<sup>2</sup> OMB Circular A-87, Section C, 3. Allocable Costs

<sup>3</sup> OMB Circular A-87, Section C, 2. Reasonable Costs

In evaluating and identifying reimbursable costs the TSA design expert should assess each design against the following items:

1. Reimbursable costs:

- (a) TSA supports basic interior wall construction only. Costs in excess of basic interior wall construction are Non-Reimbursable. TSA supports basic interior wall finishes in bag inspection rooms. Costs in excess of basic finishes are TSA Non-Reimbursable.
- (b) TSA supports costs associated with the demolition of existing spaces, modification or renovation of existing spaces or fit out of newly constructed spaces, necessary to support the TSA's operations. However, TSA will only consider those costs associated with areas necessary for its operation or directly supporting baggage screening operations (e.g., checked baggage resolution area, the On-Screen Resolution Room (OSR) and the CBIS matrix). ( See Section 1.3.1(2)(a) regarding exterior walls and building shell.)
- (c) TSA supports air conditioning of bag screening rooms, OSR and CBRA/ETD and other areas that will be staffed by TSA field personnel. The exact extent of the HVAC cost that will be considered eligible for TSA reimbursement is assessed on a case by case basis.
- (d) TSA requires lighting in checked baggage inspection system areas, CBRA and the OSR meeting minimum building code and Occupational Safety and Health Administration requirements for lighting (lumen per square foot) for office space. TSA supports basic light fixtures necessary to meet lighting requirements in bag inspection and OSR rooms, costs in excess of basic fixtures are TSA Non-Reimbursable.
- (e) Automatic Tag Readers (ATR) are only eligible for reimbursement by TSA if utilized to support bag tracking. Eligibility and the exact amount of reimbursement will be determined on a case by case basis. If the ATR's are only used for reading the IATA bag tags for the purposes of identifying the bag destination and associated passenger/s for baggage reconciliation then they are Non-Reimbursable.
- (f) ATR may be considered reimbursable for systems that have been modified from a single carrier per make-up/sortation unit to multiple carriers per make-up sortation unit, where the carriers are now forced to sort baggage for loading to the appropriate plane. The only way to do this is via IATA carrier code or some type of additional tag. Either way the BHSC will need to supply some type of scanning array for sortation that was not needed prior to EDS.
- (g) Due to the remoteness, in some airports, of the OSR room from some CBIS and CBRA areas, and the need for communications during BHS maintenance, LEO, BOA and to notify personnel in the CBIS of OSR decisions, phone or other telecommunication systems are supported and reimbursable by TSA.
- (h) Closed caption television at the entrance and exit of the EDS is reimbursable by TSA on a case by case basis.

- (i) Centralized Baggage System Control rooms may be considered, subject to negotiation, if the airport is installing a centralized control room to minimize operational costs and this will be the ONLY area where the system can be monitored from.
  - (j) TSA will only consider reimbursement of Programmable Logic Controllers (PLC) if the addition of an in-line screening system requires a modification/addition to current systems. TSA will only consider reimbursement for the additional programming to control the in-line screening portion, and will only reimburse that portion of the controls necessary to support the CBIS, OSR and CBRA operations. See Section 1.3.1(2)(g) regarding eligibility of full replacement of the PLC.
  - (k) TSA will consider specific replacement and upgrade of the conveyor system necessary to support the integration of the screening matrix. Conveyor systems to support high throughput EDS screening system will be considered on a case by case basis.
2. Non-Reimbursable Costs:
- (a) The TSA does not reimburse costs associated with the buildings shell or exterior enclosure. TSA does not reimburse the cost of construction of terminal expansions, whether necessary to support TSA operations or for other purposes. See Section 1.3.1 (1)(b) regarding fit out of new spaces.
  - (b) TSA does not reimburse construction costs for TSA leased spaces. If TSA is leasing the space from the airport or airline, funding for facility construction costs or modification costs will not be approved, as it will be assumed that the airport will recoup the funds for the construction of spaces, such as the OSR or CBRA rooms.
  - (c) Centralized Bag System Control Rooms are not reimbursed by TSA if the Baggage Handling System (BHS) has been equipped with flow sensors with visual and audible alarms for jams, faults and other system related errors. See Section 1.3.1(1)(h)
  - (d) Extended warranties and the procurement of extended warranties are not reimbursed by TSA.
  - (e) On-site technical support has no bearing on the in-line screening system operation and therefore, is not reimbursable by TSA. [except during start-up and preparing for ISAT]
  - (f) Spare parts are covered under the standard one-year warranty for all EDS equipment purchased by TSA, therefore TSA does not require and does not reimburse the cost of any spare parts nor areas for storage of spare parts.
  - (g) The full replacement of an existing Programmable Logic Controller (PLC) package is a decision made by the airport/airline when soliciting bids. TSA will not reimburse full replacement of existing PLC programs to integrate EDS screening. See Section 1.3.1(1)(i) regarding sections of the PLC eligible for reimbursement consideration.
  - (h) TSA does not reimburse the cost of laptop computers used for maintenance of the BHS and CBIS.
  - (i) Baggage reconciliation (carousels or sortation systems) systems are not required in support of CBIS and are therefore non-reimbursable by TSA.

- (j) TSA does not reimburse costs associated with connectivity to Baggage System Management (BSM) data providers and/or BSM systems as the BSM is solely used by the airlines for internal processing, and is not a requirement of in-line screening. CBIS systems where TSA requests or supports initiation of selectee screening will require BSM. Reimbursement of BSM in these areas will be evaluated on a case by case system.
- (k) Manual encoding consoles are required only for sorting baggage with either unreadable tags, no bag tag destinations in the system or damaged tags. Manual encoding systems are not required as part of the TSA supported CBIS and are therefore are not reimbursable by TSA.
- (l) TSA does not support full replacement of conveyor systems as new in-feed, take away and transfer point conveyors are to the benefit of the airport (i.e., ticket counter belts and conveyor for the sortation area are not eligible for reimbursement).

#### **1.4. Cost Estimating**

The October 7<sup>th</sup>, 2007 version of the Planning Guidelines and Design Standards (PGDS) requires airports and/or project sponsors to submit cost estimates as part of the design package submission at each design phase (Pre-Design, Schematic, 30%, 70% and 100%). While the Pre-design and Schematic design phases require rough order of magnitude (ROM) costs, the 30% through 100% designs require detailed cost estimates based on the Basis of Design Report. However, format and requirements for the Basis of Estimate are not stipulated.

In order to ensure that TSA is only funding that portion of a project that is necessary to implement an automated, semi-automated (mini-in-line) or stand-alone CBIS the airports, airlines or other organizations requesting funding support from TSA should provide a detailed cost estimate summary as included in Appendix A at each phase of design. Additionally, estimates submitted for funding request purposes should include a Basis of Estimate (BOE), developed from the perspective of the prime contractor for construction, document that includes, at a minimum, the following elements:

- Purpose
- Executive Summary
- Project Scope Description
- Estimate Methodology
  - Work Breakdown Structure (WBS)
  - Tools and Data Bases
  - Level of Project Definition “Contingency”
  - Estimate Practices for Labor; Equipment and Material
  - Prime and Subcontractor General Requirements and Fees
  - Other Cost
- Schedule
- Assumptions, Inclusions, Exclusions, Risks, etc

Further explanation of each section of the each BOE component is furnished below.

#### **1.4.1. Purpose:**

This section of the BOE is to provide a brief concise description of the major components of the project scope, level of the estimate and those major exclusions. A clearly stated Purpose will provide an Executive Summary of the project and those efforts that took place prior to preparing the estimate as well as readying the user for the ensuing detail through the body of the estimate.

#### **1.4.2. Executive Summary**

This section provides a brief statement of the design level the estimate was based on and states if the Current Working Estimate (CWE) is authored by a single entity or a reconciliation of two (2) or more estimates. The executive summary will also state if the estimate has been escalated based on a project schedule, and summarize the CWE at a high level to show BHS, Other Construction Related Costs, and Soft Costs. If the design level has not incorporated an Existing Conditions study then Areas of Risk and their associated potential impact should also be assessed. This will provide TSA with a Total Estimated Cost (TEC) range from which to base decisions knowing that certain risks for lack of existing conditions will be further ascertained and will or will not become part of the base scope in subsequent design stages. Areas of Risk are further described later in this document.

#### **1.4.3. Project Scope Description:**

This section of the estimate should be organized to correspond to the Work Breakdown Structure “WBS” and will include a more detailed description of the major components of the project and the means and methods assumed in the estimate to construct them.

#### **1.4.4. Methodology used to prepare the Estimate**

##### **1.4.4.1. Work Break down Structure (WBS)**

Explaining the estimate structure plays a significant role in any future required reconciliation, as such a generic description of the estimate format and relationships of detailed cost items to their hierarchy should be given. A sample WBS is provided in **Appendix A**.

##### **1.4.4.2. Tools and Data Bases**

The BOE should indicate the primary estimating methodology used in preparing the cost estimate including those for cost resources, historical data, estimating tools and documents.

##### **1.4.4.3. Major Cost Components: Labor, Equipment, Material**

Major cost elements used in preparing the estimate should be described, thereby further demonstrating the Estimator’s level of effort and knowledge of the project requirements. For example: equipment cost in the estimate was derived from multiple indexes including R.S. Means, Blue Book Equipment Rental Rates, and in

the case of the casting yard equipment and specialized erection equipment actual invoices from other projects were utilized.

#### **1.4.4.4. Sub Contractor and Prime Contractor Markups and Fees**

Since mark-ups and fees can be subjective, articulating the style of contract and the expected General Requirements and Fees used is inherent to the BOE's purpose.

#### **1.4.4.5. Allowances**

Allowances used in the estimate and the reason they were used should be clearly stated.. For example: a 10% cost allowance for project phasing due to the contractor being required to fully mobilize and de-mobilize workers and equipment to the project site each day.

#### **1.4.4.6. Other Factors**

In order for the effort to be factual and complete the Estimator should describe any other elements bearing on the estimated calculations including: Project Options; Cost Risks; and deviation from Standard Practices.

#### **1.4.4.7. Schedule Requirements:**

A complete BOE must address the project schedule. A well versed BOE will address those specific requirements provided for in the estimate to maintain all major and interim milestones including: procurement, fabrication, anticipated shift work and work week schedule. Any assumptions made regarding the Projects Key milestones should be stated.

Once TSA has made the determination to fund the Project and the LOI/OTA has been negotiated, the airport or project sponsor should submit a cost and resource loaded schedule in Microsoft Project within 30 days of signature of the LOI or OTA. The schedule should be submitted in both hard and soft copy, and must contain enough detail for TSA to monitor that status of activities related to the design, construction, and installation and testing of the Checked Baggage Inspection System (CBIS), the On-Screen Resolution (OSR) room and the Checked Baggage Resolution Area (CBRA). In addition the schedule should include the anticipated delivery dates for Explosive Detection Systems, Explosive Trace Detectors (ETD) and any other equipment TSA is anticipated to provide.

This schedule, in conjunction with the project cost estimate provides the basis for the Earned Value Management required in Section 1.9.

#### **1.4.4.8. Assumption / Exclusions/ Exemptions**

The BOE should include three separate and distinct bulleted listings, that concisely identify the assumptions, exclusions and exemptions utilized in developing the estimate. The assumptions should document any assumed premiums for shift work, compressed phasing, and work anticipated to be completed by other entities. Additionally, a clear list of all activities and work that is not included in the

assumption or presumed to be excluded based on the statement of work, should be clearly identified.

**1.4.4.9. Areas of Risks**

Once existing conditions have been established and reflected in design documents, the estimate should include, as either pricing factors on line items or as estimate-wide factors that inflate the costs of labor, material and equipment cost as globally as necessary, as well as assessments for:

- The Sequence of Work to adjust for Labor Productivity, Shift Premiums, unusual daily access to the site, multiple and phased staging;
- Area/space constraints that may require hand tool versus large equipment utilization;
- Any other subsidiary work the contractor will be required to perform in order to safely proceed with construction; and
- Any other constructability issues

Up to the 30% design phase when an Existing Condition study has not been performed, the estimate should provide a “Range” based on the design’s team assessment of Areas of Risk. A Rule of Thumb for the Low Range is to reduce the Design Contingency to half of what the base estimate has provided. The High Range can be assessed by identifying Risk Factors and their corresponding probability and cost impact. A formal process is not being recommended in this document. However, factors to consider have been provided in **Appendix B**. Figure 1 below is a sample range estimate.

**Figure 1: Areas of Risk Breakout Sample**

ESTIMATED PROJECT COMPLETION DATE: TBD		Estimate Construction Cost at Award (\$s)				
Current Working Estimate - Effective Pricing Date: May-08		CBIS Matrix Estimate	CBRA Area Estimate	OSR Room Estimate	Infra-structure Estimate	TOTAL ESTIMATE
CWE Scope Based on Design Level of: 10%						
<b>TOTAL ESTIMATED COSTS (TEC) (CURRENT \$s)</b>		31,954,000	1,331,000	250,000	14,800,000	48,335,000
<b>Areas of Risk</b>						<b>Cost Impact</b>
Sequence of Work - Productivity Loss, Congested areas, Site access, Stakeholder constraints						\$ 4,625,000
Labor Availability for NYC Area						\$ 4,070,000
CBIS Technology Issues						\$ 2,362,000
Unknown/TBD Constructability Issues - Interface w/existing BHS systems						\$ 4,834,000
Commissioning						\$ 1,181,000
<b>Range of Risk</b>						<b>\$ 17,072,000</b>
<b>Low Range of TEC</b>						<b>\$ 44,307,000</b>
<b>High Range of TEC</b>						<b>\$ 65,407,000</b>

**1.5. Cost Estimate Breakouts**

Additionally, estimates submitted for funding request purposes should, at a minimum, include the elements below as [Figure 2: Sample Cost Estimate Breakout](#).

- o The Current Working Estimate (CWE) sheet included herein as **Appendix C** “Current Working Estimate Summary” includes;

- Subtotal estimated construction values as cost accounts (columns):
  - Baggage handling system (BHS)
  - Checked Baggage Inspection System (CBIS)
  - On-Screen Resolution (OSR) Area
  - Checked Baggage Resolution Area (CBRA)
  - Infrastructure Construction (IC)
- Each account above should be organized in a report by CSI Division summary Master Format 2004.
- The following SoftCosts:
  - Construction Contingency
  - Design and programming
  - Project/Construction Management
  - Escalation
- BHS estimates listed separately under CSI division 34 “Transportation” as noted in Appendix C and include as separate items each of the following:
  - Project Management
  - Equipment
  - Installation
  - Engineering
  - Controls
  - Testing

**Figure 2: Sample Cost Estimate Breakout**

CURRENT WORKING ESTIMATE SUMMARY		By ABC Cost Consulting				
AIRPORT IDENTIFIER:	JFK					
AIRPORT NAME:	John F. Kennedy International Airport					
PROJECT NAME:	Terminal One - Option 2					
ESTIMATED PROJECT COMPLETION DATE:	TBD	Estimate Construction Cost at Award (\$s)				
Current Working Estimate - Effective Pricing Date:	May-08	CBIS Matrix Estimate	CBRA Area Estimate	OSR Room Estimate	Infra-structure Estimate	TOTAL ESTIMATE
CWE Scope Based on Design Level of:	10%					
<b>HARD COSTS (ECCA)</b>						
a. Subtotal BHS (Rounded)		23,615,000				23,615,000
b. Subtotal Other Construction Related Costs (Rounded)		3,014,000	1,109,000	208,000	12,333,000	16,664,000
<b>c. Hard Costs Sub-Total (a. + b.)</b>		<b>26,629,000</b>	<b>1,109,000</b>	<b>208,000</b>	<b>12,333,000</b>	<b>40,279,000</b>
<b>SOFT COSTS</b>						
Construction Contingency	5.00%	1,331,000	55,000	10,000	617,000	2,013,000
Design w/Const Admin	8.00%	2,130,000	89,000	17,000	987,000	3,223,000
Project & Construction Management	7.00%	1,864,000	78,000	15,000	863,000	2,820,000
Escalation NONE	0.00%	-	-	-	-	-
<b>Soft Costs Sub-total</b>		<b>5,325,000</b>	<b>222,000</b>	<b>42,000</b>	<b>2,467,000</b>	<b>8,056,000</b>
<b>TOTAL ESTIMATED COSTS (TEC) (CURRENT \$s)</b>		<b>31,954,000</b>	<b>1,331,000</b>	<b>250,000</b>	<b>14,800,000</b>	<b>48,335,000</b>

### 1.5.1. Project Management/Construction Management

Project Management as discussed in this document refers solely to the airport or airport’s existing Program Management Office (PMO) contractor’s oversight and management of activities necessary to install a CBIS solution (whether in-line, stand-alone or otherwise). Conversely, construction management as discussed in this document is the management activities undertaken by the general construction contractor and/or baggage handling system contractor (BHSC) to construct and install the CBIS solution (whether in-line, stand-alone or otherwise). Allowable Project Management and Construction Management costs are outlined in [Table 1: Allowable Fee Percentages](#).

### 1.6. Determination of Funding Level

Project Management, construction management, design fees and other so-called “soft costs”, many of which are undefined, can range from 2-3% to as much as 47% of the project construction cost.

TSA should only reimburse project management, construction management, escalation and design fees that can be directly apportioned to the TSA “allocable” portion of the BHS project. For example: if the overall project is \$100M, but TSA’s allocable costs are only 25% (or \$25M) of that, all project management, construction management, escalation and other costs will only be reimbursed against the \$25M in cost attributable to TSA’s requirements. All cost sharing apportionments (i.e., 75-25, 90-10, 95-5) should be based solely on the allocable costs negotiated. Using the example above, if the allocable/allowable costs from a \$100M project are only \$25M, then a 75%-25% cost sharing would only allow TSA to fund up to \$18.75M.

Further, TSA should only reimburse project management, construction management and design fees up to the levels identified below, unless specific justification is provided and approved in writing by the TSA Contracting Officer (CO) at the time of the negotiation (i.e., rates varying from those identified directly in the OTA, will not be accepted).

Description	Allowable Percentages
Project Management	2%
Construction Management	4-6%
Escalation	See Section 1.7
Design Fees	6% (up to 8% if including Construction Administration)
Contingency – Design	See Section 1.6.1.1
Contingency – Construction	5% of Projected Construction Cost, See Section 1.6.1.2

**Table 1: Allowable Fee Percentages**

## 1.6.1. Contingency

### 1.6.1.1. Design Contingency

Design contingency should be noted as separate and distinct items apart from direct construction costs and other associated mark-ups. Design contingency is understood to represent an amount added to the estimate to allow for items, conditions, or events for which the state, occurrence, and/or effect is uncertain but that experience shows will likely result, in aggregate, in additional costs<sup>4</sup>.

Design contingency may account for:

- Errors and omissions in the estimating process
- Variability associated with the quantification effort
- Incomplete design of anticipated final quantities
- Minor variability in labor (productivity, availability, etc.)
- Historically supported weather impacts
- Minor variability in wage rates
- Minor variability in material and equipment costs
- Substitute construction materials

Design contingency does **not** account for:

- Significant changes in scope
- Errors and Omissions in Design
- Major unexpected work stoppages (strikes, etc.)
- Disasters (hurricanes, tornadoes, etc.)
- Excessive, unexpected inflation
- Excessive, unexpected currency fluctuations
- Other Areas of Risks

Design contingency amounts shall correspond to the level of project design as per the following table:

% Overall Design Completion	% Contingency
0-30	20
30-70	15
70-90	10
90-100	5
100	0

**Table 2: Allowable Design Contingency Percentages by Design Phase**

Design contingency shall be applied to the sum total of the direct construction costs, including labor, material and equipment costs. Application of business concerns such as

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<sup>4</sup> AACE International Recommended Practice No. 10S-90 “COST ENGINEERING TERMINOLOGY”, copyright 2004.

general conditions, overhead and profit, escalation and other related mark-ups shall be based on the sum total of direct construction costs and design contingency.

### **1.6.1.2. Construction “Contingency”**

In most construction budgets, there is an allowance for contingencies or unexpected costs occurring during construction. Construction contingencies cover the uncertainty associated with inadequacies of incomplete project scope definition, estimating methods and estimating data. For example, construction contingencies may include:

- Design development changes,
- Schedule adjustments,
- General administration changes (such as wage rates),
- Differing site conditions for those expected, and
- Third party requirements imposed during construction, such as new permits.

TSA should allow construction contingencies of up to 5% of the total construction budget for allocable items. For example: If the total project budget is \$100M, but TSA has determined that it’s allocable share of the project is \$25M, then the 5% contingency would be developed against the \$25M budget only.

However, contingency should not be added into the base budget for negotiation but should require submission of “change orders”, outlining the change in condition that requires the additional funding and should require supporting documentation including modified plans and specifications for the change. Further, the contractor/airport should submit a cost estimate, meeting all the requirements of this document, with the “change order” justifying the change in cost.

Access to the 5% contingency funding should only be provided based on written approval by TSA’s CO of the proposed change order.

## **1.7. Escalation**

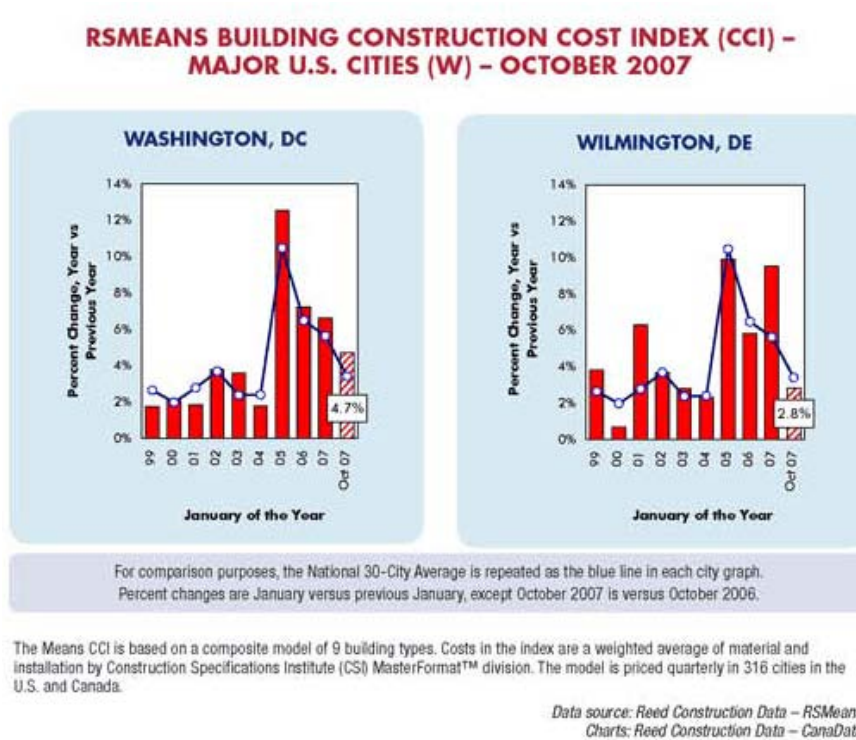
### **1.7.1. Current Escalation**

It is typical practice for estimators to use or reference legacy estimate/quotes, and commercial databases that have aged several months to a couple of years as part of their CWE. The body/details of the estimate should have all cost items in current year dollars (\$’s). The historical escalation used to bring data current should be based on RS Means Building Construction Cost Index (CCI) from the relevant source date to the current date.

### **1.7.2. Forward Escalation**

Escalation should be based on the average annual rate for the three years prior to the estimate development date as established by the most current quarterly published RS Means Building Construction Cost Index (CCI). The rate used should be based on the nearest city provided in the CCI. The following is an excerpt from the CCI as

**Figure 3: RSMEANS Building Construction Cost Index (CCI).**



Escalation should be noted as separate and distinct items apart from direct construction costs and other associated mark-ups. Escalation is understood to represent a provision in actual or estimated costs for an increase in the cost of equipment, material, labor, etc, over that specified in the purchase order or contract due to continuing price level changes over time<sup>5</sup>.

Escalation should be calculated from the scheduled construction start date to the midpoint of construction on a compounding basis. Escalation should be applied to the sum total of direct construction costs, contingency, general conditions and overhead and profit. Other related mark-ups should be based on the sum total as described above.

Should a construction schedule not be available, the CWE should be represented in Non-Escalated \$'s and clearly noted as such.

### **1.7.3. Cost Estimate Currency/Age**

CWE's should have an Effective Pricing Date no later than 90 day from the time of submittal and/or use for funding reimbursement request purposes. The Basis of Estimate documentation should clearly indicate the estimate is reflective of current market conditions. Estimates dated prior to 90 calendars days from the funding submittal date will require updating.

<sup>5</sup> AACE International Recommended Practice No. 10S-90 "COST ENGINEERING TERMINOLOGY", copyright 2004.

Estimates submitted for funding reimbursement request purposes should be accompanied by a market analysis specific to the airport location and timeframe during which proposed improvements will be performed. At a minimum, the analysis should include:

- b) Description of current bidding climate relative to number bidders responding to requests for proposals
- c) Use of Davis Bacon Wage rates, where applicable
- d) List of current construction projects, including project name, type, approximate construction value and schedule
- e) Use of union versus non-union labor
- f) Narrative of labor availability
- g) Narrative of material and equipment availability
- h) Review of typical contracting methods used in location

#### **1.7.4. Estimate Reconciliation**

It is common practice to have two (2) or more independent estimates prepared at a given design level to increase confidence and accuracy in the CWE for project and budget decisions. If a Reconciled Estimate is sought, the approach to reconcile the estimate should proceed with the following ground rules:

- (1) The formats for the estimate should strictly adhere to a WBS to evaluate scope of the project. A sample WBS is provided in Appendix A. Scope variance should be reconciled prior to review of pricing. Once scope differences are resolved updated estimate summaries should be generated.
- (2) Estimate Summaries should strictly adhere to the CWE format illustrated in Appendix C. As a rule of thumb variances in excess of 10% for each Division should be reconciled further. An explanation or rationale should be documented to provide an understanding of the reconciled value.
- (3) The “Reconciled” Estimate should be used as the Go-Forward estimate.

A sample report of the Reconciled CWE is provided as **Appendix D**.

#### **1.7.5. Estimate Trending**

As the subsequent design level is completed the CWE should be compared with the prior design phase CWE. Major changes to scope should be identified in a report along with the associated cost impacts. These changes should be approved by TSA prior to commencing with the next design phase. Once a project budget has been established, minor changes in cost should be added or deducted from design contingency. Hence with the exception of Major changes, the TEC should remain the same as the prior phase’s CWE.

### **1.8. Facility Costs**

Projects submitted to TSA for funding can typically be divided into four (4) primary categories:

- 1) Modification of existing baggage handling systems (BHS)
- 2) New facilities/terminal including BHS
- 3) BHS requiring extensive modification with the expansion of existing facilities (bump outs)
- 4) Redesign/retrofits and/or upgrades of BHS to meet new CBIS performance requirements

The primary rule that should be applied to each of these project types can be found in Section 3.3.2 of the *Working Group Report, Baggage Screening Investment Study* prepared for the Aviation Security Advisory Committee, dated 9 August 2006.

“In the Framework, known new terminal construction projects were assumed in the analysis, but no costs were assumed for yet-to-be-announced new terminals. Given that some new terminals will replace old terminals (i.e., they will replace rather than supplement existing terminal capacity), the Technical Team requested that some additional costs be assumed for providing in-line screening systems at future new terminals.

To include these costs, an estimated annual rate of terminal construction was developed for 2010 and beyond based on surveys conducted by industry associations, as discussed in Appendix B. The included costs only represent the portion of the construction cost for a new terminal associated with an in-line EDS screening system.”

Transportation Safety Administration should only reimburse or fund those construction costs at a new terminal or facility directly associated with an in-line EDS screening system, i.e., the electrical, mechanical, plumbing etc., requirements necessary to implement an in-line EDS screening solution and support the OSR Room and CBRA. Funding should be provided based on an agreed to percentage of the “allocable” costs for the TSA requirements at the facility plus facility costs based on the average national square foot price for similar functional space. Any agreed to program management, construction management, escalations or design fees will be in addition to funding for the BHS and facility costs. The square foot facility cost will be adjusted based on locality in accordance with the most current version of the RS Means locality modifiers.

A TSA Baggage Handling Expert should identify those portions of the baggage handling system design that are required to meet TSA screening requirements as outlined in the most current version of the PGDS. Facility costs, structural, mechanical (HVAC), plumbing, electrical, etc., necessary to support the portion of the airport facility utilized to meet TSA screening requirements should be funded/reimbursed on a square foot basis as identified above. This includes any areas necessary for the OSR Area or the CBRA.

### **1.9. TSA Reimbursement**

In general, the CWE should be for reimbursable costs only. If the CWE includes Non-Allocable Costs they should be factored from the estimate in a manner shown in **Appendix**

E. The format illustrated in Appendix E also provides a worksheet from which the appropriate TSA funding percentage can be applied to the reimbursable portion of the estimate. From this the additional funding (non-TSA) that is needed for a complete budget can be calculated as shown in Figure 4.

**Figure 4: TSA Reimbursable Funding Breakout Sample**

ESTIMATED PROJECT COMPLETION DATE: TBD			ECCA (\$'s)		TSA ALLOCABLE COSTS		TSA AGREED TO FUNDING		Additional Allocable Funding Needed (Non-TSA)
Current Working Estimate - Effective Pricing Date: May-08			TOTAL ESTIMATE		%	\$s	%	\$s	
CWE Scope Based on Design Level of: 10%									
<b>HARD COSTS (ECCA)</b>									
a. Subtotal BHS (Rounded)			23,615,000		100%	23,615,000	90%	21,254,000	2,362,000
b. Subtotal Other Construction Related Costs (Rounded)			16,702,000		100%	16,702,000	75%	12,527,000	4,176,000
c. Hard Costs Sub-Total (a. + b.)			40,317,000		100%	40,317,000	84%	33,781,000	6,538,000
<b>SOFT COSTS</b>									
Construction Contingency			5.00% 2,015,000		100%	2,015,000	75%	1,511,250	503,750
Design w/Const Admin			8.00% 3,226,000		100%	3,226,000	75%	2,419,500	806,500
Project & Construction Management			7.00% 2,823,000		100%	2,823,000	75%	2,117,250	705,750
Escalation NONE			0.00% -		100%	-	75%	-	-
Soft Costs Sub-total			8,064,000		100%	8,064,000	75%	6,048,000	2,016,000
<b>TOTAL ESTIMATED COSTS (TEC) (CURRENT \$s)</b>			<b>48,381,000</b>		<b>100%</b>	<b>48,381,000</b>	<b>82%</b>	<b>39,829,000</b>	<b>8,554,000</b>

### 1.10. Invoicing and Earned Value Management (EVM)

Invoices/requests for payment should include a summary page utilizing the same format as the cost estimate to allow for ease of tracking and comparing actual expenses to agreed costs.

Additionally, because of the widely accepted practices of EVM and the equations ability to measure cost performance, airports, airlines or other organizations requesting funding support from TSA should provide a current EVM analysis. This analysis should identify work completed to date and include a forecast of the work anticipated to be completed during the next month or invoicing period, whichever is longer.. The EVM data should be representative of the entire project scope in the WBS format utilizing the most current up to date cost loaded project schedule. Estimates with EVM calculations submitted for funding reimbursement request purposes should include, at a minimum, the following EVM elements:

- Budgeted Cost of Work Scheduled “BCWS”
  - Literally, representative of all cost including in-directs that are planned or scheduled. A well design schedule usually reflect these planned cost as a traditional S-curve shape
- Actual Cost of Work Performed “ACWP”
  - Once again literally representative of all cost including in-directs charged against activities that are completed
- Budgeted Cost of Work Performed “BCWP”

- More traditionally described as the “Earned Value” these are representative of the cost including in-directs for the activities that are completed, and are distinct from the BCWS which is for activities that are planned to be completed.
- Budget at Completion “BAC”
- Estimate at Completion “EAC”
- Schedule Variance “SV”
- Variance at Completion “VAC”
- Cost Performance Index “CPI” (ACWP/BCWP)

The BCWS, ACWP and ACWS provide the mechanics for a full analysis of the Projects progress and performance in the EVM environment. As depicted in Figure 5, the forecast of Estimate at Completion; Schedule Variance and Variance At Completion will be derived from these initial investments.

Where the EAC for the data date compiled is:

$$EAC = \frac{(BAC - BCWP) + ACWP}{CPI}$$

Note: CPI = ACWP/BCWP (poor performance is greater than one)

**Figure 5: EVM Graph**

