USAID
FROM THE AMERICAN PEOPLE

USAID Construction Assessment

NOVEMBER 21, 2014

Cover photo: A contractor works on the West Bank Hebron Bulk Water Supply Project, which will improve water supply for the local community.

Provided by Marshall McLeod

USAID CONSTRUCTION ASSESSMENT

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ACRONYMS AND ABBREVIATIONS

Agency	USAID
ADS	USAID Automated Directive Systems (USAID guidance)
ASHA	American Schools and Hospitals Abroad Office, in DCHA Bureau
BFS	USAID Bureau for Food Security
CDCS	Country Development Cooperation Strategy
CO/AO	Contracting Officer/Agreement Officer
COR/AOR	Contracting Officer Representative/Agreement Officer Representative
DCHA	USAID Bureau for Democracy, Conflict, and Humanitarian Assistance
E&E	USAID Bureau for Europe and Eurasia
E&I	Office of Energy and Infrastructure, in E3 Bureau
E3	USAID Bureau for Economic Growth, Education, and Environment
F	Department of State, Office of the Director of Foreign Assistance ("F")
F Framework	Foreign Assistance Framework
FAR	Federal Acquisition Regulation(s)
FARA	Fixed Amount Reimbursement Agreement (see Appendix VI, USAID Contracting Terminology)
FFP	Food for Peace Office, in DCHA Bureau
FSN	Foreign Service National
FSO	Foreign Service Officer
G2G	Government to Government assistance (see Appendix VI, USAID Contracting Terminology)
GAO	U.S. Government Accountability Office
GH	USAID Global Health Bureau
IG	Inspector General
International Practices Study	*International Development Construction: A Survey of Practices and Results* (CH2M HILL 2014)
LAC	USAID Bureau for Latin America and the Caribbean
M	USAID Bureau for Management

M&E	Monitoring and evaluation
MCC	U.S. Millennium Challenge Corporation
M/OAA	Bureau for Management, Office of Acquisition and Assistance
NGO	Nongovernmental Organization
OAPA	USAID Office of Afghan and Pakistan Affairs
O&M	Operations and Maintenance
OFDA	Office of Foreign Disaster Assistance in DCHA Bureau
OTI	Office of Transition Initiatives in DCHA Bureau
PEPFAR	President's Emergency Plan for AIDS Relief
PIO	Public International Organization (see Appendix VI, USAID Contracting Terminology)
PPL	Bureau of Policy, Planning, and Learning
PSC	Personal Services Contractor
UNOPS	United Nations Office of Project Services
USAID	U.S. Agency for International Development
USDH	U.S. Direct Hire

ACKNOWLEDGEMENTS

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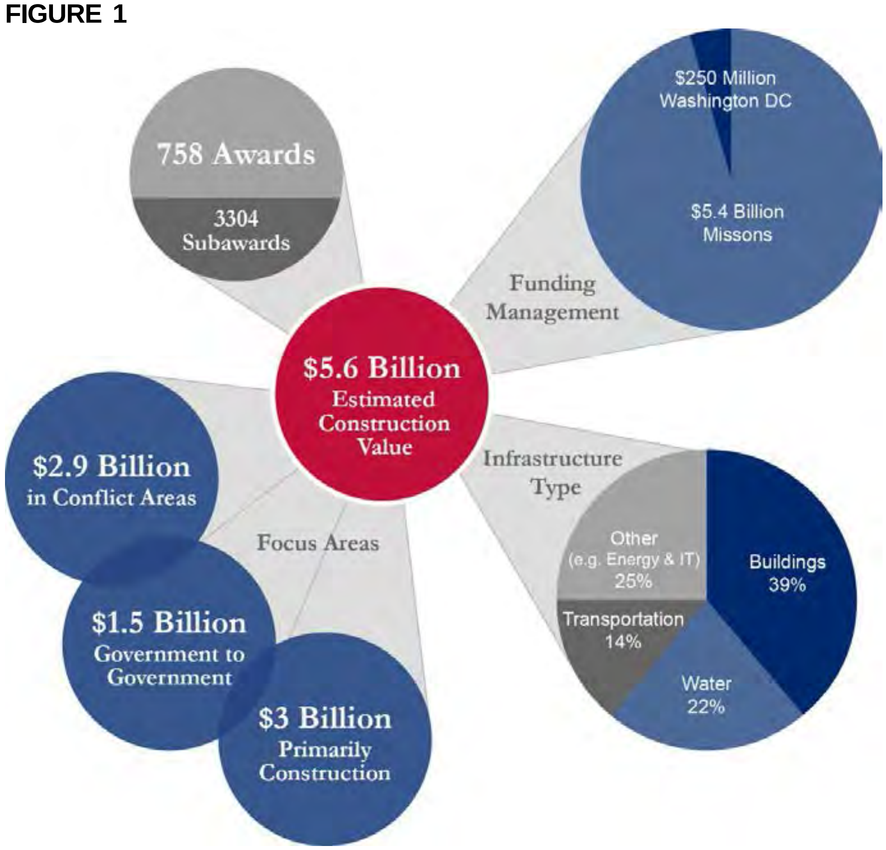
SUMMARY

USAID's global construction portfolio includes a broad and rich array of activities throughout the world. Projects range in size from very large to very small. Many are primarily construction, but others involve minor infrastructure under awards having primary objectives other than construction. Some are new construction, and others focus on rehabilitation. These construction activities are conducted in areas subject to varying degrees of conflict. USAID uses eight primary types of mechanisms for awarding construction, and an array of management practices as diverse as the places and settings in which the Agency works.

In 2013, USAID conducted a survey of construction awards for the purpose of deepening our understanding of the scope, location, and parameters of the portfolio. The survey identified 758 prime awards (including 3,304 subawards) that included construction and were active during the two-year assessment period. Together, these awards represented an estimated value of $5.6 billion (Figure 1).

FIGURE 1



Estimation is necessary because more than half of the construction work is in awards that are not predominantly construction, and construction value within such awards is not formally tracked. The survey reveals that construction is even more significant in sectors such as health and education than previously thought.

Over one-third of the construction subawards included buildings (39%), almost one-quarter (22%) were water related, and 14% included transportation. The remaining subawards were for energy, solid waste management, and other activities such as telecom and outdoor sports facilities projects (25%).

In terms of geographic distribution, one-third of USAID's construction subawards were reported in predominantly conflict areas, which represented just over half the value of the portfolio. Similarly, 68% of the portfolio value was distributed among Afghanistan (27%), Pakistan (24%), and countries of the Middle East (14%). Although clearly much of this construction was not reported in conflict areas, it is a part of the world where much has been invested because of conflicts.

Table 1 provides additional details on the nature of USAID's construction portfolio.

TABLE 1. USAID'S CONSTRUCTION PORTFOLIO

REGION/OFFICE	CONSTRUCTION VALUE	TOTAL NUMBER OF AWARDS	TOTAL NUMBER OF SUB AWARDS
TOTAL	**5,618,022,347**	**758**	**3,304**
MISSION SUBTOTAL	**5,366,056,538**	**474**	**1,942**
Afghanistan and Pakistan	2,876,979,883	50	79
Africa	839,258,954	166	303
Asia	364,336,255	26	175
Europe and Eurasia	250,255,660	48	445
Latin America and the Caribbean	270,521,975	80	447
Middle East	764,703,810	104	493
WASHINGTON BUREAUS SUBTOTAL	**251,965,810**	**284**	**1,362**
Bureau for Food Security (BFS)	4,200,000	6	7
Economic Growth, Education, & Environment (E3)	12,141,608	5	12
Global Health (GH)	10,220,000	4	7
Democracy, Conflict & Humanitarian Assistance (DCHA) subtotal	225,404,202	269	1,336
DCHA/ASHA (American Schools and Hospitals Abroad)	30,722,075	58	58
DCHA/FFP (Food for Peace)	66,016,422	102	87
DCHA/OFDA (Office of Foreign Disaster Assistance)	97,869,936	95	86
DCHA/OTI (Office of Transition Initiatives)	30,795,769	14	1,105

Balancing risk, good development, and humanitarian outcomes will be the challenge.

KEY FINDINGS

- Existing USAID construction policy and operational guidance[1] do not provide enough strategic and operational guidance to accommodate the variety of construction types, settings, and purposes identified through this survey.
- The survey revealed inherent and observed risks that are not uncommon in the international construction industry. USAID currently has no standardized Agency risk review procedure or process in place.
- Management approaches, particularly in levels of oversight, professional experience, and managing change, were found to be variable across the portfolio. This reflects not only the decentralized nature of the USAID system but also the shortage of USAID engineering expertise. Balancing risk, good development, and humanitarian outcomes will be the challenge.
- There is no Agency-wide system to track key metrics (such as cost and schedule, progress, award information, geographic location, and other relevant parameters).
- USAID offices currently exempted from the construction policy in Automated Directives System (ADS) 303 because of their humanitarian/emergency mandates and activities accounted for only 5% of total construction value during the two-year study period.

[1] Currently found in General Notice 22805, Construction Policy, April 3, 2012 and Automated Directives System (ADS) 303maw. Refer to Appendix I.

KEY RECOMMENDATIONS

- Broaden and deepen the construction policy to address the challenges the Agency faces, accounting for the survey findings and applicable laws.
- Develop guidelines on risk assessment and risk mitigation. USAID should begin systematic experimentation with risk management processes.
- Increase the number of Foreign Service and other engineers to provide oversight for such an extensive portfolio and to strengthen the knowledge and understanding of the many non-engineers who are managing and overseeing small construction activities.
- Strengthen Agency-wide management information systems and reporting requirements to be better able to track construction, particularly at the subaward level.
- Ensure that the officers and missions involved with construction as just a part of larger programs reflect what has been learned in the assessment in their different approaches, principles, and practices.
- Analyze the ideas and issues captured in this assessment in terms of the Program Cycle guidance. Many of the identified critical success factors are captured in the Program Cycle and other parts of the ADS. A similar process should be carried out by the Bureau of Management (M) for financing guidance, mechanisms, and procedures.

SECTION I

INTRODUCTION

This assessment's information will enable the Agency to better assess its existing systems and enhance processes as appropriate to improve the efficiency and effectiveness of its construction portfolio management.

This worldwide assessment of USAID's construction portfolio[2] (referred to throughout this document as the Construction Assessment) provides a survey of the character, scope, value, and management of construction activities supported by USAID during the period from July 1, 2011, to June 30, 2013. The Construction Assessment also included several analyses designed to improve USAID construction management performance and identify and mitigate portfolio risks.

Early in 2012, Agency senior management determined that a policy be issued and a worldwide survey should be conducted to improve the Agency's understanding of the character and extent of its construction portfolio and how it is managed. The assessment would also help USAID improve the knowledge of risks associated with its construction activities, and serve as a basis for developing strategies and procedures to reduce risk. This decision was informed by USAID's Office of Energy and Infrastructure (E&I) in the Bureau for Economic Growth, Education and Environment (E3) review of more than 20 USAID Inspector General (IG) audits between 2000 and 2010 that indicated numerous significant incidents of construction failure and performance deficiencies.[3]

[2] The Survey used the Federal Acquisition Regulation (FAR) definition of construction with some qualifications. *Construction, alteration, or repair (including dredging, excavating and [painting]) of buildings, structures or other real property. For purposes of this definition, the terms "buildings, structures, or other real property" include, but are not limited to, improvements of all types, such as bridges, dams, plants, high ways, parkways, streets, subways, tunnels, sewers, mains, power lines, cemeteries, pumping stations, railways, airport facilities, terminals, docks, piers, wharves, ways, lighthouses, buoys, jetties, breakwaters, levees, canals, and channels. (FAR 2.101)* (Exceptions to the definition for purposes of the study were: vertical construction less than $5,000 and horizontal construction less than $50,000, and activities solely for painting. More details are included in Appendix 1, Methods.)

[3] List of audits included in the references.

The Construction Assessment would also help USAID respond to various queries about its construction portfolio, including a request from the Government Accountability Office (GAO), for information on USAID's "large infrastructure projects," particularly those in conflict areas. A collaborative construction assessment team was assembled:

- USAID, particularly E3 and M Bureaus
- CH2M HILL, an international engineering and program management firm
- NORC at the University of Chicago, an independent social science research firm
- Willis Global Solutions, an international risk insurance consulting firm

The Construction Assessment addressed the size and complexity of the USAID construction portfolio through a combination of different techniques to identify and analyze results. Activities included:

- A **worldwide survey of USAID awards[4] with construction active in a two-year period[5]** to collect details on the character, scope, nature, and reported management practices of USAID's global construction portfolio. A rigorous methodology was established for the survey instrument design, data collection, and cleaning. The survey was completed by USAID field staff in the summer and fall of 2013 with assistance from the Washington-based Construction Assessment team. The survey included questions on compliance with USAID's policies and generally accepted engineering or project management practices. Regression analysis was used to help understand the data. The decision to conduct a construction survey was approved by the Administrator's Leadership Council. (The survey questionnaire is provided in Appendix II.
- Identification and rough estimate of the scope of the portfolio's **possible losses** using a proprietary actuarial approach to risk analysis used routinely in construction insurance industry, but cutting-edge in its application to foreign assistance. (See Appendix III.)

4 We use the term "award" as the unit of analysis throughout this report; this includes some procurement approaches even though these are not "awards" executed by USAID's Office of Acquisition and Assistance.

5 July 1, 2011, to June 30, 2013.

- **Four expert risk panels** for qualitative inputs from a range international construction subject matter experts and quantitative modeling to determine cost drivers and embedded losses. This was used both to estimate embedded risk costs for different types of construction and as a source of lessons about construction. (See Appendix III.)

- **A survey of practices** used by selected other donors or organizations implementing international development construction activities. This was used to help determine generally accepted engineering and project management practices. It should be noted that no bilateral agencies from other countries were included. (The complete *International Development Construction: A Survey of Practices and Results,* developed by CH2M HILL in April 2014, is included as Appendix IV, and is referred to throughout this report as the International Practices Study.)

Safe and reliable water supply pump constructed in Ghana.

- Evaluations or case studies are still planned to assess actual results in terms of quality and use of the infrastructure in the field and to deepen our understanding of management practices under the varying circumstances and risk mitigation practices and procedures.

The Construction Assessment data were collected through an online survey questionnaire developed to capture key attributes of the Agency's global construction portfolio. The limitations of the survey and the data, however, are important to keep in mind.[6] The survey was ambitious, with approximately 150 basic questions possible depending on what construction types were included. The assessment team was aware from the outset that much of the data sought would not be available because the survey was restricted to Agency files and staff knowledge. With the rapid turnover in mission staff, especially in Afghanistan and Pakistan, key knowledgeable individuals often were not available to participate in the survey. No construction sites were visited, as this was deemed to be an excessive burden on missions, the assessment team lacked sufficient qualified engineers to undertake site visits and provide consistent assessments, and the increase in time and cost required to systematically conduct site and partner visits would have been prohibitive. Implementing partners were not asked to complete or respond to any of the questions, because this would have been a potentially significant burden not covered by award language and budgets. Thus the team anticipated that a higher percentage of the data would be available for direct contracts and host country contracts that require more extensive reporting than for cooperative agreements, grants, and PIO grants that rarely require detailed reports. Even with the limitations—resulting in a non-response rate more than 65% for some questions—a very significant and large amount of valuable information was collected.

This information will enable the Agency to assess its existing systems and enhance processes as appropriate to improve the efficiency and effectiveness of its construction portfolio management. It is expected that this Construction Assessment will be useful to a broader public audience, including the Government Accountability Office (GAO) and Congress. Together, the survey and associated analytic activities provide an extensive understanding of the portfolio's scope and nature, aspects of management, and areas for further investigation through evaluations and possibly further research.

6 See Appendix V for full discussion of methods including the survey process.

SECTION II

SCOPE AND CHARACTER OF USAID'S CONSTRUCTION PORTFOLIO: A SNAPSHOT

This snapshot of USAID's portfolio comes from the survey responses based on USAID awards that were open between July 1, 2011, and June 30, 2013 (see Appendix V on methods for more detailed information). The general picture of the portfolio is therefore developed from understanding where construction was occurring during this period, the value of those open construction awards, the number of awards and subawards, whether the awards were primarily construction or not, and what type of infrastructure was being constructed. Construction data gathered included so many possible aspects that it is impractical to identify and examine all of them within the scope of this Construction Assessment report; accordingly, this report must focus in a few areas that provide the basis for needed follow up. After presenting the overall snapshot, special attention is given to the following topics:

- Large infrastructure (i.e., the 24 awards over $50 million), an area of interest for the GAO
- Construction in conflict areas (as reported by survey respondents)
- Construction that was part of health and education projects
- Construction under special circumstances: using G2G approaches (including G2G agreements, FARAs, and Host Country Contracts) and responding to emergencies, disasters, and crises.

OVERALL SNAPSHOT

To generalize, USAID's $5.6 billion portfolio of construction awards had two areas of concentration at opposite ends of the spectrum:

- *Primarily construction* (more than 80% of an overall award is construction). These awards constituted $3 billion of the value of all construction. This group of awards ranged in size from under a half million dollars to several hundred million dollars.
- *Micro/incidental awards.* Nearly one- third of USAID's awards were micro (less than $500,000). A particular concentration of these micro awards are "*incidental* awards," which are both micro-size and less than 20% construction. The portfolio included 137 incidental awards that total $643 million in value. Awards of this size were small enough to have been excluded from key provisions of USAID's construction policy.

Missions managed the most awards (474) as well as the greatest value, $5.4 billion, including Afghanistan and Pakistan. Afghanistan and Pakistan accounted for $2.9 billion, which was greater than the rest of the missions combined at $2.5 billion. Africa was the region with the next highest concentration of construction at $839 million; the fewer countries of the Middle East comprised a value of $765 million.

Of the 758 awards that included construction, 3304 subawards were identified. One-third of the subawards were initiated by Office of Transition Initiatives (OTI); the unique character of OTI construction is discussed below.

The portfolio's complexity made it difficult to accurately quantify the number of structures built, but 39% of the subawards included some kind of building (a vertical structure). Of these, one-third included schools, and one-fifth included hospitals and clinics. Nearly one-quarter of the subawards involved water (22%). These were fairly evenly split between water and wastewater (which tend to be related to health and sanitation) and water resources, a broader subcategory. One-eighth of the subawards included transportation (14%). The rest were energy, solid waste management, and other activities such as telecom and outdoor sports facilities projects (25%). The glossary includes details of the types of infrastructure USAID supports. Across the portfolio, half of the subawards included new construction, a little over one-third were rehabilitation, and the rest were upgraded, or expanded beyond the existing construction footprint.

FIGURE 2

FIGURE 3

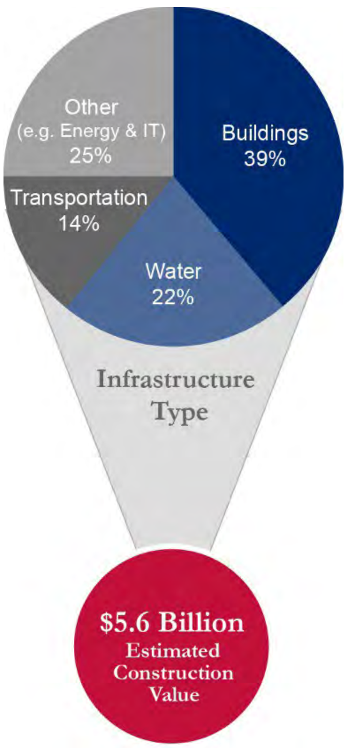


FIGURE 4

Two-thirds of the subawards were not in conflict areas. Fourteen of the large awards (over $50 million) were reported in primarily conflict areas, which contributed to just over one-half of USAID's construction **value** being implemented in primarily conflict areas.

Notably, $1.5 billion of the construction value was Government to Government (G2G) assistance (addressed further below).

Two different scale classifications are discussed throughout the report:

- **Number of awards in value ranges:** less than $0.5million, $0.5-1 million, $1–10 million, $10-50 million, $50–100 million, and greater than $100 million. Awards over $50 million are called *large*.
- **Percent of total award value for construction:** primarily construction (greater than 80% of an award's value was estimated as construction), mixed (50–80% construction and other activities 20-50%), and less than 20% construction. When awards are both less than $0.5 million and less than 20% construction, they are called *incidental*.

The snapshot captures the broad outlines of the portfolio, but much can be learned from sharpening the focus.

GEOGRAPHIC LOCATION

For the purpose of this Construction Assessment, geographic location is not a geographic analysis of the location of construction activities, but instead reflects the source of the awards (also referred to as the management location of the award).[7] Analysis of the source of award provides a general picture of most of the portfolio (particularly as measured by value of award rather than the number of the awards.)

The worldwide nature of USAID's construction portfolio is clear in Map 1, which shows the missions with the number and value of their awards. Table 2 provides a regional breakdown of mission construction awards. Maps 2 through 5 show further regional details.

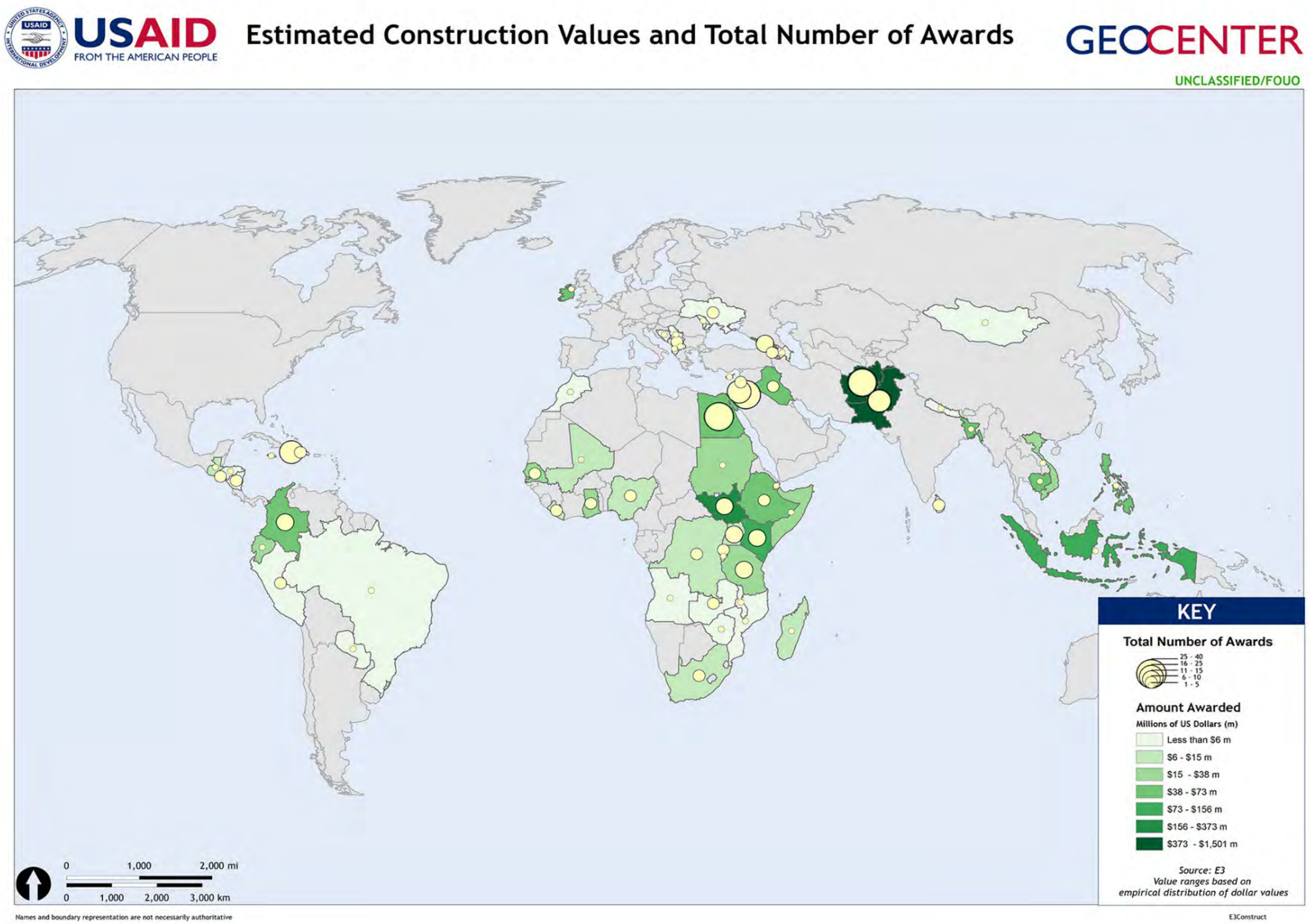
Africa and LAC missions' awards both clearly followed the pattern of concentration of awards that are primarily construction as well as concentrations of awards that are incidental construction (micro and less than 20%). Nearly half of Africa's awards were less than $500,000. Over half the awards in the Middle East were primarily construction, but the size of the Middle East awards was concentrated between $1 million and $50 million. Asia and Europe and Eurasia varied both by size and percent of construction.

TABLE 2. AWARDS BY REGION

REGION	VALUE OF AWARDS	NUMBER OF AWARDS
Africa missions	$839 million	166 awards
Asia missions	$364 million	26 awards
Europe & Eurasia missions	$250 million	48 awards
Latin America & the Caribbean (LAC)	$271 million	80 awards
Middle East missions	$765 million	104 awards
Afghanistan & Pakistan	$2.9 billion	50 awards

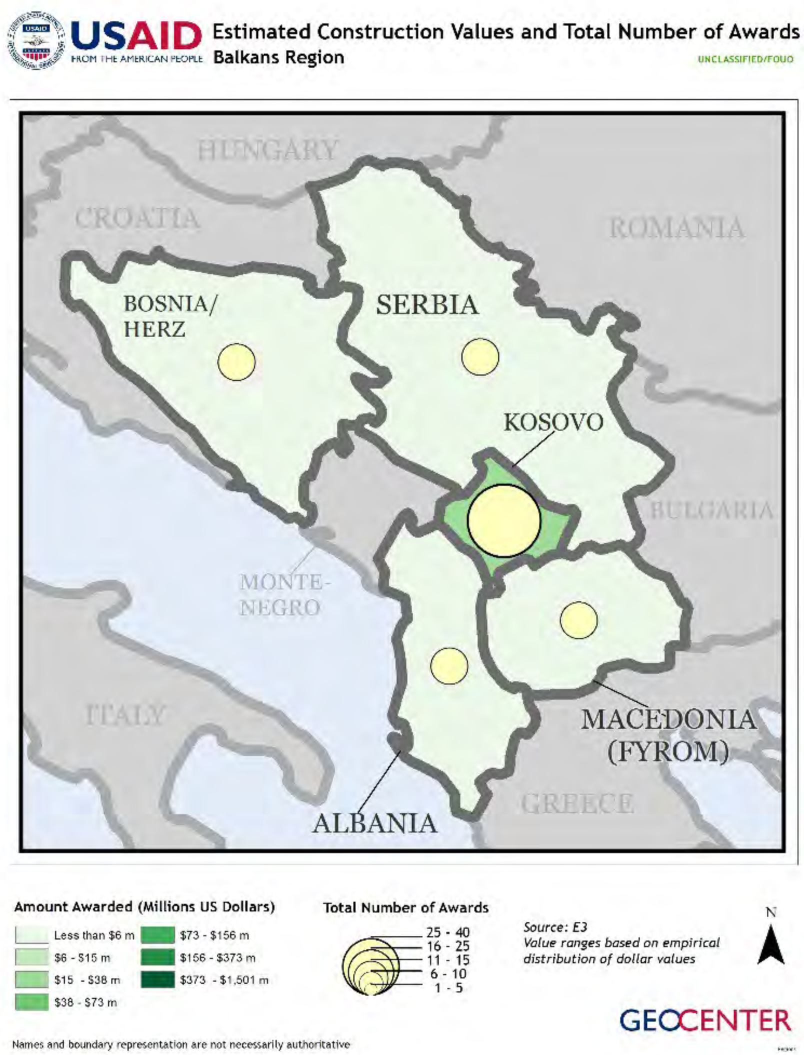
7 The survey contains a question about country location, but the responses could not be tied to the construction values. Due to this complication, the construction location and value of infrastructure funded from Washington cannot be linked and are not included in this section.

MAP 1



USAID
FROM THE AMERICAN PEOPLE
Estimated Construction Values and Total Number of Awards
GEOCENTER
UNCLASSIFIED/FOUO
KEY
Total Number of Awards
25 - 40
16 - 25
11 - 15
6 - 10
1 - 5
Amount Awarded
Millions of US Dollars (m)
Less than $6 m
$6 - $15 m
$15 - $38 m
$38 - $73 m
$73 - $156 m
$156 - $373 m
$373 - $1,501 m
Source: E3
Value ranges based on
empirical distribution of dollar values
0 1,000 2,000 mi
0 1,000 2,000 3,000 km
Names and boundary representation are not necessarily authoritative
E3Construct

MAP 2


USAID
FROM THE AMERICAN PEOPLE
Estimated Construction Values and Total Number of Awards
Balkans Region
UNCLASSIFIED/FOUO
HUNGARY
CROATIA
ROMANIA
BOSNIA/
HERZ
SERBIA
KOSOVO
BULGARIA
MONTE-
NEGRO
ITALY
MACEDONIA
(FYROM)
GREECE
ALBANIA
Amount Awarded (Millions US Dollars)
Less than $6 m
$6 - $15 m
$15 - $38 m
$38 - $73 m
$73 - $156 m
$156 - $373 m
$373 - $1,501 m
Total Number of Awards
25 - 40
16 - 25
11 - 15
6 - 10
1 - 5
Source: E3
Value ranges based on empirical distribution of dollar values
N
GEOCENTER
Names and boundary representation are not necessarily authoritative

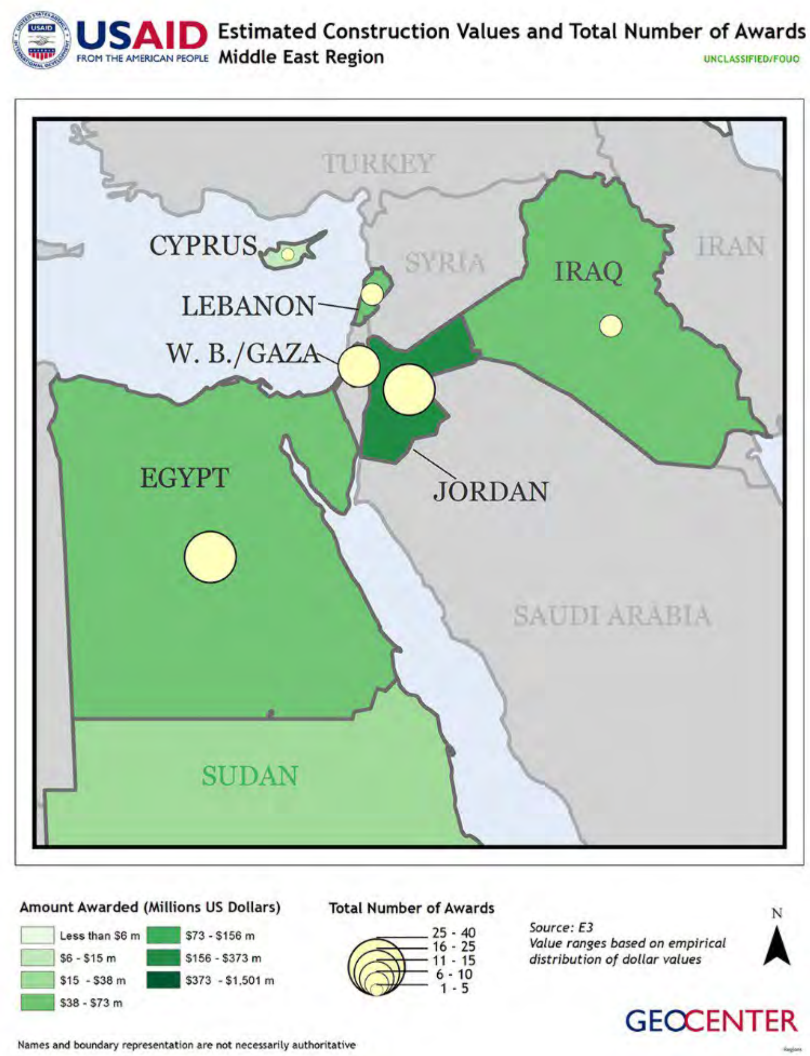
MAP 3


USAID
FROM THE AMERICAN PEOPLE
Estimated Construction Values and Total Number of Awards
Caucasus Region
UNCLASSIFIED/FOUO
RUSSIA
GEORGIA
ARMENIA
AZERBAIJAN
TURKEY
IRAN
SYRIA
IRAQ
Amount Awarded (Millions US Dollars)
Less than $6 m
$6 - $15 m
$15 - $38 m
$38 - $73 m
$73 - $156 m
$156 - $373 m
$373 - $1,501 m
Total Number of Awards
25 - 40
16 - 25
11 - 15
6 - 10
1 - 5
Source: E3
Value ranges based on empirical distribution of dollar values
N
GEOCENTER
Names and boundary representation are not necessarily authoritative

MAP 4


USAID
FROM THE AMERICAN PEOPLE
Estimated Construction Values and Total Number of Awards
Latin America and Caribbean Region
UNCLASSIFIED/FOUO
CUBA
MEXICO
JAMAICA
BELIZE
HONDURAS
HAITI
DOM. REP.
GUATE- MALA
NICARAGUA
EL SALVADOR
PANAMA
COSTA RICA
VENEZUELA
COLOMBIA
Amount Awarded (Millions US Dollars)
Less than $6 m
$6 - $15 m
$15 - $38 m
$38 - $73 m
$73 - $156 m
$156 - $373 m
$373 - $1,501 m
Total Number of Awards
25 - 40
16 - 25
11 - 15
6 - 10
1 - 5
Source: E3
Value ranges based on empirical distribution of dollar values
N
GEOCENTER
Names and boundary representation are not necessarily authoritative

MAP 5


USAID
FROM THE AMERICAN PEOPLE
Estimated Construction Values and Total Number of Awards
Middle East Region
UNCLASSIFIED/FOUO
TURKEY
CYPRUS
SYRIA
IRAN
IRAQ
LEBANON
W. B./GAZA
EGYPT
JORDAN
SAUDI ARABIA
SUDAN
Amount Awarded (Millions US Dollars)
Less than $6 m
$6 - $15 m
$15 - $38 m
$38 - $73 m
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25 - 40
16 - 25
11 - 15
6 - 10
1 - 5
Source: E3
Value ranges based on empirical distribution of dollar values
N
GEOCENTER
Names and boundary representation are not necessarily authoritative

In addition to Afghanistan and Pakistan, seven countries had particularly large construction portfolios as shown in Table 3. To some extent, the largest construction portfolios were within USAID's largest missions.

Although most awards originated from missions, Washington bureaus and offices executed and managed some of the construction awards as well. Bureau for Food Security (BFS) had six awards that included construction, E3 including the offices of Education and E&I had five, and GH had four, one of which included the President's Emergency Plan For AIDS Relief (PEPFAR)-funded Supply Chain Management System, with an estimated $10 million of construction.

DCHA had 269 from several of its offices: American Schools and Hospitals Abroad (ASHA), Food for Peace (FFP), the Office of Foreign Disaster Assistance (OFDA), and OTI, but FFP, OFDA, and OTI all have particular approaches and authorities to be able to respond quickly and effectively to disasters, emergencies, and crises. Countries such as Yemen, which had nearly $10 million of construction in multiple subawards, did not show up on the map because the construction was funded from Washington offices.

TABLE 3. COUNTRIES WITH CONSTRUCTION AWARD VALUES ABOVE 1% OF USAID'S CONSTRUCTION PORTFOLIO

COUNTRY	PERCENTAGE OF PORTFOLIO VALUE	AWARDS VALUE
Afghanistan	27%	$1.5 billion
Pakistan	24%	$1.4 billion
South Sudan	7%	$374 million
West Bank/Gaza	5%	$297 million
Jordan	5%	$274 million
Georgia	3%	$157 million
Indonesia	3%	$142 million
Haiti	2%	$126 million
Kenya	2%	$103 million

For a complete understanding of the USAID construction portfolio, it is important to look beyond the numbers and values of the 758 awards and consider the number of subawards.

One other aspect of construction that shows regional variation is the distribution of construction subawards that included new construction, rehabilitation, or an upgrade (meaning the footprint of the construction was increased). Asia, Africa, and Afghanistan/Pakistan all exceeded the 50% average of new construction for the whole portfolio. Only 15% of all the subawards included upgrading, but LAC and Middle East were higher than that average, each having more than 25% upgraded. Comparatively more rehabilitation was done in the Bureau for Europe and Eurasia (E&E), which was double the amount of rehabilitation done by other bureaus.

AWARDS AND SUBAWARDS, MECHANISMS, AND PARTNERS

Part of what makes the understanding of the USAID portfolio challenging are the many possible approaches to financing infrastructure:

- Large direct contracts that are only infrastructure with international construction firms
- Multiple subawards under cooperative agreements
- Small subawards in large contracts for which construction is incidental
- Grants to nongovernmental organizations (NGOs)
- Grants to international organizations
- Interagency agreements with others part of the U.S. government and multi-donor trust funds

For a complete understanding of the USAID construction portfolio, it is important to look beyond the numbers and values of the 758 awards and consider the number of subawards. The 758 awards included 3,304 subawards, which averaged to 4.5 subawards for each award. Most countries had fewer than the average number of subawards included in their awards, but a handful of missions and Washington offices had much higher averages for subawards per award: an average of 61 subawards per award were identified in Iraq, 34 on average in the Philippines, 20 each in Kosovo and Colombia, and seven on average in the Sudan. The highest average number of subawards identified was 79 for OTI. Construction in the midrange-to-smaller procurements became more apparent when examining the subawards.[8]

[8] All types of awards were allowed under USAID Policy until the changes in General Notice 22805 in April of 2012 and further refined in ADS 303 maw. Refer to Appendix 8

Another way to deepen our understanding of the awards is to look at the type of implementing mechanism. The survey found eight primary types of mechanisms used to finance construction (Table 4). The most frequently used mechanism is the cooperative agreement. The USAID construction policy in ADS 303 states that unless a waiver is granted, cooperative agreements are not to be used for construction that is large or primarily construction (note that DCHA and West Bank/Gaza are excepted from these provisions). Although cooperative agreements are frequently used, more than half of the awards over $50 million were accomplished through direct contracts. Analysis showed that the cooperative agreements reported in Table 4 were either signed before the 2012 construction policy in ADS 303 or were exceptions because of size or managing bureau. The USAID Forward priority for Local Solutions is reflected in the 88 uses of the three types of awards defined in USAID guidance: G2G agreements, Host Country Awards, and Fixed Amount Reimbursement Agreements (FARAs). FFP accounted for most of the grants to Public International Organizations (PIOs). Types of award mechanisms are explained in Appendix VI. A more complete understanding of the complexities of construction financing should be included in further research and evaluation, and in follow-on working group discussions.

FIGURE 5

TABLE 4. TYPES OF AWARD MECHANISMS USED FOR CONSTRUCTION

AWARD MECHANISM	NUMBER OF AWARDS	PERCENT
Direct Contracts	165	22%
Cooperative Agreements	258	34%
Grants (excluding PIOs)	125	16%
PIOs	37	5%
G2G Agreements	20	3%
Host Country Awards	31	4%
FARAs	37	5%
Other*	14	1%
Unspecified	71	10%
Total	**758**	**100%**

* For example, USG Interagency, DCA, Multidonor.

Considerable diversity exists among the type of implementers that perform the construction. Data on implementers showed a strong pattern of managers using predominantly local construction firms at the subaward level.

In addition to the extent of subawards and the variety of award mechanisms, considerable diversity exists among the type of implementers that perform the construction. Data on implementers showed a strong pattern of managers using predominantly local construction firms at the subaward level (see Table 5). LAC is an exception; in almost half of their reported subawards, committees of local citizens managed and oversaw construction in consultation with ministry engineers.

Understanding who performs the construction, how it is related to the type of financing and award mechanism, and what this means for quality and sustainability will be further explored in subsequent research and evaluation.

TABLE 5. TYPE OF CONSTRUCTION IMPLEMENTER

WHICH OF THE FOLLOWING BEST CHARACTERIZES THE SUB-AWARDEE CONSTRUCTION IMPLEMENTER?	NUMBER OF SUBAWARDS
International construction/engineering firm	47
International firm (not primarily construction)	14
International NGO	84
Other international organization	14
Local construction/engineering firm	1,312
Local firm (not primarily construction)	153
Local NGO	55
Local government	27
Other local organization	321
Missing	1,303
Total	**3,330**

CONSTRUCTION TYPE DIVERSITY

The questionnaire was not designed to count the number of structures built. To get a sense of what types of infrastructure were captured in the snapshot, we look at the number of activities that included each type of construction. Table 6 shows the number of subawards that included each type of infrastructure.

Several things can be noted from the Table 6. More than 1,200 subawards included buildings from mission awards, of which half included schools, hospitals, and clinics. The data reveal other patterns:

- DCHA offices included 422 building-related subawards, over half of which were schools, hospitals, and clinics.
- LAC had the most subawards with schools.
- E&E had the most building-related subawards of all types.
- Africa and the Middle East had the most subawards including hospitals and clinics.
- Africa had the most water/related subawards but LAC, ME, and E&E had many as well.
- Because OTI had by far the greatest number of subawards overall, it also had the greatest number of subawards associated with roads, water, energy, and other types of construction.

Subawards with buildings (including schools and hospitals) showed a pattern of being concentrated in awards where infrastructure comprises less than 20% of the overall award. This means that school construction was often just a minor portion of larger projects that may have been focused primarily on education outcomes or stabilization objectives. Roads, all types of water, and energy subawards showed a similar pattern. Other transportation (other than roads) may have been part of a larger program in the same way, but just as often were the primary focus of the award.

Appendix VII, Descriptive Statistics, captures the more detailed information that was collected for each type of construction.

Bridge span construction at Arugam Bay, Sri Lanka.

TABLE 6. NUMBER OF SUBAWARDS INCLUDING TYPES OF INFRASTRUCTURE

REGION	ALL BUILDINGS	SCHOOL BUILDINGS	HOSPITALS AND CLINICS	OTHER BUILDINGS	ALL TRANSPORTATION	ROADS	OTHER TRANSPORTATION	ALL WATER	WATER& WASTEWATER	WATER RESOURCES	ENERGY	OTHER
Africa	164	28	54	96	14	11	9	80	40	57	3	25
Asia	30	9	1	21	32	18	26	44	26	18	3	64
EE	298	81	8	214	15	14	1	63	59	5	10	32
LAC	193	113	18	86	44	35	17	75	49	35	16	53
ME	111	32	39	44	12	12	3	65	60	6	1	14
OAPA	26	15	5	12	11	10	7	11	3	9	13	10
E3	-	-	-	-	-	-	-	4	4	-	1	-
BFS	-	-	-	-	-	-	-	-	-	-	-	1
DCHA/ASHA	49	30	14	9	-	-	-	6	5	2	2	-
DCHA/FFP	34	16	12	27	37	36	10	56	9	50	-	31
DCHA/OFDA	18	-	9	9	9	9	5	41	24	26	-	10
DCHA/OTI	321	108	26	189	292	291	1	269	147	192	40	466
Global Health	-	-	-	-	-	-	-	-	-	-	-	-
Total	**1,244**	**432**	**186**	**707**	**466**	**436**	**79**	**714**	**426**	**400**	**89**	**706**

Note:
Some subawards had multiple types of construction, so the rows do not add.

About two-thirds of the large awards were primarily construction (over 80% construction). Six of the eight largest awards were in Afghanistan and Pakistan.

LARGE INFRASTRUCTURE

Twenty-four awards were over $50 million (see Table 7). None of these large awards were in E&E or LAC, or managed from Washington.

About two-thirds of these large awards were primarily construction (over 80% construction). Seven were between 20% and 80% construction, and one that was less than 20%. These large awards were overwhelmingly for new construction.

Six of the eight largest awards were in Afghanistan and Pakistan. Most of the large awards were direct contracts. Five were G2G awards (a special case discussed in a following section), three were PIO grants, and four were cooperative agreements. Forty-three percent of the awards more than $50 million were in conflict areas; however, of the eight of those exceeding $100 million, 75% were identified as in conflict areas.

TABLE 7. CONSTRUCTION AWARD VALUE FOR LARGE INFRASTRUCTURE

REGION	NUMBER OF AWARDS BETWEEN $50–100 MILLION	NUMBER OF AWARDS OVER $100 MILLION	VALUE OF AWARDS $50–100 MILLION	VALUE OF AWARDS OVER $100 MILLION	TOTAL VALUE IN AWARDS MORE THAN $50 MILLION
Africa	4	1	$268 million	$221 million	$489 million
Asia	2	1	$121 million	$114 million	$235 million
E&E	0	0			
LAC	0	0			
ME	1	0	$50 million		$50 million
Afghanistan/ Pakistan	9	6	$585 million	$1.9 billion	$2.5 billion
Total	**16**	**8**	**$1 billion**	**$2.2 billion**	**$3.2 billion**

CONFLICT

Construction is a tool used in conflict programming across the spectrum—from very large/primarily construction, to very small/primarily not construction, and everything between. Just over 15% of the number of awards was designated conflict, but this fairly small number of awards totaled to a construction value of $2.9 billion. The one type of construction subaward reported predominantly in conflict areas was transportation; 95% of subawards with transportation included construction reported at conflict sites. Construction in conflict areas often has stabilization and transition objectives that are more important than, or as important as, the sectoral objectives.

A large majority of USAID's construction occurs in Afghanistan, Pakistan, and the countries of the Middle East Region (including North Africa). Although not all construction sites in these places were designated conflict by the survey respondents, it is generally considered that much of the investment in that part of the world has some relation to peace and security. Middle East Bureau had 12% of its awards in conflict areas, and these tended to be large. All of the countries in the Middle East with construction awards had at least 1% of the worldwide construction portfolio value, except Morocco.

In other parts of the world, Africa's 25 awards identified as conflict was the highest number of any other region. Because over one-quarter of the awards were less than $10 million, the construction value for Africa's conflict awards was relatively small. LAC was the region with the second-highest percentage of conflict awards at 21%, but the value was much smaller.

The survey found that 1 in 10 of USAID-funded construction awards was through G2G approaches during the assessment period.

HEALTH AND EDUCATION

The survey was not designed to disaggregate data on sectors such as health or education, but analysis of responses to several questions does suggest that significant amounts of construction were associated with health and education activities. There are several ways to get some insights on these sectors: 1) data on types of construction (see Table 6) and 2) awards reported as health and education in the Foreign Assistance Framework of the Office of the Director of Foreign Assistance ("F") at the Department of State.[9]

Because the F Framework question in the survey allowed for multiple answers, the construction award values and other details are not exclusive to those sectors. But some interesting observations can be made.

Over 200 construction awards were reported as being designated in the F Framework as including health activities; 186 subawards included hospitals and clinics, and 426 included water/wastewater. Hospitals, clinics, and water were all concentrated in Africa and the Middle East. About half of the hospitals, clinics, and water were in awards with construction values between $1 million and $10 million (that included values for all of the construction in those awards.)

The Bureau for Global Health was responsible for four awards, which included seven subawards. The estimated construction value for those Washington-managed awards was $10,220,000, including the single award mentioned previously for the PEPFAR-funded Supply Chain Management Systems that included $10 million of construction.

The other three fall into the incidental category (less than $500,000 and less than 20%). The construction value of all four of the awards was less than 20% of the overall award budget.

About 115 construction awards included education activities (from the F Framework). Awards are concentrated in the $1 million to $50 million range (the construction value includes activities unrelated to schools). The largest number of subawards with schools was from LAC (113) and OTI (108; see Table 6). Forty-three percent of the subawards that included schools were identified as being in predominantly conflict areas, but the data does not indicate whether the purpose was education, transition, or stabilization.

9 This analysis relies on responses to survey questions about what area and element of the F Framework were identified, not an analysis of the FACTS Info reporting itself.

GOVERNMENT-TO-GOVERNMENT ASSISTANCE

The survey found that one in ten of USAID-funded construction awards was through G2G approaches during the assessment period. These 83 awards totaled $1.5 billion of the construction award value (27%). The newly revised ADS 220, with USAID's guidance on G2G assistance, includes three types of G2G awards[10]:

- G2G agreements: 20 agreements for roughly $1 billion
- Host country awards: 31 awards for $237 million
- FARAs: 37 awards for $170 million

In contrast to the prevailing pattern for all construction awards that were concentrated in the very large and very small categories, three-quarters of the G2G agreements were in the midrange of $1 million to $50 million. Ninety percent of the G2G awards were more than 80% construction, including all of the Host Country Awards and the FARAs.

One of the driving forces behind G2G assistance is the intent to build the capacity of countries to lead their own development by working more directly with local governments, the private sector, civil society, and academia. Table 6 shows how much construction was accomplished through local partners.

RESPONDING TO EMERGENCIES, DISASTERS, AND CRISES

Rebuilding infrastructure following an emergency is often a priority activity. After a natural disaster, missions frequently make awards for much-needed reconstruction, as they did in response to the earthquakes in Haiti and Pakistan. Examples and lessons from several mission-managed post-emergency reconstruction efforts are provided in the side discussion, *Infrastructure as Part of Emergency Response.*

Infrastructure as Part of Emergency Response

ACEH ROAD, INDONESIA

In December 2004, a 9.2 magnitude earthquake and subsequent tsunamis devastated coastal communities across Southeast Asia; the road from the provincial capital of Banda Aceh was destroyed in the disaster, economically paralyzing the region. USAID committed to rebuild the road, working both with international and Indonesian firms. After seven years of effort, well over 100 kilometers of road were reconstructed or rehabilitated.

PAKISTAN EARTHQUAKE RECONSTRUCTION PROGRAM, PAKISTAN

In October 2005, a 7.6 magnitude earthquake critically damaged northern Pakistan. In response, USAID launched a multi-year reconstruction effort to rebuild schools and hospitals. The project conducted social feasibility studies and enlisted the community's involvement before sites and structure designs were selected. Throughout all phases of the project, public meetings soliciting community input, review, and agreement on final designs were conducted. USAID's diligence took time, but the result was strong community ownership in maintenance, use, and sustainability of the facilities. After approximately eight years of reconstruction, hundreds of thousands of Pakistanis are benefiting from the massive project.

LESSONS

Although emergencies create an atmosphere of urgency that surrounds USAID's response, the creation of infrastructure requires fundamental steps that are as necessary in post-emergency situations as in non-emergency situations. Fundamentally, all infrastructure projects must go through Planning, Design, Construction, and Operations & Maintenance. Stakeholder involvement and tendering/procurement can require significant amounts of time that are misaligned with the sense of urgency following a major emergency. Attention must be paid to sustaining the infrastructure over time through appropriate institutional arrangements, trained staff, and financial resources. To produce sound infrastructure that contributes to development objectives, the time requirement is unavoidable.

Note: The survey did not ask a specific question about post-emergencyresponse, so anecdotal information has been provided bysenior engineers in the Office of Energy& Infrastructure.

[10] The term *award* is used as the unit of analysis for G2G assistance, just as it is throughout the report; however, G2G assistance are not "awards" executed by USAID's Office of Acquisition and Assistance.

OFFICE OF FOOD FOR PEACE

FFP provides in-kind and cash-based food assistance to address both the emergent need for food and long-term food insecurity. Due to the complex nature of food insecurity, FFP engages in many food assistance activities across several program activity areas to ensure that the right people get the right food at the right time. Development food assistance programs target the underlying causes of food insecurity, and may include small-scale or incidental construction activities to improve agricultural livelihoods or market access. Emergency responses comprise the majority of USAID's food assistance programs, primarily implemented through the World Food Program, and construction was a minor component of programs providing life-saving food to those in need. The total estimated value of FFP construction activities reported was $66 million.

OFFICE OF TRANSITION INITIATIVES

OTI supports US foreign policy priorities by helping local partners advance peace and democracy in countries experiencing crises. Seizing critical windows of opportunity, USAID/OTI works to provide fast, flexible, short-term assistance targeting key political transition and stabilization needs in order to create and foster the political space that leads to longer-term development. Individual sub-awards are typically provided as in-kind assistance; are small in size (average between $40,000 and $50,000), and short in duration (average three to four months). Sub-awards may include small-scale construction as an incidental component (i.e. repairing a school or community center), as part of a larger transition or stabilization objective. There were 1,103 subawards comprising an estimated value of $31 million.

OFFICE OF US FOREIGN DISASTER ASSISTANCE

OFDA is the lead US Government agency for the coordination of international disaster responses. The mandate of OFDA is saving lives, reducing suffering, and reducing the social and economic impacts of disasters. OFDA was involved in 86 subawards during the survey period, or 2 percent of total agency-wide subawards. The many small activities totaled $98 million, representing 1.6 percent of total agency-wide construction funding. OFDA did not engage in any construction activities above $500,000 (the defined threshold in the construction policy in ADS 303) during the reporting period.

In addition to mission responses, DCHA has three offices that respond to disasters, emergencies, and crises: FFP, OFDA, and OTI. Together, these offices executed more than one-third of the construction subawards. Because their construction tended to be a small, supportive part of their programs, this represented only a small value (less than 5% of USAID's construction portfolio). Nevertheless, three of their awards were in the $10 million to $50 million range.

The three offices do operate differently, and one dimension of this is how they finance assistance, including construction:

- Most of OTI's subawards (711) are implemented under their 12 direct contracts, but there were also 306 subawards under their PIO awards.
- OFDA has 65 subawards under their grants, with a handful of activities each being reported under direct contract, PIO, and cooperative agreements.
- Most of FFP's subawards are done under cooperative agreements (38), with 10 under grants and five under PIOs.

OTI most often used local construction/ engineering firms (reached through their US prime contractors) and OFDA and Food for Peace most often worked with international NGOs. Seventy percent of OTI's activities were reported in conflict areas, half of OFDA's but only 3% of Food for Peace's.

SECTION III

DEEPENING THE UNDERSTANDING OF CONSTRUCTION RISK AND MANAGEMENT ISSUES

The Construction Assessment team reviewed more than 20 audits performed by USAID's Office of Inspector General[11] and recognized that USAID needed to focus greater attention on risks that can lead to issues such as poor quality that shorten the usable life of the infrastructure or can even result in injuries. Although this sample of audits represents a fairly small portion of USAID's large construction portfolio, the audits are likely to be representative of other problems more generally. As good stewards of such a sizable segment of U.S. foreign assistance, USAID's approach to construction management must include a more vigorous approach to assessment and mitigation of risk.

RISK

The Construction Assessment team performed deeper analysis to gain further understanding of risk analysis and management practices. These approaches have led to the extension of the data to be combined with tacit expert knowledge and theory to generate findings and issues for further investigation that can be found in Appendix III.

- ***International Development Construction: A Survey of Practices and Results*** (referred to as the International Practices Study), developed by CH2M HILL, provides a review of international construction industry practices and experiences, including systems tools and guidelines that USAID can consider in the process of strengthening

[11] List of audits are included in the references.

The assessment team identified 11 critical success factors that provide a basis for identifying potential best practices.

its own engineering and construction practices. Although not directly comparable to USAID's portfolio (only one of the included organizations is a bilateral foreign assistance agency), the review is useful for expanding USAID's understanding of the practices used by the Millennium Challenge Corporation (MCC, a fellow U.S. Government foreign aid agency with a very different business model), the U.S. Army Corps of Engineers, the World Bank, and the United Nations Office of Project Services (UNOPS). As part of the review process, the Construction Assessment team identified 11 critical success factors that provide a basis for identifying potential best practices. The full review of industry practices is included in Appendix IV, and citations of the studies that informed the critical success factors are in the references.

- **Expert risk panels**–a quantitative and collaborative method to establish relative significance of risks that are not otherwise readily measured–were established for this analysis: standalone infrastructure (defined as more than 50% of the value of the award was for construction), emergency response (specifically, OTI, OFDA, and FFP awards), non-infrastructure (less than 50% of the award was for construction), and direct G2G assistance. Subject-matter experts were convened to address "gaps" in the original survey and to develop estimates of embedded cost risks through four focused facilitation and discussion groups, or "risk panels." "Embedded losses" are estimates of the costs, including both direct financial costs and economic costs due to loss of service, that are attributable to loss factors such as schedule delays, poor quality, rework, operations and maintenance practices, reduced service life, and similar factors. These are referred to as *implicit* and *embedded* losses.

  Anticipating that historical data would be scarce, or in some cases nonexistent, the risk panels employed Willis's proprietary process Loss PIQ℠, which is specifically designed to quantify risks that do not lend themselves to more routine predictive modeling techniques. The Loss PIQ℠ is a spreadsheet model tool that facilitates and captures the risk panel interactive discussions and panelists' answers regarding individual risk scenarios and cost drivers that most likely affect some measured loss. The model was built using the survey data specific to each of the four risk panel topics.

- **Regression analysis** is an analytic tool that allows for the simultaneous consideration of multiple factors. Regression analysis of the survey data served two objectives:
  1. Identify the key correlates of different risk outcomes; that is, to identify which construction processes and management observations (factors) are correlated to the incidence and severity of the various risk outcomes, taking into account factors that are outside USAID's control (confounding factors).
  2. Estimate the distribution and magnitude of different implicit risk outcomes in the USAID construction portfolio. This estimate was developed using regression analysis, which seeks to identify statistically significant relationships between variables, and was used to model the distribution and magnitude of the risk outcomes.

The regression analysis was conducted at the subaward level. This is the level at which the type of construction was defined in the survey, so cost data could be related to quantity/capacity data, and most construction activity was directly implemented. The regressions were carried out on awards and subawards that were either completed or sufficiently far into the construction process that risk outcomes could be detected.

Limitations to these processes should be explicit:

- Analysis was conducted at the subaward level; this is where the data were weakest as a consequence of incomplete records and knowledge in missions, policy for minimal reporting from subawardees, and staff turnover, particularly in missions with conflict areas. The response rate (and number) of subawards included for the key outcomes analyzed were as follows:
  – Budget overruns: 693 (46% response rate for eligible cases)
  – Schedule delays: 697 (47% response rate)
  – Quality: 682 (45% response rate)
- Direct observation of outcomes was beyond the scope of this Construction Assessment; therefore, two key outcomes were based on proxies:
  – Quality was based on 1) reported rework and 2) lack of materials testing. When assessing the quality of a contractor, the need for rework indicates a serious quality issue. In USAID's working environment, rework may be equally an indication of the quality of vigilant management

and oversight Materials testing is an international best practice, and the non-response rate for questions in the questionnaire about subawards was 62%. These factors make these imperfect proxies for quality.

- Sustainability used planned operations and maintenance as the proxy. These indicators provide only a very partial indication of expected sustainability. Actual sustainability can be assessed only after the construction project is complete.

Although these processes were quite rigorous in combining the descriptive data, expert knowledge, and an innovative approach to estimating the level of loss that USAID risks, the results should not be taken as an assessment of the losses in USAID's portfolio. Instead, the results highlight the very role of a bilateral foreign assistance agency: to undertake activities that would not be commercially viable. Findings and conclusions from the additional analytic efforts are included in Appendix III.

Classrooms designed and constructed to withstand extreme storm and tidal action in Sri Lanka.

MANAGEMENT ISSUES

The survey included a number of questions about USAID management practices related to risk mitigation. A number of strengths appear in the data discussed below, including USAID's strategic allocation of its limited engineering staff. Challenges are also clearly identified, including those associated with insufficient engineering staff.

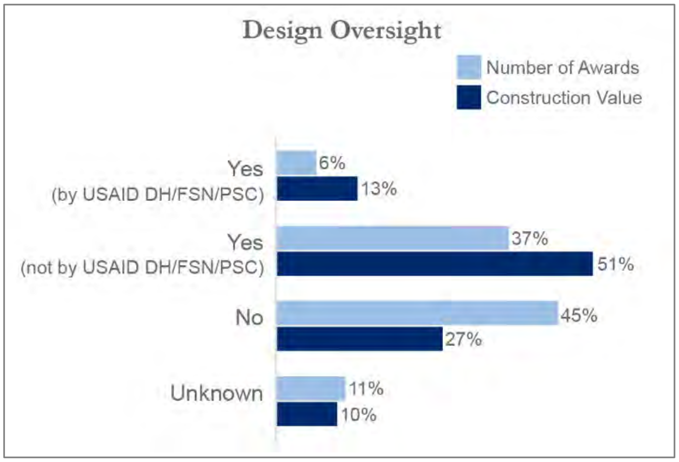
DESIGN OVERSIGHT BY ENGINEERS

The survey results indicate that 6% of construction-related awards utilized USAID engineering staff (Direct Hire, Foreign Service National, or Personal Services Contractor)[12] to oversee the design of the infrastructure to be constructed. Design oversight was provided by non-USAID staff for 37% of the awards, 45% of the awards had no design oversight, and design oversight was unknown for 11% of the awards (Figure 6).

The indication that 45% of USAID's construction-related awards lacked engineering design oversight should be a priority area of improvement. The magnitude of the deficiency is tempered when considering construction value; 27% of USAID's assessed construction value lacked design oversight, according to survey responses.

Interestingly, the survey results indicate that USAID staff managed a proportionally high construction value; the 6% of awards managed by USAID staff included 13% of the total construction value. These data suggest that USAID provides design oversight for higher-value projects because 64% of projects by construction value receive oversight. In this case, there is more reason to believe that the minimal supply of qualified and available USAID staff is the primary reason for the low percentage of design oversight coverage by USAID staff. The high construction value of awards overseen by USAID staff suggests a preference and demand for USAID staff to provide the design oversight on larger infrastructure

FIGURE 6



12 In some discussions of the survey results related to design oversight, the categories may appear differently. For example, the survey question categorized "host-country government engineer" with "USAID." Due to the unexpected categorization of some responses as "USAID," the discussion above has disaggregated the responses and grouped together USAID's Direct Hires, Foreign Service Nationals, and Personal Services Contractors as one group for "yes" responses, and then grouped together all other "yes" responses into a separate group.

USAID excels in engagement of the host government during the design process.

projects. Additionally, the high construction value of awards overseen by USAID engineering staff suggests that the Agency is effectively allocating its limited staff to produce the greatest impact.

Another important factor is the number of awards in which construction was a supporting or incidental activity; such awards are at greater risk of engineering oversight not being a priority. Although the strategy of allocating engineering expertise to the largest awards is practical, the survey also revealed how extensive these activities are.

FIGURE 7

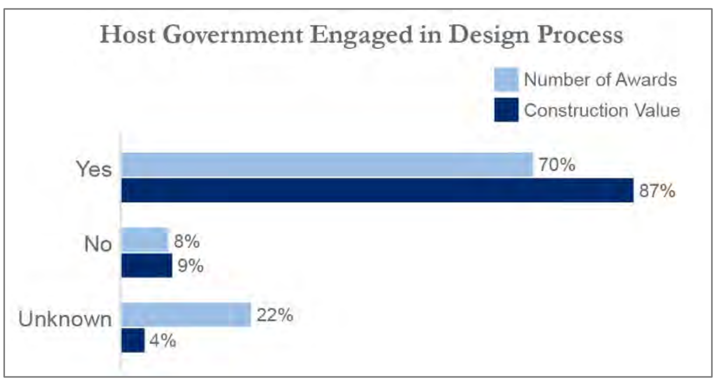
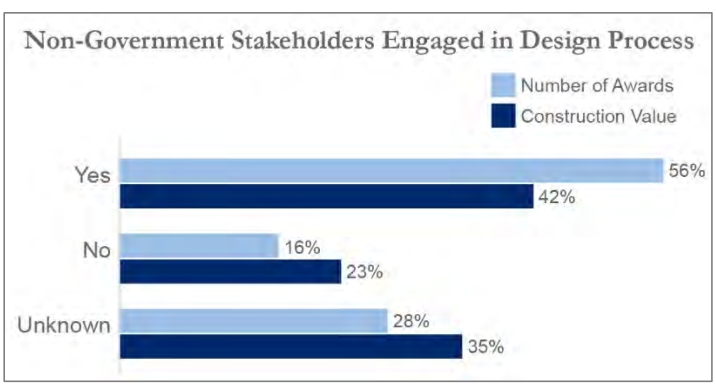


FIGURE 8



Additionally, small construction activities can carry major risks; for example, a simple elevated water tank could cost just a few thousand dollars, yet the risks associated with it falling can include injuries and fatalities. USAID must consider strategies, project design and development, and operational policy and information systems management practices to reduce risk on awards that include supporting and incidental construction.

INFRASTRUCTURE DESIGN PROCESS

The survey revealed details about several areas of the design process: stakeholder engagement, gender analysis, operation and maintenance (O&M) funding, and accommodation of disabilities.

Stakeholder engagement and analyses are critical components of infrastructure design that ensure the infrastructure serves its intended purpose and that negative side-effects are mitigated over the infrastructure's entire life. USAID excels in engagement of the host government during the design process (Figure 7). Respondents reported that the host government was engaged in 70% of the awards (87% of construction value). The design process also includes engagement of non-government stakeholders; here, the percentage of awards falls to 56% for stakeholder engagement (Figure 8). The government and non-government stakeholder engagement are both important to the long-term impacts desired from infrastructure, and in most cases the majority of users are non-government stakeholders. A hospital may be designed well to serve the needs of the government staff, but if it does not equally serve the needs of the local population, then the overall development impacts may suffer.

A gender analysis is a required component of USAID projects; the survey results indicate that a gender analysis was included for 58% of awards in the planning/design process (Figure 9). Missed opportunities and the creation of gender-related challenges can result without diligent analysis of the different ways in which gender and the proposed infrastructure interact. A majority of awards (58%) indicated that a gender analysis was included in the planning/design process.

To provide the benefits for which it was intended, infrastructure—such as a road, a hospital, or a water system—must be operated and maintained in the way its design intended. These O&M requirements carry a cost that may be measured in terms of money, time, and/or skill. Commonly, the host government accepts the burden of the O&M funding. The survey indicates that the actual availability of O&M funding was not assessed in 27% of the awards (Figure 10). In these cases, the practicality of the host government (or others) actually paying the O&M costs is completely unknown. The success of USAID's infrastructure projects and the return on USAID's infrastructure investments depends on the O&M requirements being fulfilled as intended over the life of the road, hospital, water system, or whatever the facility may be. A key question for follow-up case studies or evaluations would be whether host country governments have the fiscal (or technical) capacity to sustain the infrastructure to continue to provide services.

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FIGURE 9

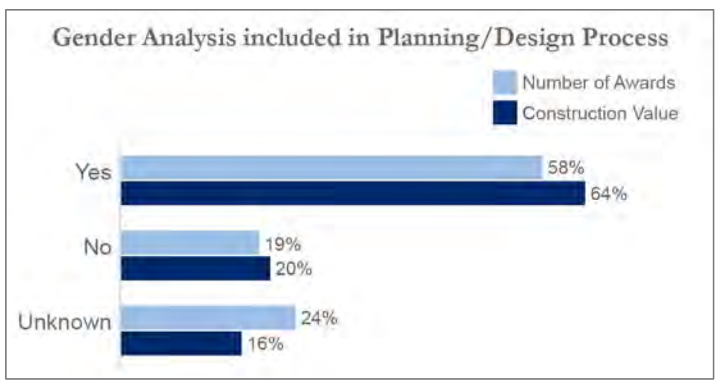
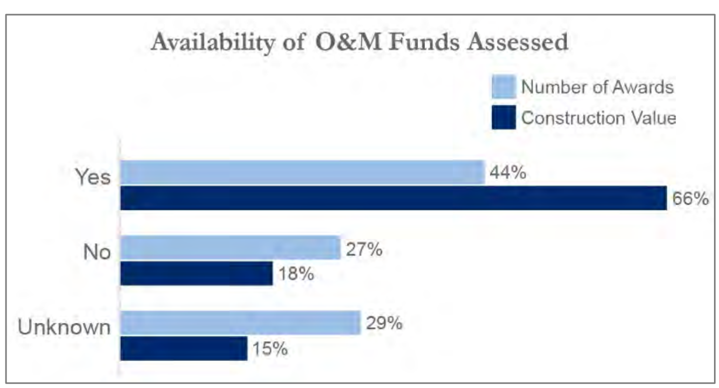
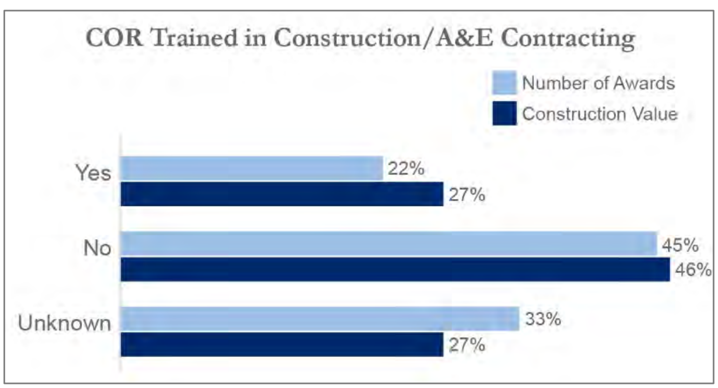


FIGURE 10



Section 611(e) of the Foreign Assistance Act requires mission director certification of the recipient institution's capacity (both financially and in terms of human resources) to properly operate and maintain proposed infrastructure, when the total infrastructure cost in an award is over $1 million. Of the 316 awards with construction values over $1 million, 22% reported that there was no assessment of the availability of O&M funding. The wording of the question could have suggested a more formal assessment process than the types of assessments that mission directors rely on. Risk panels indicated that attention to proper institutional and funding arrangements to sustain service delivery over time is particularly challenging.

FIGURE 11



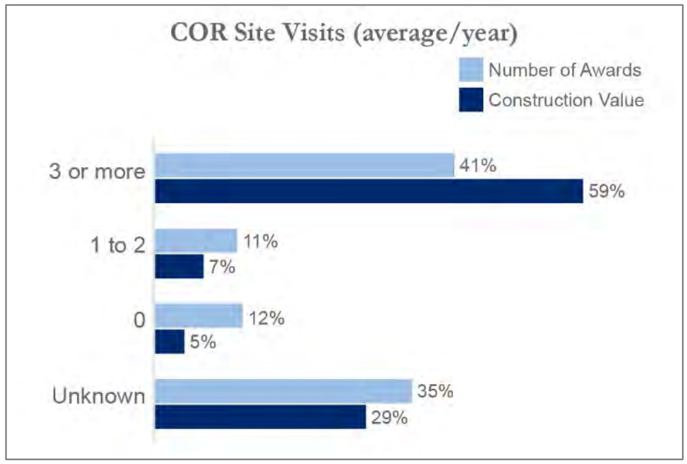
Disability accessibility standards are required for construction contracts. The questionnaire asked whether "subaward incorporated design elements to accommodate people with disabilities." Fifty-five percent of the subawards including buildings were reported as including such standards (of the 572 subawards with buildings that provided answers for the question).

CONTRACTING OFFICER REPRESENTATIVE/ AGREEMENT OFFICER REPRESENTATIVE

The primary USAID manager for a construction award is the Contracting Officer Representative (COR) or Agreement Officer Representative (AOR, which is the same role for different types of awards.) The survey results indicated that a construction award's AOR or COR tended not to be trained in construction or architecture/ engineering contracting; in 45% of the awards, the AOR/COR was reported as not trained in this technical area. The AOR/COR was reported as trained in 22% of the awards (Figure 11). The lack of available USAID staff with training and experience geared to infrastructure projects is reiterated in this survey result.

A few fundamental indications of AOR/COR performance are reflected in the survey results, importantly with respect to site visits. The majority of awards (52%) indicate an average of at least one site visit by the COR per year. A positive pattern is shown in the breakdown of these awards with site visits (Figure 12): awards with three or more site visits per year were proportionally of a higher construction value (41% of awards totaling 59% of construction value) than awards with just one to two site visits per year (11% of awards totaling 7% of construction value). A higher construction value is one factor indicating the need for more intensive management, such as via more-frequent site visits, so the pattern is a positive indication of effective allocation of resources (staff and staff time) by the Agency. However, the survey result shows that in 12% of awards, the AOR/COR did not visit the site of the construction project even once per year. The lack of qualified and available USAID staff is a theme reflected here once again, although it is not the only factor. Of the 91 awards with no AOR/COR site visits, 48 were in non-conflict settings, and 17 were in conflict settings (26 had incomplete data). With over half of USAID's construction activities occurring in areas of conflict, non-permissive environments preventing site visits are clearly an important factor that the Agency has been and will continue to address.

FIGURE 12



FINANCING MECHANISMS

Several issues should be highlighted for future discussion.

- USAID has made two policy changes in recent years: General Notice 22058 in April 2012 and the addition to ADS 303 in 2013. These policy statements now require that all construction must be financed under direct contract if the award is solely for construction. For awards with some portion attributable to construction, if the estimated cost of construction is $500,000 or more for a single project site, or $10 million in aggregate, the award must be a direct contract. G2G agreements, Development Credit Authority instruments (ADS 249) and PIO grants (ADS 308), DCHA and West Bank/Gaza, and other case-by-case exceptions are not subject to this requirement. Twenty-four cooperative agreements with an estimated construction value greater than $10 million were signed before the 2012 construction policy change but continued into the two-year Construction Assessment period. There are also a dozen cooperative agreements with estimated construction values greater than $500,000, but it is not clear whether these are single site. Although the policies are being followed, this significant amount of construction should be addressed in subsequent research and evaluation.

- There is low use of Federal Acquisition Regulations (FAR) Part 36, which is specific to contracting for construction and architecture-engineering services.[13] About 20% of contract officers were reported as having received construction-related training. The lack of necessary training might be reflected in the significant number of awards that did not use the construction contracting part of FAR Part 36.

- A third issue is only indirectly related to procurement. USAID guidance requires managing at the prime-award level, which the survey found to have a limiting effect on the records available and which constrains USAID's ability to conduct oversight. In many instances, this challenge has been addressed, and those lessons should be shared with other parts of the Agency.

CRITICAL SUCCESS FACTORS AND THE PROGRAM CYCLE

The International Practices Study identified 11 critical success factors for construction.[14] Experience has demonstrated that attention to these 11 factors strengthens construction implementation, improves quality of infrastructure, and minimizes risks.

While the construction survey was being conducted, several streams of work on USAID guidance and policy were in development, and these should support USAID managers as they work to address these factors. The Bureau of Policy, Planning, and Learning (PPL) developed full Program Cycle guidance in ADS 200-203. The Local Solutions Working Group and PPL developed new G2G guidance in ADS 220, and the Management (M) Bureau developed new forms of G2G contracting.

To address the management and procurement issues identified in the survey and to institutionalize changes, solutions will need to be integrated into these ongoing Agency processes listed in Table 8. This should be a significant area of follow up.

13 Note that FAR Part 36 is not relevant to all the construction addressed in the report; other parts of the FAR, such as part 15 Design Build, are also appropriate choices. But it would be useful to understand why the use of Part 36 was as low as it was.

14 Construction success factors were identified in the literature used for the Practices Study in Appendix 2 – these citations can be found in the references.

TABLE 8. CRITICAL SUCCESS FACTORS AND ADS GUIDANCE

CRITICAL SUCCESS FACTORS	PROGRAM CYCLE	ADS	PARTNER OFFICES
1. Project definition, screening, and selection process	CDCS, Project Design and Implementation	200-201	PPL, regional and pillar bureaus
2. Stakeholder engagement	Project Design and Implementation	200-201	Particularly DCHA's work on civil society
3. Policies and procedures addressing types of mechanisms	Activity Design	201, 220, 221 300, 302, 303, 304, 305, 308, 310	M Bureau
4. Institutional capabilities to operate and maintain investments	Project Design, and G2G planning	ADS 201 and 220	DCHA – Organizational Capacity Assessment and Local Solutions Team
5. Health, safety, environmental, and social requirements	CDCS and Project Design	201, 204 & 205	Bureau, Office and Mission Environment Officers
6. Appropriate design standards and technology for construction	Project Design and Implementation		E3 Office of Energy and Infrastructure; Agency Coordinator for Disability
7. Quality of cost estimating and scheduling	Project planning and pre-obligation requirements	ADS 201	PPL
8. Appropriate levels of contractor technical qualifications	Project Design and Implementation	302, 303	
9. Risk management methodology	Project Design and Implementation	ADS 220	PPL
10. Construction oversight and quality verification	Project Design and Implementation and Monitoring and Evaluation	203, 300, 302, 3003, 305, 308	M Bureau and PPL
11. Monitoring and evaluation	Monitoring and Evaluation	203	PPL

SECTION IV

CONCLUSIONS AND RECOMMENDATIONS

This Construction Assessment provides significant insights and information regarding USAID's international construction portfolio that require further investigation and understanding. It demonstrates that the extent, complexity, and diversity of the portfolio are, in all likelihood, greater than commonly understood. Although the survey provides a good picture of the portfolio's nature and extent, it is by design only a snapshot within the two-year period. However, when integrated with the findings of the risk panels and the International Practices Study, this assessment provides a basis for first steps in developing better management and risk mitigation practices.

CONCLUSIONS

Ultimately, the survey and risk panels revealed inherent and observed risks that are not uncommon in the international construction industry. Given the unique nature of USAID's construction practices; USAID's mandates and foreign policy expectations from the USG to work in a very broad range of environments (including many where conflict is a significant issue); the overall complexity, diversity, and geographic distribution of its projects; and how all these factors relate to its overarching development goals, one can still conclude that recognized best practices and critical success factors can be applied to USAID's observed management practices. These need to be examined in the context of Program Cycle guidance, G2G guidance, and the Agency Acquisition and Assistance procedures for construction, with appropriate flexibility incorporated for working in changing, security-challenged environments.

Several notable observations are presented below to inform improved policy, establish appropriate responses, and improve the efficiency and effectiveness of Agency construction practices.

- Management approaches, particularly regarding oversight, professional experience, and managing change, were variable across the portfolio. This reflects the decentralized nature of the USAID system but also the shortage of USAID engineering expertise. Integrating the identification of, and proactively managing, relevant risks and aligning to good development and humanitarian outcomes will be the challenge.

- A high percentage of respondents reported not using standardized (or construction-specific) procedures or documentation. Standardized procedures help to assure attention to best construction practices is balanced against the very diverse needs of the different parts of the Agency that use construction to achieve development and humanitarian objectives.

- The USAID construction policy in ADS 303 was intended to address limited procurement issues and is not tailored to accommodate the variety of construction types, settings, and purposes identified through this survey.

- Although several Agency construction-related primers, mission-specific best practices, and Mission Orders were observed, there is currently no standardized risk review procedure or process established. A comprehensive risk management plan would necessitate the process of identifying, planning for, and mitigating the inherent risks related to the Agency's construction categories or global construction practice.

- A comprehensive means or system to track key metrics (cost and schedule progress, award information, geographic location, and so forth) and provide continuous real-time monitoring of the global construction portfolio does not currently exist. USAID is planning for a full management information system, but it is still several years away. It should build on those strong tracking systems that have been developed in some parts of the Agency.

Water conveyance in Cairo, Egypt, requires extensive work in sensitive, historical areas.

FOCUS AREAS FOR STRENGTHENING CONSTRUCTION PORTFOLIO MANAGEMENT

Five focus areas of construction portfolio enhancement activities were identified for USAID to consider as it works to improve its construction policies, procedures, and practices and mitigate risk. These enhancement activities cut across and support multiple critical success factors.

Figure 13 presents five recommended focus areas for construction portfolio enhancement activities that are all determined to be of critical or high importance based on data, analysis, and qualitative information collected and analyzed in this Construction Assessment. The importance of each focus area is then further aligned relative to each of the 11 critical success factors and rated on a scale ranging from low to critical.

FIGURE 13

Construction Portfolio Enhancement Activities Aligned To Critical Success Factors

	Critical Success Factors										
Focus Areas of Construction Portfolio Enhancement Activities	1. Project Definition	2. Stakeholder Engagement	3. Procurement & Contracting Approaches	4. Instructional Capabilities	5. HSE&S Requirements	6. Locally Appropriate Design Standards	7. Cost Estimating & Scheduling	8. Contractor Qualifications	9. Risk Management Methodology	10. Construction Oversight	11. Monitoring & Evaluation
Staff Development Determination of required capabilities and development of staff to fill positions	C	L	H	L	L	C	M	L	M	C	M
Standardized Procurements & Contracts Establish appropriate contract mechanisms for full range of construction requirements	M	L	C	L	H	M	H	H	M	H	L
Management Information Establish information systems for active monitoring & reporting at multiple levels	H	L	M	L	M	L	C	L	H	C	C
Risk Management Standardized process and tools for assessment and reporting of risks across all project phases	H	H	M	H	H	M	M	M	C	H	M
Policies & Procedures Establish construction policy and modify/expand ADS requirements and guidelines	C	M	H	M	H	M	H	M	M	H	M

C **Critical** Urgent need for enhancement activity

M **Medium** Related factors impacted by enhancement activities

H **High** Major focus of enhancement activity required

L **Low** Neutral to somewhat postive impact

STAFF DEVELOPMENT OPPORTUNITIES

Alignment of adequately trained and qualified staff relative to the size, complexity, and geographical environments of construction projects is essential for the successful planning, execution, and oversight in managing a global construction portfolio. The development of staff includes ensuring the proper training, education, and relevant experience are commensurate with the responsibilities assigned in the context of how construction-related activities (technical, managerial, and administrative) are undertaken within USAID's organizational structure and its overarching development goals. Some notable observations supporting this are listed below.

- **Survey responses –** Construction oversight and engineering design oversight: Less than 50% of USAID awards have any USAID engineering design oversight.
- **Regression analysis –** Greater COR/AOR experience and knowledge of managing construction projects resulted in statistically fewer budget overruns.
- **Descriptive statistics –**High percentage of contracting officers that had no previous experience in managing the awards for construction activities.
- **International Practices Study –** Strong correlation demonstrated between quality/experience of in-country project manager and resulting project efficiencies (World Bank study).

STANDARDIZED FINANCING DOCUMENTATION

USAID utilizes a wide array of financing mechanisms to support a variety of construction types across the globe, with no standard approach, and in many instances with contract mechanisms that were not specifically oriented to construction. By comparison, the International Practices Study highlighted a significant movement toward "harmonized" procurement and contracting procedures by multilateral development banks and other international organizations. Some of the benefits that have been observed from this harmonized approach include greater consistency, ease of use, and enforceability across a wide range of applications. One difference between USAID and industry is the amount of construction that USAID implements as part of awards for other purposes. This makes standardization even more challenging. Some observations that highlight the importance of this focus are listed below.

- **Survey responses –** 68% of total awards did not utilize standardized construction documents, and 20% did not know the type of construction documents that were used to procure services.

Greater COR/AOR experience and knowledge of managing construction projects resulted in statistically fewer budget overruns.

- **Survey responses** – Indicates that a significant number of construction awards may not be utilizing FAR 36 in construction contracts; this needs to be further understood.

- **International Practices Study** – Impetus of World Bank and most other international development organizations to move to harmonize procurement standardization of contract documents for like construction activities internationally.

MANAGEMENT INFORMATION ENHANCEMENTS

The ability to account for or easily provide a comprehensive and accurate inventory of construction award and subaward key metrics (such as number of, type, location, investment, implementer information, schedule, and progress) of current individual construction projects or portfolio of projects by Operating Unit, geographically, or by contract mechanism, does not currently exist within the Agency. A centralized reporting and tracking information system designed for the Agency's specific needs could efficiently provide this and other information in "real time" through a web-based interface for the desired level of reporting required by users ranging from the individual Missions/Washington offices to senior management.

- Current USAID project databases vary in type of construction information stored, utility among users, and are not comprehensive or standardized to adequately record or track construction projects within the USAID portfolio.

- **Survey results** – High number of "do not know" responses on financial and descriptive indicators as a result of no centralized information system with project key performance indicators of award and subaward information and metrics. (Many "do not know" responses also stemmed from the source of survey data being restricted to the files in the missions/offices and to offices excepted from the policy also being excepted from answering certain questions. See Appendix V for further discussion.)

- **Risk panels** – In conflict and post-emergency reconstruction, access to project sites is often limited or prohibited due to security concerns. Third-party monitoring, reporting, and quality control are being used as substitutes in insecure environments.

Given the time and resource constraints and survey complexity, construction records available to mission staff were not always of a sufficient level of rigor or completeness to enable full responses to the survey. While the constraints due to time and resources were part of the issue, this may also be partly a function of the policy to manage at the prime award level. This should be considered in future discussion of policy.

RISK MANAGEMENT ENHANCEMENTS

The identification, assessment, and mitigation of potential construction-related risks through a variety of methodologies have become a proven industry standard approach for managing risk. Such methodologies have resulted in demonstrated improvements in cost and schedule efficiency and in mitigation of direct (project and stakeholder) and indirect (third party) potential for financial loss and physical hazards or failures. Results of the survey indicated the following:

- **Survey responses** – A risk management process was reported in only 35% of the awards, and 20% were not aware if one was developed or not.
- **Regression analysis** – Data indicate that having a means to track potential risks and risk impacts (i.e., a risk register) had a positive effect on budget overruns.
- **International Practices Study** – Engineering and Construction Risk Institute and Construction Industry Institute research shows that common risk management tools are effective in reducing cost and schedule overruns and in improving project communications and control.
- **Risk panels** – The inherent risks in conflict areas need to be addressed, as do the risks in G2G awards that result from meshing USG process with those of host governments.

Construction industry organizations, including the institutes mentioned above, provide scalable and readily available risk management tools, processes, and training that can be incorporated into any construction risk management process needs. USAID should further investigate these approaches while working toward strengthened risk management practices specific to construction.

As part of the Haiti WINNER project, this degraded irrigation structure is being assessed for improvement.

POLICIES AND PROCEDURES OPPORTUNITIES

The USAID construction policy in ADS 303 does not address the complexity of USAID's construction portfolio to some degree because the policy was developed to address issues with choice of mechanism. Below are a few supporting observations provided by the Construction Assessment:

- USAID has developed several good resources and practices, including several primers, Mission Orders, and Mission-specific best practices (see Appendix VIII).
- **Survey responses and risk panels** indicated the need for a consistent procedure for developing cost estimates (48% of respondents indicated that no cost estimate of construction activities was developed, while 14% did not know).
- **Survey responses** – The inconsistent responses and high number of "do not know" responses may signal a lack of common understanding of survey questions as well as the requirements and processes across the Agency, both in terms of construction and USAID's planning, design, and monitoring and evaluation (M&E) practices more broadly.
- **Risk panels** noted the lack of an established or appropriate means for managing change in construction planning and execution. Cases in which COs made changes to contracts that resulted in technical impacts without (or with disregard for) appropriate engineering assessment and inputs were noted as common occurrences.

RECOMMENDATIONS

Although the survey and other assessment tasks completed so far provide the broad outlines of the construction portfolio, the extensive scope of the portfolio, the deepened understanding of risks, and the complex character of USAID's construction portfolio provide adequate understanding for USAID to begin taking some actions now.

RECOMMENDATIONS BASED ON THE SCOPE AND CHARACTER OF THE PORTFOLIO

- The construction policy needs to be broadened and deepened to address the challenges the Agency faces, taking into account survey results and applicable Agency policy as well a federal regulations and laws. Policies need to be developed around successfully designing, implementing, and administering construction activities through awards at the prime level and the subaward level.
  - USAID's Office of the General Counsel as a first step, has completed a comprehensive review of the regulations and laws that must be applied to construction overseas.
  - Careful integration with related ADS guidance will be required (see Table 8).
- USAID must strengthen its management information systems to better support the tracking of construction awards and performance metrics, particularly at the subaward level.
- In conflict situations, the Agency needs to experiment with and provide guidance and tools for third-party monitoring, reporting, and quality control.
- Twenty-five Foreign Service Officer (FSO) engineers deployed overseas is insufficient to directly oversee a $5 billion portfolio.
  - Increase the number of FSOs and other engineers. Prioritize candidates with professional engineering certifications beyond an engineering degree (but do not require at this time).
  - Continue to supplement with Foreign Service National (FSN), Personal Services Contractor (PSC), and other types of engineering support.
  - Support USDH and FSN engineers maintaining professional certifications.

- In the program evaluation, specifically address the level of training of engineers (FSO, FSN, and contract officers) and determine if a threshold level of training or certification should be established.

- Continue the 3- and 5-day courses on engineering and construction contract management. Ensure that these include the specific aspects of construction that non-engineer USAID managers must know to design and manage successful infrastructure projects. Issues of risk standards and construction-focused contracting should be highlighted. Training should be updated as follow-on research and case studies are completed. Consider a training module that key elements needed specifically for health and education officers (possibly Democracy officers also). Consider whether specific modules should be developed for each sector.

- Finalize development of the course tailored to COs/AOs and Acquisition and Assistance Specialists. Issues of risk standards and construction-focused contracting should be thoroughly addressed in this course.

- The construction survey highlighted how much of USAID's construction is occurs as part of projects that are not primarily construction. GH (and health officers in the field), the E3 Office (and education officers in the field), and several of the DCHA programs are responsible for a large number of activities that are just incidental to their projects. In the follow up work, the Agency should ensure that specific approaches, principles, and practices reflect what has been learned in the Construction Assessment while carefully balancing special circumstances.

RECOMMENDATIONS BASED ON THE DEEPENED UNDERSTANDING OF RISK

- USAID should develop guidelines on risk assessment and risk mitigation:
  - USAID should begin systematic experimentation with risk management processes. A working group should be formed to review the International Practices Study and findings from the risk panel process, and contact missions that do use risk assessment and planning processes as identified in the survey.

- Special attention needs to be given to construction in conflict areas that have inherently higher risks of cost increases and schedule delays due to insecure environments.
- When experimentation results are available, the USAID construction-related policies should be amended. Specific attention should be paid to the unique circumstances of G2G approaches.

- Any risk assessment and management practices should be integrated with the Program Cycle, particularly Project Design and Implementation and G2G guidance.
- Many of the identified critical success factors identified in the International Practices Study are captured in the ADS 200 series about the Program Cycle and other parts of the ADS. The Agency should analyze the ideas and issues captured by this Construction Assessment in terms of the Program Cycle guidance. The Agency should ensure that construction practices are well grounded in the Program Cycle guidance and benefiting from Program Cycle tools. In addition, USAID should ensure that the Program Cycle has the scope and flexibility to support this large segment of USAID's portfolio. A similar process should be carried out with Bureau for Management, Office of Acquisition and Assistance (M/OAA) for financing and mechanisms guidance and procedures. Then the two should be thoughtfully synchronized.

GLOSSARY

The following list of technical terms and their definitions are provided to aid reader comprehension of the inherent complexities in an analysis of global construction risk assessment. For the purposes of this assessment, terms such as *award* are given a simplified definition. USAID contracting terminology as defined by FAR is provided in Appendix VI.

AWARD	The Primary contract mechanism between USAID and the prime Awardee covering the entire scope of work and TORs, often referred to as the contract or agreement. In this report, the term award is used as the unit of analysis; this includes some procurement approaches even though these are not awards executed by USAID's Office of Acquisition and Assistance.
CONSTRUCTION TYPES	Buildings (new construction, renovation, and/or repair; includes schools, clinics, hospitals, community centers, libraries, government offices, storage facilities/warehouses/hangers, factories, cultural heritage, airport terminals, and railway stations) Energy-related facilities (carbon-based, solar and wind, electrical and natural gas transmission, hydroelectric generation excluding hydroelectric dams.) Other construction activities (non-building cultural heritage sites, market or outdoor sports facilities, etc.) Solid waste management facilities (landfills, transfer stations, recycling centers, incinerators) Telecommunication facilities (cell towers, antennae, switching stations) Transportation (roads, bridges, rail beds, ports, etc.) Water resources facilities (dams, hydroelectric dams, irrigation systems) Water storage/rainwater catchment systems (below or on-ground cisterns/water catchment, aboveground cisterns or water towers, rainwater catchment systems) Water/wastewater facilities (potable water distribution, water treatment plants, wastewater treatment plants, community septic systems, sewers, etc.)
COST DRIVER: BUDGET OVERRUN	Analysis of data collected on the planned and actual or estimated budgets for construction activities and the planned and actual or estimated quantity or capacity of the output of the construction activity at the subaward level. Budget overrun outcomes were measured in terms of the planned and actual unit costs of the construction activity.
COST DRIVER: COMPLIANCE	Data collected concerning awardee requirements for reporting health and safety and environmental incidents.
COST DRIVER: QUALITY	Analysis of data collected on the risk impact of quality issues by obtaining the responses related to quality. Specifically, this included whether rework or material testing was required, whether there was a loss of utility or capacity, and whether the results were reported to USAID.
COST DRIVER: SCHEDULE DELAY	Analysis of data collected on the planned and actual or estimated completion dates for construction activities at the subaward level. Schedule delays were measured in terms of the change in the time period for completing each construction activity and applying an implicit interest rate to reflect the additional costs.

COST DRIVER: SUSTAINABILITY	Analysis of data collected on the cost associated with the structure not delivering the full stream of services intended over its designed economic life.
CRITICAL SUCCESS FACTOR	These eleven factors are commonly recognized among international development organizations for their importance in determining the success of a construction effort: project definition; stakeholder engagement; procurement procedures, contract types, and approaches; institutional capabilities to operate and maintain investments; health, safety, environmental and social requirements (HSES); appropriate design standards and technology; quality of cost estimating and scheduling; risk management methodology; construction oversight and quality verification; and monitoring and evaluation process. Additional detail about each factor is provided in Table 2-1.
EMBEDDED LOSS	Costs incurred by the Agency, including both direct financial costs and economic costs due to loss of service, that are attributable to loss factors such as schedule delays, poor quality, re-work, operations and maintenance practices, reduced service life, etc. (referred to as implicit and embedded losses)
FINANCIAL IMPACTS	These impacts are associated with loss scenarios and include schedule delay, capacity reduction, service life reduction, health and safety, third party damage, environmental, and rework/remediation.
LOSS PIQ^{SM}	The spreadsheet model “tool” that facilitates and captures the risk panel interactive discussions and panelists answers regarding individual risk scenarios and cost drivers that most likely affect some measured loss. The model was built using the survey data specific to each of the four risk panel topics, which also correspond to the six USAID construction categories.
LOSS SCENARIO	A specific condition or event, controllable or otherwise, that if were to occur would have a measurable negative impact to the construction effort resulting in significant financial or economic loss.
REGRESSION ANALYSIS	An analytic tool that allows for the simultaneous consideration of multiple factors.
RISK FACTORS	One of five potential negative outcomes: (1) cost overruns, (2) schedule delays, (3) low quality, (4) poor sustainability, and (5) non-compliance through an assessment of existing practices and comparison with industry norms.
RISK OUTCOME	Budget overrun, schedule delay, quality, sustainability, and compliance
RISK PANELS	A quantitative and collaborative method to establish relative significance of risk that are not otherwise readily measured. Four panels were established for this analysis: standalone infrastructure, emergency response, non-infrastructure, and government-to-government.
SUBAWARD	Subcontract agreements between Awardee and subcontractors/implementers for portions of work identified in the Award to be performed by the subcontractor(s). *Subaward* is used in this report similarly to *award*. See *award*.

SELECTED REFERENCES

SOURCE PAPERS FOR CRITICAL SUCCESS FACTORS

Denizer, C., etc. (2011). Good countries or good projects? Macro and micro correlates of World Bank project performance, Policy Research Working Paper, the World Bank.

Limodia, N. (2011). The success of infrastructure projects in low-income countries and the role of selectivity, Policy Research Working Paper, the World Bank.

Ika, L., etc. (2011). Critical Success factors for World Bank Projects: an empirical investigation, International Journal of Project Management.

Crawford, P. & Brice, P. (2003). Project monitoring and evaluation: a method of enhancing efficiency and effectiveness of aid project implementation, International Journal of Project Management.

Hermano, V., etc. (2013). How to manage international develop projects successfully. Is the PMD Pro 1 Guide going to the right direction? International Journal of Project Management.

Gunhan, S. & Arditi, D. (2005). Factors affecting international construction, Journal of Construction Engineering and Management.

Murray, S. L., etc. (2011). Development of a Generic risk matrix to manage project risks, Journal of Industrial and Systems Engineering.

AUDITS REVIEWED

USAID Office of Inspector General, Audit of the Kabul to Kandahar Highway Reconstruction Activities Financed by USAID/Afghanistan's Rehabilitation of Economic Facilities and Services Program, Report No. 5-306-04-006-P, September 21, 2004, Manila, Philippines.

USAID Office of Inspector General, audit of USAID/Afghanistan's Reconstruction of the Kandahar-Herat Highway Under the Rehabilitation of Economic Facilities and Services (Refs) Program, Report No. 5-306-06-005-P, May 18, 2006, Manila, Philippines.

USAID Office of Inspector General, Audit of USAID/Afghanistan's School and Health Clinic Reconstruction Activities, Report No. 5-306-06-008-P, August 18, 2006, Manila, Philippines.

USAID Office of Inspector General, Review of School and Health Clinic Buildings Completed Under the Schools and Clinics Construction and Refurbishment Program, Report No. 5-306-10-002-O, June 24, 2010, Manila, Philippines.

USAID Office of Inspector General, Audit of USAID/Afghanistan's Power Sector Activities Under Its Afghanistan Infrastructure Rehabilitation Program, Report No. 5-306-10-002-P, November 10, 2009, Manila, Philippines.

USAID Office of Inspector General, Audit of USAID/Afghanistan's Construction of Health and Education Facilities Program, Report No. F-306-11-002-P, 3-27-2011, Manila, Philippines.

USAID Regional Inspector General, Audit of USAID/Haiti's Hurricane Georges Recovery Program, Audit Report No. 1-521-01-005-P, May 15, 2001, San Salvador, El Salvador.

USAID Regional Inspector General, Audit of USAID Haiti's Tropical Storm Reconstruction Program, Audit Report No. 1-521-05-007-P, April 11, 2005, San Salvador, El Salvador.

USAID Office of Inspector General, Audit of USAID'S Efforts to Provide Shelter in Haiti, Audit Report No. 1-521-11-003-P, April 19, 2011, San Salvador, El Salvador.

USAID Office of Inspector General, Audit of USAID/Indonesia's Banda Aceh-Lamno Road Reconstruction Activities Under Its Tsunami Recovery and Reconstruction Program, Audit Report No. 5-497-06-003-P, March 30, 2006, Manila Philippines.

USAID Office of Inspector General, Audit of USAID/Indonesia's Tsunami Recovery and Reconstruction Program Activities Implemented by Development Alternatives, Inc., Audit Report No. 5-497-06-009-P, September 15, 2006.

USAID Office of Inspector General, Audit of USAID/Indonesia's Aceh Road Reconstruction Project Under Its Tsunami Program, Audit Report No. 5-497-07-008-P, July 11, 2007, Manila, Philippines.

USAID Office of Inspector General, Audit of USAID/Indonesia's Tsunami-Related Housing Construction Activities Implemented by Cooperative Housing Foundation International, Audit Report No. 5-497-08-002-P, January 31, 2008, Manila, Philippines.

USAID Office of Inspector General, Audit of USAID/Pakistan's Earthquake Reconstruction Activities, Audit Report No. 5-391-09-001-P, November 25, 2008, Manila, Philippines.

USAID Office of Inspector General, Audit of USAID/Pakistan's Road Rehabilitation and Reconstruction Activities Under the Quick Impact Projects in South Waziristan, Audit Report No. G-391-11-005-P, June 20, 2011, Islamabad, Pakistan.

USAID Office of Inspector General, Audit of USAID/Pakistan's Community Rehabilitation Infrastructure Support Program, Audit Report No. G-391-11-006-P, August 29, 2011, Islamabad, Pakistan.

USAID Office of Inspector General, Audit of USAID/Sudan's Road Infrastructure Activities, Audit Report No 4-650-09-009-P, September 28, 2009, Pretoria, South Africa.

USAID Office of Inspector General, Audit of USAID/El Salvador-Financed Housing Reconstruction Activities, Audit Report No. 1-519-03-001-P, November 19, 2002, San Salvador, El Salvador.

USAID Office of Inspector General, Audit of USAID/El Salvador's Reconstruction of Schools, Healthcare Facilities, and Other Infrastructure Projects Under the Earthquake Reconstruction Program, Audit Report No. 1-519-04-009-P, August 10, 2004, San Salvador, El Salvador.

USAID Office of Inspector General, Audit of the Post-Project Condition of Roads and Bridges Constructed in Honduras Under the Emergency Reconstruction of Roads and Bridges Activity, Audit Report No. 1-522-04-006-P, March 3, 2004, San Salvador, El Salvador.

USAID Office of Inspector General, Audit of USAID/Mozambique's Performance Monitoring of Road Repair and Reconstruction Activities Funded by the Southern Africa Floods Supplemental Appropriations, Audit Report No. 4-656-03-001-P, January 31, 2003, Pretoria, South Africa.

USAID Office of Inspector General, Audit of USAID/Madagascar's Performance Monitoring of Road and Rail Repair and Reconstruction for Southern Africa Flood Relief Supplemental Appropriations, Audit Report No. 4-687-04-006-P, April 15, 2004, Pretoria, South Africa.

USAID Office of Inspector General, Audit of USAID/Sri Lanka's Large-Scale Infrastructure Rebuilding Activities Under Its Sri Lanka Tsunami Reconstruction Program, Audit Report No. 5-383-07-001-P, November 30, 2006, Manila, Philippines.

USAID Office of Inspector General, Audit of USAID/Sri Lanka's Tsunami Recovery and Reconstruction Program Selected Outputs Implemented by Development Alternatives, Inc., Audit Report No. 5-383-07-007-P, June 22, 2007, Manila, Philippines.

USAID Office of Inspector General, Audit of USAID/Iraq's Infrastructure Reconstruction and Rehabilitation Program, Report No. E-266-04-002-P, June 3, 2004, Baghdad, Iraq.

USAID Office of Inspector General, Audit of USAID's Compliance with Federal Regulations in Awarding the Iraq Phase II Reconstruction and Rehabilitation, Program Advisors and Oversight Contract, Audit Report No. E-266-04-003-P, August 6, 2004, Baghdad, Iraq.

USAID Office of Inspector General, Audit of USAID/Iraq's Participation in Provincial Reconstruction Teams in Iraq, Audit Report No. E-267-07-008-P, September 27, 2007, Baghdad, Iraq.

APPENDIX I

ADS 303
CONSTRUCTION
POLICY AND NOTICE

USAID Implementation of Construction Activities

A Mandatory Reference for ADS Chapters 303

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BACKGROUND: USAID is funding construction projects in all regions across all foreign assistance objectives. USAID infrastructure investments range from small-scale projects such as community water tanks to large power plants and water treatment facilities. USAID also makes direct infrastructure investments in schools, hospitals, health clinics, and other public buildings, as well as rural farm to market roads, trunk roads, and bridges. The Agency's infrastructure projects are a critical component of our development programs in post-conflict and post-disaster countries but are not limited to those situations.

The use of contracts and task orders to manage both the design and construction of infrastructure projects allows the Agency to specify that engineering requirements including design, tendering, and construction oversight activities, as well as safety or other operational construction standards/specifications are met. In contrast, the agreement conditions with grantees under assistance awards minimizes the Agency's ability to ensure that the design and construction activities are carried out properly.

Operating Units (OUs) and Agreement Officers (AOs)/Contracting Officers (COs) must be aware of this policy as it applies to the program and acquisition planning phase of USAID projects.

POLICY: This document states the Administrator-approved policy limiting the use of assistance awards to implement construction activities. "Construction activities" for purposes of this policy are defined in Section IV. Definitions.

I. Applicability

The construction policy is applicable to all funds with the exception of those funds provided through

a. A government-to-government agreement (e.g., a Fixed Amount Reimbursement Agreement);
b. A Development Credit Authority instrument under **ADS 249, Development Credit Authority (DCA)**; and
c. Grants under **ADS 308, Awards to Public International Organizations**, to Public International Organizations or grants to other bilateral donors.

Effective Date: The policy applies to all solicitations, awards, and modifications or amendments to existing awards that authorize new activities not already authorized under such awards issued after the effective date of April 3, 2012.

II. Types of Instruments for Construction Activities

a. Acquisition

USAID must use a direct contract (including a task order) when:

- The award is solely for construction; or
- The award includes construction activities as some portion of all award activities, and

(1) The estimated cost of construction activities at a single project site is $500,000 or more, or
(2) The total aggregate estimated cost of construction activities under the award Is $10,000,000 or more.

Where construction activities are financed under contracts, COs are strongly encouraged to use firm fixed price contracts to the greatest extend possible.

b. Assistance

(1) USAID may use an assistance award to finance construction activities only when all of the following conditions apply:

i. The award is a cooperative agreement (CA), since greater oversight is possible through substantial involvement by USAID (see ADS **303.3.11**). Construction must not be financed under a grant;
ii. The construction activities are only a portion of all award activities and
   1. The estimated cost of construction activities at a single project site is less than $500,000 (see definition of single project site below); and
   2. The total aggregate estimated cost of construction activities under the award is less than $10,000,000.
iii. The CA complies with the requirements of **ADS 221, USAID's Procedures for Implementing International Agreements for Tied and Untied Aid**;
iv. Construction activities are explicitly stated in the budget;
v. The CA expressly states that no construction activities other than those explicitly approved under the agreement may be performed as part of the cooperative agreement;
vi. A term of substantial involvement provides the right of the Agreement Officer's Representative (AOR) to halt construction; and

AOs must not approve any amendments or modifications to the cooperative agreement or subawards or procurements by recipients for construction activities that increase the value of construction activities above the limits established in item b.(1)ii above.

(2) For any assistance awards under which construction activities are not permitted by the above policy, AOs must not approve any subawards or procurements by recipients for construction activities.

(3) AOs must ensure that Mandatory Standard Provision "Limiting Construction Activities" is included in all awards. When no construction activities are contemplated under the award, the AO must insert "Construction is not eligible for reimbursement under this award" in section d) of this provision. In those awards under which construction activities are permitted by the above policy

or as authorized by waiver, the AO must insert the description and location(s) of the specific construction activities in section d) of the provision. The AO must also ensure that there is a specific line item for construction activities in the award budget.

III. Requests for Waivers or Additional Exceptions

a. The Procurement Executive (PE), in consultation with the Director, EGAT/I&E, may approve requests to increase the value of construction activities above the limits stated in item b. above or approve additional exceptions or waivers from this policy on a case-by-case basis. OUs must submit written requests for waivers through the AO to M/OAA/Policy addressing the following:

(1) A description of the construction activities included in the program activities, broken down by type, site and estimated cost; and
(2) The impact to USAID's programmatic and foreign assistance objectives that compliance with the policy will otherwise cause.

b. Waivers are currently granted for the offices and activities listed below.

(1) Construction activities carried out under Food for Peace for disaster relief (including that using program income and monetized proceeds);
(2) Construction activities carried out by DCHA/OTI through Grants Under Contracts (e.g., Support Which Implements Fast Transition contract or SWIFT) to the extent current practice is maintained;
(3) Construction activities conducted by DCHA/OFDA;
(4) Construction activities carried out by the West Bank/Gaza Mission; and
(5) Construction activities conducted by DCHA/ASHA.

IV. DEFINITIONS:

"**Construction"** for purposes of this policy means: construction, alteration, or repair (including dredging and excavation) of buildings, structures, or other real property and includes, without limitation, improvements, renovation, alteration and refurbishment. The term includes, without limitation, roads, power plants, buildings, bridges, water treatment facilities, and vertical structures.

"Direct USAID contract awards" for purposes of this policy means a contract awarded pursuant to the FAR, AIDAR, and **ADS 302, USAID Direct Contracting**, and does not include grants, cooperative agreements, or other transactions, including without limitation, a grant/cooperative agreement awarded pursuant to **ADS 303, Grants and Cooperative Agreements to Non-Governmental Organizations**, a grant under a contract, a procurement contract under a grant/cooperative agreement, a Global Development Alliance, etc.

“Improvements, renovation, alteration and refurbishment” for purposes of this policy includes any betterment or change to an existing property to allow its continued or more efficient use within its designed purpose (renovation), or for the use of a different purpose or function (alteration). Improvements also include improvements to or upgrading of primary mechanical, electrical, or other building systems. “Improvements, renovation, alteration and refurbishment” does NOT include non-structural, cosmetic work, including painting, floor covering, wall coverings, window replacement that does not include changing the size of the window opening, replacement of plumbing or conduits that does not affect structural elements, and non-load bearing walls or fixtures (e.g., shelves, signs, lighting, etc.).

“**Modifications or amendments**” as used in this policy refer to changes in scope or refinements of work plans that include activities not previously carried out by an assistance recipient.

“**Single project site**” for purposes of this policy means a single undertaking of construction within a contiguous geographic location, including but not limited to, a road, a building, a wastewater treatment facility, a power plant, a school, a clinic, etc., but also includes contiguous multiples of the same.

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USAID Construction Policy

USAID is funding construction projects in all regions across all foreign assistance objectives. USAID infrastructure investments range from small-scale projects such as community water tanks to large power plants and water treatment facilities. USAID also makes direct infrastructure investments in schools, hospitals, health clinics, and other public buildings, as well as rural farm to market roads, trunk roads, and bridges. The Agency's infrastructure projects are a critical component of our development programs in post-conflict and post-disaster countries but are not limited to those situations.

The use of contracts and task orders to manage both the design and construction of infrastructure projects allows the Agency to specify that engineering requirements including design, tendering, and construction oversight activities, as well as safety or other operational construction standards/specifications are met. In contrast, the lesser degree of control that the Agency can legally assert over grantees under assistance awards minimizes the Agency's ability to ensure that the design and construction activities are carried out properly. The Administrator has approved the policy stated below; the first step in a larger effort to address these and other construction-related concerns.

I. Type of Instrument for Construction Activities
   a. USAID must use a direct contract (including a task order) when:
      i. The award is solely for construction, or
      ii. The award includes construction activities as some portion of all award activities and
         1. The estimated cost of construction activities at a single project site is $500,000 or more, or
         2. The total aggregate estimated cost of construction activities under the award is $10,000,000 or more.

   b. USAID may use an assistance award to finance construction activities only when all of the following conditions apply:
      i. The award is a cooperative agreement (CA), since greater oversight is possible through substantial involvement by USAID (see ADS 303.3.11). Where construction activities are financed under contracts, operating units are encouraged to use fixed price contracts to the greatest degree possible. Construction must not be financed under a grant;
      ii. The CA complies with the requirements of ADS 221 USAID's Procedures for Implementing International Agreements for Tied and Untied Aid;
      iii. The CA must expressly state that no construction activities other than those explicitly approved under the agreement may be performed as part of the cooperative agreement;
      iv. Construction activities must be explicit in the budget;
      v. A term of substantial involvement must be the right of the Agreement Officer's Representative (AOR) to halt construction; and
      vi. The construction activities are only a portion of all award activities and
         1. The estimated cost of construction activities at a single project site is less than $500,000 and
         2. The total aggregate estimated cost of construction activities under the award is less than $10,000,000.

Agreement Officers must not approve any amendments or modifications to the cooperative agreement or subawards or procurements by recipients for construction activities that increase the value of construction activities above the limits established in the above policy without approval from the Procurement Executive, in consultation with the Director, EGAT/I&E, on a case-by-case basis.

   c. Exempt from the above policy are funds provided through:
      i. A government-to-government agreement (e.g., a Fixed Amount Reimbursement Agreement);
      ii. A Development Credit Authority instrument under ADS 249; and

iii. Grants under ADS 308 to Public International Organizations or grants to other bilateral donors.

d. For any assistance awards under which construction activities are not permitted by the above policy, the following requirements apply:
  i. The award must expressly state that construction is not part of the "financial assistance" contemplated (i.e. it is not a core part of the award), and
  ii. Agreement Officers must not approve any subawards or procurements by recipients for construction activities.

II. Exceptions and Waivers

a. Any additional exceptions or waivers from this policy must be reviewed and approved by the Procurement Executive in consultation with the Director, EGAT/I&E, on a case-by-case basis, based on the following factors:
  i. What construction activities will take place, broken down by type, site and cost; and
  ii. The impact to USAID's programmatic and foreign assistance objectives compliance with the policy will otherwise cause.

b. Waivers are currently granted for the offices and activities listed below.
  i. Both the Type of Instrument Policy and the Construction Oversight Requirements Policy do not apply to:
    1. Construction activities carried out under Food for Peace for disaster relief (including that using program income and monetized proceeds);
    2. Construction activities carried out by DCHA/OTI through Grants Under Contracts (e.g., SWIFT) to the extent current practice is maintained; and
    3. Construction activities conducted by DCHA/OFDA.
    4. Construction activities carried out by the West Bank/Gaza Mission and
    5. Construction activities conducted by DCHA/ASHA.

DEFINITIONS:

"Construction" for purposes of this policy means: construction, alteration, or repair (including dredging and excavation) of buildings, structures, or other real property and includes, without limitation, improvements, renovation, alteration and refurbishment. The term includes, without limitation, roads, power plants, buildings, bridges, water treatment facilities, and vertical structures.

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"Improvements, renovation, alteration and refurbishment" for purposes of this policy includes any betterment or change to an existing property to allow its continued or more efficient use within its designed purpose (renovation), or for the use of a different purpose or function (alteration). Improvements also include improvements to or upgrading of primary mechanical, electrical, or other building systems. "Improvements, renovation, alteration and refurbishment" does NOT include non-structural, cosmetic work, including painting, floor covering, wall coverings, window replacement that does not include changing the size of the window opening, replacement of plumbing or conduits that does not affect structural elements, and non-load bearing walls or fixtures (e.g., shelves, signs, lighting, etc.).

"Direct USAID contract awards" for purposes of this policy means a contract awarded pursuant to the FAR, AIDAR, and ADS 302 and does not include grants, cooperative agreements, or other transactions, including without limitation, a grant/cooperative agreement awarded pursuant to ADS 303, a grant under a contract, a procurement contract under a grant/cooperative agreement, a Global Development Alliance, etc.

"Modifications or amendments" as used in this policy refer to changes in scope or refinements of work plans that include activities not previously carried out by an assistance recipient.

Effective dates of implementation of the policy. The policy becomes effective upon publication of this Notice. It applies to all assistance solicitation issues after the effective date of this Notice and the resulting awards, and to modification or amendments to existing awards that authorize new activities not already authorized under such awards.

Conforming amendments to the ADS and other guidance will be issued to implement the above policy.

Any questions concerning this notice may be directed to:

-- Ken Baum, EGAT/I&E, (202) 712-0532, kbaum@usaid.gov , or
-- Carol Ketrick, M/OAA/P, (202) 567-4676, cketrick@usaid.gov , or
-- Ron Wietecha, GC/A&A, (202) 712-5178, rwietecha@usaid.gov

Notice 0424

APPENDIX II

SURVEY QUESTIONNAIRE

USAID Construction Assessment Survey

INTRODUCTION

The USAID Construction Assessment details the amount and characteristics of USAID's construction portfolio, as well as the advisory and supervisory role of the Agency. The information collected may be used to improve USAID's technical oversight of construction awards.

The survey is being administered on behalf of USAID by NORC, a research center affiliated with the University of Chicago, and CH2MHILL, a global consulting and engineering firm. USAID will ensure that individual responses remain confidential and that the anonymity of respondents is preserved. Questions in this survey reflect awards that include construction activities that are in progress and those that have already been completed. You or an associate recently took part in a discovery process which listed all of the awards with construction components that were part of your mission portfolio. The following survey will ask you to describe the content of those awards and associated construction processes. Your answers are critical for the current survey and will help USAID improve its programs and impacts in host countries.

You may stop at any time and resume where you left off or skip to specific sections of the survey as needed.

If you have any questions or have trouble accessing the survey, please send an email to____________________so that we may assist you.

CONSENT

[START] Will you participate in this survey and complete the questions to the best of your knowledge??

- ❑ Yes
- ❑ No

Logic: If START = 'yes' skip to PROJNAME else ask REASON_REFUSAL

[REASON_REFUSAL] Can you please tell me the reason why you are choosing not to continue at this time?

____

[CONT_LEVEL] AWARD LEVEL

The following section covers general award information such as the phase the award is in, award type, and cooperative partner agreements (as applicable).

[GEN_AWARD_INFO] GENERAL AWARD INFORMATION

The following survey references award PROJNAME, award number AWARD_NO. When completing the survey please reference this award.

[PROJNAME_CONF] Is the award or award name correct?

- ❑ Yes
- ❑ No; please enter corrected award or award name: ____

[AWARD_NO_CONF] Is the award or award number correct?

- ❑ Yes
- ❑ No; please enter corrected award or award number: ____

[PROJ_PHASE] What phase is the USAID award in? (Check one only)

- ❑ Award/Mobilization
- ❑ In implementation
- ❑ Award ended

[CON_PHASE] What phases is the construction component of the award in? (Check one only)

- ❑ Award/Mobilization
- ❑ Under construction

- ❑ Construction closeout (punch list)
- ❑ Completed

[COUNTRY_LOC] In which country/countries is/was construction work being conducted? **[DROP DOWN LIST OF COUNTRIES]**

(a) ____________________
(b) ____________________
(c) ____________________
(d) ____________________
(e) ____________________
Additional countries: ____

LOGIC: Allow 5 responses with multiple responses in the last field.
LOGIC: Drop down a-e with a list of all countries

[SPONSOROFF] Is the primary responsible managing party for this award a USAID Mission or a Washington operating unit?

- ❑ USAID Mission
- ❑ Washington Operating Unit
- ❑ Don't know
- ❑ Other Specify______________

LOGIC: If SPONSOROFF =' USAID Mission' ask MISSIONOFF, if SPONSOROFF = ' WOU' ask WAUOFF, else skip to FRAMEWORK

[MISSIONOFF] Which USAID Mission is cognizant (the primary responsible managing entity) for the award**? (drop-down)**

- ❑ Angola
- ❑ Benin
- ❑ Botswana
- ❑ Burkina Faso
- ❑ Burundi

- ❑ Cote D'ivoire
- ❑ Djibouti
- ❑ Democratic Republic of the Congo
- ❑ East Africa Regional
- ❑ Ethiopia
- ❑ Ghana
- ❑ Guinea and Sierre Leone
- ❑ Kenya
- ❑ Liberia
- ❑ Madagascar
- ❑ Malawi
- ❑ Mali
- ❑ Mozambique
- ❑ Namibia
- ❑ Niger
- ❑ Nigeria
- ❑ Rwanda
- ❑ Senegal
- ❑ South Africa
- ❑ Sudan
- ❑ South Sudan
- ❑ Tanzania
- ❑ Uganda
- ❑ West Africa Regional
- ❑ Zambia
- ❑ Zimbabwe
- ❑ Afghanistan
- ❑ Bangladesh

- ❑ Burma
- ❑ Cambodia
- ❑ Central Asian Republics Regional
- ❑ East Timor
- ❑ India
- ❑ Indonesia
- ❑ Kyrgyzstan
- ❑ Mongolia
- ❑ Nepal
- ❑ Pakistan
- ❑ Philippines
- ❑ Regional Development Mission-Asia
- ❑ Sri Lanka
- ❑ Vietnam
- ❑ Albania
- ❑ Armenia
- ❑ Azerbaijan
- ❑ Bosnia-Herzegovina
- ❑ Cyprus
- ❑ Georgia
- ❑ Hungary
- ❑ Kosovo
- ❑ Macedonia
- ❑ Russia
- ❑ Serbia and Montenegro
- ❑ Ukraine, Moldova and Belarus
- ❑ Bolivia
- ❑ Brazil

- ❑ Caribbean Regional Program
- ❑ Central America Regional Progam
- ❑ Colombia
- ❑ Dominican Republic
- ❑ Ecuador
- ❑ El Salvador
- ❑ Guatemala
- ❑ Guyana
- ❑ Haiti
- ❑ Honduras
- ❑ Jamaica
- ❑ Mexico
- ❑ Nicaragua
- ❑ Panama
- ❑ Paraguay
- ❑ Peru
- ❑ Barbados-Eastern Caribbean
- ❑ Egypt
- ❑ Iraq
- ❑ Jordan
- ❑ Lebanon
- ❑ Libya
- ❑ Morocco
- ❑ Tunisia
- ❑ West Bank/Gaza
- ❑ Yemen

[WAUOFF] Which Washington Operating Unit is cognizant (the primary responsible managing entity) for the award**?**

- ❑ Office of U.S. Foreign Disaster Assistance
- ❑ Office of Transition Initiatives
- ❑ Office of Food for Peace
- ❑ Office of Conflict Management and Mitigation
- ❑ OTHER OFFICE IN BUREAU FOR DEMOCRACY, CONFLICT AND HUMANITARIAN ASSISTANCE:
- ❑ Development Credit Office
- ❑ Microenterprise and Private Enterprise Promotion Office addresses
- ❑ Energy and Infrastructure Office
- ❑ Education Office
- ❑ Global Climate Change Office
- ❑ Water Office .
- ❑ Forestry and Biodiversity Office
- ❑ Food Security Bureau
- ❑ Office of Health, Infectious Diseases and Nutrition
- ❑ Office of Health Systems
- ❑ Office of HIV/AIDS
- ❑ Office of Population and Reproductive Health
- ❑ Don't know
- ❑ Other: ____

[FRAMEWORK] What is the F Framework program area?

- ❑ 1.1 Counter Terrorism
- ❑ 1.2 Combating WMD
- ❑ 1.3 Stabilization Operations and Defense Reform
- ❑ 1.4 Counter-narcotics
- ❑ 1.5 Transnational Crime
- ❑ 1.6 Conflict Mitigation and Response
- ❑ 2.1 Rule of Law and Human Rights
- ❑ 2.2 Good Governance

- ❑ 2.3 Political Competition and Consensus-Building
- ❑ 2.4 Civil Society
- ❑ 3.1 Health
- ❑ 3.2 Education
- ❑ 3.3 Social Services and Protection for Vulnerable Populations
- ❑ 4.1 Macroeconomic Foundation for Growth
- ❑ 4.2 Trade and Investment
- ❑ 4.3 Financial Sector
- ❑ 4.4 Infrastructure
- ❑ 4.5 Agriculture
- ❑ 4.6 Private Sector Competitiveness
- ❑ 4.7 Economic Opportunity
- ❑ 4.8 Environment
- ❑ 5.1 Protection, Assistance and Solutions
- ❑ 5.2 Disaster Readiness
- ❑ 5.3 Migration Management
- ❑ Don't know

[ECD_NUM] Is there an Environmental Compliance Data base file number associated with this award?

- ❑ Yes; ECD number: ___________________
- ❑ No
- ❑ Don't know

LOGIC: If ECD_NUM = 'no' or 'don't know' ask ECDNUM_SPC else skip

[ECDNUM_SPC] Please specify the reason there is no ECD number is available: ____

[AWARD_MECH] What type of agreement was this award or award completed under?

- ❑ Direct award
- ❑ Grant (excluding PIO)
- ❑ Public International Organization (PIO) Grant
- ❑ Cooperative Agreement
- ❑ Host Country Award
- ❑ Government-to-Government Agreement
- ❑ Fixed amount reimbursement agreement (FARA)
- ❑ USG Interagency Agreement
- ❑ Development Credit Authority Guarantees

LOGIC: If AWARD_MECH = 'Direct Award' ask GRNT_CNTRCT, else skip to CAP_BUILD
LOGIC: If AWARD_MECH = USG Interagency Agreement skip PRE_PREP

[GRNT_CNTRCT] Did this direct award include sub-grants?

- ❑ Yes
- ❑ No
- ❑ Don't know

[CAP_BUILD] CAPACITY ASSESSMENT

The next section deals with capacity assessment activities undertaken with the implementer of the construction activities. This may be the prime awardor of the award or the government in charge of the award (in cases of government-to-government agreements). Later we will ask you about the capabilities of the owner & operator of the constructed facility/facilities to manage the output. For now though, please focus on capabilities related to <u>constructing</u> the facility.

[IMPLM_ASSESS] Prior to receiving USAID financing was the implementing partner's capacity and experience in carrying out construction activities assessed?

- ❑ Yes

- ❑ No
- ❑ Don't know

LOGIC: if IMPLM_ASSESS = 'no' or 'dk' skip to ENAB_ENV_SUPPORT, else ask ASSESS_WHO

[ASSESS_WHO] Who carried out the capacity assessment? Check all that apply.

- ❑ USAID
- ❑ Awardee self-assessment
- ❑ Other USG Specify _____
- ❑ Other donor Specify _____
- ❑ Host Country Government
- ❑ Other Specify___________

[ASSESS_PROC] What process(es) were used to assess the capacity of the implementing partner (select all that apply)

- ❑ Public Financial Management Risk Assessment Framework (PFMRAF) Stage 2 Risk Assessment under ADS 220 **[LOGIC: Show only if AWARD_MECH = FARA, Host Country Award, Government- to-Government Agreement]**
- ❑ "Assurance" under ADS 317 **[LOGIC: Show only if AWARD_MECH = FARA, Host Country Award, Government- to-Government Agreement]**
- ❑ "Certification" under ADS 301/305 **[LOGIC: Show only if AWARD_MECH = FARA, Host Country Award, Government- to-Government Agreement]**
- ❑ Technical capacity analysis in project design under ADS 201 **[LOGIC: Show for all]**
- ❑ Pre-award Survey **[LOGIC: Show for all]**
- ❑ Technical evaluation in competition process **[LOGIC: Show for Direct award, NGO Grant, cooperative agreement]**
- ❑ Responsibility determination **[LOGIC: Show for Direct award, NGO Grant, Public International Organization (PIO) Grant, cooperative agreement]**
- ❑ Don't know
- ❑ Other specify__________

[ASSESS_OUTCOME] What was the outcome of the assessment?

- ❑ Implementing partner had appropriate capacity
- ❑ Implementing partner did not have appropriate capacity and needed support
- ❑ Don't know

[ENAB_ENV_SUPPORT] Has the implementing partner received any type of support related to the construction activities in the award?

- ❑ Yes
- ❑ No
- ❑ Don't know

LOGIC: If ENAB_ENV_SUPPORT = 'No' or DK, skip to CERT_USE

[ENAB_ENV_TYPE] What types of support were provided? (Select all that apply.)

- ❑ Sector regulatory reform
- ❑ Building code reform
- ❑ Strengthening internal operations (financial systems, personnel systems, business management)
- ❑ Tariff development/reform
- ❑ Construction trades training
- ❑ Operations & maintenance training
- ❑ Environmental procedures
- ❑ Regulatory authorities
- ❑ Monitoring and evaluation
- ❑ Other (Specify): ____

[CAP_BUILD] Other than "capacity building" in the form of training, did the implementing partner receive any other type of capacity building (for the construction component of the award)?

- ❑ Yes; type(s) of capacity building provided: ___________________________________

- ❑ No
- ❑ Don't know

[OM] OPERATIONS AND MAINTENANCE

The following section deals with operations and maintenance (O&M) funding for the construction components of the award and deal with the owner and operator of the final output.

[OMFUND_AVAIL] Was availability of operations and maintenance (O&M) funding assessed?

- ❑ Yes, by USAID staff
- ❑ Yes, by USAID awardor
- ❑ Yes, by others specify ____
- ❑ No
- ❑ Don't know

Logic: If OMFUND_AVAIL = 'No' or 'DK' skip to OMFUND_CON

[OM_OUTCOME] What was the outcome of the O&M funding assessment?

- ❑ O&M funds will not be available
- ❑ Some O&M funds will be available,
- ❑ All estimated O&M funds will be available
- ❑ Don't know

[OMFUND_CON] What source(s) will provide continued operations and maintenance (O&M) funding? Check all that apply

- ❑ Host government commitment (historical budget allocation)
- ❑ Host government commitment (new budget allocations)
- ❑ Local Community

- ❑ Tariff system/user fees [viable, provides adequate O&M funds]
- ❑ Tariff system/user fees [unviable, does not provide adequate O&M funds]
- ❑ Maintenance fund
- ❑ USAID Funding
- ❑ Public international organization or other donor funding
- ❑ Not determined
- ❑ Don't know
- ❑ Other Please specify_______________

[OM_CONTIN] Are there additional requirements upon which adequate O&M funding is contingent? Select all that apply.

- ❑ Capacity building
- ❑ New laws
- ❑ Increased Number of users
- ❑ Increased User Fees
- ❑ Better collection of tariffs and user fees
- ❑ Community organization/support
- ❑ Other Specify_____________
- ❑ Don't know

[CERT_USE] Was a 611 (e) certification of the end-users ability to use and maintain the infrastructure made and considered prior to financing?

- ❑ Yes
- ❑ No
- ❑ Don't know

[PRE_PREP] PRE-AWARD PREPARATION

The following section covers pre-award preparation and documentation

[GENDER] Was gender analysis included as part of the planning and design process of the construction component?

- ❑ Yes
- ❑ No
- ❑ Don't know

[RISK_REG] Did USAID develop a means to identify and track potential issues and risks (i.e. risk register)?

- ❑ Yes
- ❑ No
- ❑ Don't know

[**GOV_CONSULT**] Was the host country government consulted in the design of the infrastructure component before the overall construction activity was approved?

- ❑ Yes
- ❑ No
- ❑ Don't know

Logic: If GOV_CONSULT = 'No' or 'DK' skip to STKH_CONSULT

[**GOV_CONSULT_WHO**] Which government entities were consulted in the design of the infrastructure? Select all that apply.

- ❑ Central government authorities/Ministry officials
- ❑ Regional officials
- ❑ Local officials
- ❑ Other (Specify): ____

[STKH_CONSULT] Were non-governmental stakeholders consulted in the design of the infrastructure component before the overall construction activity was approved?

- ❑ Yes
- ❑ No
- ❑ Don't know

Logic: If STKH_CONSULT = 'No' or 'DK' skip to SITE_APPRV

[**STKH_CONSULT_WHO**] Which non-governmental stakeholders were consulted in the design of the infrastructure? Select all that apply.

- ❑ NGOs/CSOs
- ❑ User/business associations
- ❑ Community groups
- ❑ Other (Specify): ____

Logic: If AWARD_MECH = Host Country Award skip to CONT_DES
Logic: If AWARD_MECH = Government-to-Government Agreement skip to DES_STD_AWARD

[SITE_APPRV] Did USAID receive formal approval for the construction activity site from the government?

- ❑ Yes
- ❑ No
- ❑ Don't know

LOGIC: If SITE_APPRV = 'No' or 'DK' skip to CONSTRCT_EVAL

[**SITE_APPRV_WHO**] Which government entities gave formal approval for the construction activity site? (Select all that apply.)

- ❑ Central government authorities/Ministry officials
- ❑ Regional officials
- ❑ Local officials
- ❑ Other (Specify): ____

[CONSTRCT_EVAL] Was a constructability review completed?

- ❑ Yes
- ❑ No

- ❑ Don't know

[SECINFRA] Was the construction activity dependent on other infrastructure projects not funded by USAID?

- ❑ Yes
- ❑ No
- ❑ Don't know

[CRB_REV] Was the solicitation reviewed by the Awardor Review Board (CRB)?

- ❑ Yes
- ❑ No
- ❑ Don't know

[USG_TECH] Were USG officials outside of the implementing mission/bureau involved in directing technical aspects of the construction planning and implementation (e.g. timing, siting, materials used, design specifications, etc.).

- ❑ Yes
- ❑ No
- ❑ DK

LOGIC: If USG_TECH = 'yes' ask TECH_WHO else skip to AWARD_STD

[TECH_WHO] Which USG officials were involved? (Select all that apply)

- ❑ USAID/Washington
- ❑ Other country team
- ❑ State Department/Washington
- ❑ Congress

- ❑ Department of Defense
- ❑ Other specify
- ❑ Don't know

[CONT_DES] AWARD DESIGN

[AWARD_STD] Does the USAID award agreement include or require the awardee to use a standard form of construction award, e.g. FIDIC, or FIDIC based, American Institutes of Architects, American General Awards Association, etc.?

- ❑ Yes
- ❑ No
- ❑ Don't know

LOGIC: If AWARD_STD = 'No' or 'DK' skip to DLP

[AWARD_TYPE] What was the standard form of award used?

- ❑ FAR based only
- ❑ FIDIC-based
- ❑ American Institutes of Architects-based
- ❑ American General Awards Association-based
- ❑ Other (Specify): ____

LOGIC: If AWARD_MECH = Direct Award ask FAR16 else skip to DLP

[FAR16] Was the award agreement designed using FAR 16?

- ❑ Yes
- ❑ No
- ❑ Don't know

LOGIC: if FAR16 = 'No' or 'DK' skip to CONTRCT_SUP

[FAR16_TYPE] What type of FAR Part 16 award was used?

- ❑ Firm-Fixed-Price
- ❑ Fixed-Price with economic price adjustment
- ❑ Fixed-Price with prospective price redetermination
- ❑ Fixed-Ceiling-Price with retroactive price redetermination
- ❑ Firm-fixed-price, level of effort
- ❑ Fixed-price incentive
- ❑ Cost-sharing
- ❑ Cost-plus incentive fee
- ❑ Cost-plus award fee
- ❑ Cost-plus fixed fee
- ❑ Indefinite Delivery/Indefinite Quantity
- ❑ Time-and-Materials/Labor Hour
- ❑ Letter Award
- ❑ Basic Agreement
- ❑ Don't know

[CONTRCT_SUP] Did the award include both construction and non-construction activities?

- ❑ Yes
- ❑ No
- ❑ Don't know

LOGIC: if CONTRCT_SUP = 'No' or 'DK' skip to DLP

[CON_NONCON] Was the award or award predominantly for construction or non-construction activities?

- ❑ Predominantly construction
- ❑ Predominantly non-construction
- ❑ Don't know

[CON_DIVIDE] Was the award or award divided into construction and non-construction parts?

- ❑ Yes
- ❑ No
- ❑ Don't know

LOGIC: if CON_DIVIDE = 'yes' ask FAR36_523 else skip to FAR36_MATRIX

[FAR36_523] Did the construction part of the award or award include construction clauses as specified in FAR Subpart 36.5 and the FAR Matrix at 52.3?

- ❑ Yes
- ❑ No
- ❑ Don't know

LOGIC: if CON_NONCON = 'Predominantly construction' ask FAR36_MATRIX else skip to DLP

[FAR36_MATRIX] Did the award or award include construction clauses as specified in FAR Subpart 36.5 and the FAR Matrix at 52.3?

- ❑ Yes
- ❑ No
- ❑ Don't know

[FAR36_53] Did the award or award use the forms specified in FAR Subparts 36.7 and 53.2?

- ❑ Yes
- ❑ No

- ❑ Don't know

[DLP] Does the award or award include a defects liability period (DLP) or defects notification period (DNP)?

- ❑ Yes; enter length of the DLP in days: ___________________________________
- ❑ No
- ❑ Don't know

[DES_STD_AWARD] What design standards were used in the award or award? (Check all that apply.)

- ❑ International Building Code (IBC)
- ❑ Uniform Building Code
- ❑ Local Codes
- ❑ AASHTO
- ❑ International Code Council
- ❑ ASCE
- ❑ ANSI
- ❑ OSHA
- ❑ Other (specify): ___________________

[HAZARD_MATL] Does the award agreement include specifications or award clauses addressing the use of safe, nonhazardous building materials? (For example, no asbestos containing materials, no lead-based paint, formaldehyde-free materials, etc.)

- ❑Yes
- ❑No; Explain: _____________________________________
- ❑Don't know

LOGIC: If HAZARD_MATL = 'no' or 'dk' skip to COST_EST, else ask HAZARD_MATL_BS

[HAZARD_MATL_BS] What standards were used specifying the use of safe, nonhazardous building materials?

- ❑ US Standards
- ❑ Local Standards
- ❑ International Standards
- ❑ Don't know
- ❑ Other Specify___________

[SEIS_DES] Was/Is seismic design included in the design?

- ❑ Yes
- ❑ No
- ❑ Don't know

[SEIS_DES_STD] What standard were/are used for seismic design? Select all that apply.

- ❑ Regulations for Seismic Design: A World List, 1996
- ❑ Regulations for Seismic Design: Supplement, 2000
- ❑ Regulations for Seismic Design: A World List, 2004
- ❑ Practice of Earthquake Hazard Assessment
- ❑ International Handbook of Earthquake Engineering
- ❑ Seismic Design for Buildings
- ❑ Uniform Building Code, 1997
- ❑ International Building Code, 2003
- ❑ Other (specify): _________________
- ❑ Don't know

[SEIS_CAT] What magnitude seismic design category (IBC 2000) or UBC Zone, ground acceleration, etc. was/is used as the basis of the engineering design?

_________________________; specify units: ________________________

- ❑ Don't know

[HUR_DES] Were/Are hurricanes/typhoons a consideration in the design?

- ❑ Yes
- ❑ No
- ❑ Don't know

[FLOOD_DES] Was the potential for flooding taken into consideration during project design?

- ❑ Yes
- ❑ No
- ❑ Don't know

[WIND_STD] What standards were/are used for wind design?

- ❑ IBC
- ❑ UBC
- ❑ Local building codes
- ❑ Other (specify): ________________________________
- ❑ Don't know

[COST_EST] COST ESTIMATE

The following section captures information on pre-award cost estimates and scoping estimates.

[GOV_EST] Was an independent USAID cost estimate of construction activities developed?

- ❑ Yes
- ❑ No
- ❑ Don't know

LOGIC: If GOV_EST = ‘No’ or ‘DK’ skip to GOV_SCHED else ask EST_PREP

[EST_PREP] Who prepared the USAID cost estimate?

- ❑ USAID Direct Hire (non-engineer)
- ❑ USAID Direct Hire (engineer)
- ❑ USAID Direct Hire (professional licensed engineer)licensed
- ❑ FSN (non-engineer)
- ❑ FSN (engineer)
- ❑ FSN (professional licensed engineer)
- ❑ PSC (non-engineer)
- ❑ PSC (engineer)
- ❑ PSC (professional qualified engineer)
- ❑ A&E firm (US)
- ❑ A&E firm (Host Country)
- ❑ A&E firm (Third Country National)
- ❑ Host country government engineer
- ❑ Other USG Agency (e.g. Army Corps of Engineers)
- ❑ Other (specify): _______________
- ❑ Don’t know

LOGIC: Please provide options as drop down menu.

[EST_BASIS] What was the basis of the USAID cost estimate?

- ❑ Parametric models (i.e. cost square footage, cost per km, cost per cubic meter of water per day etc).
- ❑ Capacity standard (cost/student, cost/hospital bed, etc).
- ❑ Judgment estimate
- ❑ Budget authorization/control (Unit Cost Estimate based upon incomplete / limited design)
- ❑ Control/Bid and Tender (Detailed Unit Cost Estimate based upon complete design).

LOGIC: Please provide options as drop down menu.

[COST_REV] Who reviewed the USAID cost estimate?

- ❑ USAID Direct Hire (non-engineer)
- ❑ USAID Direct Hire (engineer)
- ❑ USAID Direct Hire (professional licensed engineer)
- ❑ FSN (non-engineer)
- ❑ FSN (engineer)
- ❑ FSN (professional licensed engineer)
- ❑ PSC (non-engineer)
- ❑ PSC (engineer)
- ❑ PSC (professional licensed engineer)
- ❑ A&E firm (US)
- ❑ A&E firm (Host Country)
- ❑ A&E firm (Third Country National)
- ❑ Host country government engineer
- ❑ Other USG Agency (e.g. Army Corps of Engineers)
- ❑ Other (specify): _______________
- ❑ Don't know
- ❑ Was not reviewed

[COR_APP] Did the COR/AOR review and approve the USAID cost estimate?

- ❑ Yes
- ❑ No
- ❑ Don't know

[GOV_SCHED] Was a USAID planned schedule developed (i.e. a high level schedule that accounts for procurement and identifies awardor activities to establish reasonable project duration)?

- ❑ Yes

- ❑ No
- ❑ Don't know

LOGIC: If GOV_SCHED = 'yes' or 'ask EST_SCHED_PREP else skip to USG_INC

[EST_SCHED_PREP] Who developed the USAID planned schedule?

- ❑ USAID Direct Hire (non-engineer)
- ❑ USAID Direct Hire (engineer)
- ❑ USAID Direct Hire (professional licensed engineer)
- ❑ FSN (non-engineer)
- ❑ FSN (engineer)
- ❑ FSN (professional licensed engineer)
- ❑ PSC (non-engineer)
- ❑ PSC (engineer)
- ❑ PSC (professional licensed engineer)
- ❑ A&E firm (US)
- ❑ A&E firm (Host Country)
- ❑ A&E firm (Third Country National)
- ❑ Host country government engineer
- ❑ Other USG Agency (e.g. Army Corps of Engineers)
- ❑ Other (specify): _______________
- ❑ Don't know

LOGIC: If AWARD_MECH = 'USAID Direct Award' go to USG_INC; else, skip to COST_BEN_ANALY

[USG_INC] Was value engineering a part of the award as described in FAR 48?

- ❑ Yes; Describe ____
- ❑ No
- ❑ Don't know

[COST_BEN_ANALY] Did the award include cost benefit analysis and/or economic analysis of the proposed construction investment during the design phase?

- ❑ Yes, cost benefit analysis only
- ❑ Yes, economic analysis only
- ❑ Yes, both cost benefit analysis and economic analysis
- ❑ No
- ❑ Don't know

LOGIC: If COST_BEN_ANALY = 'Yes, economic analysis only' or 'Yes, both cost benefit analysis and economic analysis' go to RETURN_RATE; else, skip to BUILD_COST; If COST_BEN_ANALY = 'No" or 'DK', skip to SCOPE EVAL

[RETURN_RATE] What was the economic internal rate of return (EIRR) of the proposed construction investment?

_____________(%)

- ❑ Don't know

[BUILD_COST] Did cost benefit analysis/economic analysis consider long term sustainability and operations and maintenance cost versus initial material costs?

- ❑ Yes
- ❑ No
- ❑ Don't know

LOGIC: If AWARD_MECH = 'Government-to-Government' skip to BUDGET_INFO

[SCOPE_EVAL] Was a scope analysis (basis of engineering design) of the construction activities in the award developed?

- ❑ Yes
- ❑ No
- ❑ Don't know

LOGIC: If SCOPE_EVAL = 'Yes', go to SCOPE_WHO; else, skip to BONDING

[SCOPE_WHO] Who developed the basis of engineering design for the construction activities?

- ❑ USAID Direct Hire (non-engineer)
- ❑ USAID Direct Hire (engineer)
- ❑ USAID Direct Hire (professional licensed engineer)
- ❑ FSN (non-engineer)
- ❑ FSN (engineer)
- ❑ FSN (professional licensed engineer)
- ❑ PSC (non-engineer)
- ❑ PSC (engineer)
- ❑ PSC (professional licensed engineer)
- ❑ A&E firm (US)
- ❑ A&E firm (Host Country)
- ❑ A&E firm (Third Country National)
- ❑ Host country government engineer
- ❑ Other USG Agency (e.g. Army Corps of Engineers)
- ❑ Other (specify): _______________
- ❑ Don't know

[PRIME_COMP] Which of the following options would best characterize the award competition?

- ❑ Full and open competition
- ❑ Qualifications-based short list
- ❑ Limited competition
- ❑ Sole source
- ❑ Government-to-government/FARA/donor-to-donor
- ❑ Don't know

LOGIC: Ask PRIME_STAT for Direct Awards ,Grants, and Cooperative partner only

[PRIME_STAT] Which of the following best characterizes the awardee?

- ❑ International Construction/Engineering Firm
- ❑ International Firm (not primarily construction focused)
- ❑ International NGO/PVO
- ❑ Other international organization (specify)_____________
- ❑ Local Construction/Engineering Firm
- ❑ Local form (not primarily construction focused
- ❑ Local NGO
- ❑ Other Local organization (specify)___________

LOGIC: Ask FINSTAT only if AWARD_MECH = Direct Award

[**FINSTAT**] As part of the solicitation process, was the direct awardor required to submit financial statements as part of the procurement process?

- ❑ Yes
- ❑ No
- ❑ Don’t know

[**BONDING**] Was a construction surety bond or other assurance required by the award or award?

- ❑ Yes
- ❑ No
- ❑ Don’t know

[BUDGET_INFO] BUDGET INFORMATION

The following section captures information on the award budget and post-award modifications/modifications. Please note that we will ask you about both the award writ-large as well as the construction components of the overall award. Please answer appropriately for each question.

[CONT_START] What was the start date of the award?

_______________(MM/YYYY)

[CONT_END_PLAN] What was the planned end date of the award?

________________(MM/YYYY)

[TOTAL_BUDGET_PLAN] What was the original award budget for all activities (including non-construction activities)?

_______________(USD)

[CONSTRUCT_BUDGET_PLAN] Within the original award budget above, please provide an estimate of the amount specified for construction.
_______________(USD)

Logic: CONSTRUCT_BUDGET_PLAN must be equal to or less than TOTAL_BUDGET

[AWARD_AMD] Was the construction component of the award or award modified?

- ❑ Yes
- ❑ No
- ❑ Don't know

LOGIC: If 'No', skip to CO/AO

[MOD_NO] How many award modifications for the construction component were issued?

_______________(No. award modifications)

[LIC_APP_PK] Who was primarily involved in approving award modifications (other than the CO/COR)?

- ❑ USAID Direct Hire (non-engineer)
- ❑ USAID Direct Hire (engineer)
- ❑ USAID Direct Hire (professional licensed engineer)
- ❑ FSN (non-engineer)
- ❑ FSN (engineer)
- ❑ FSN (professional licensed engineer)
- ❑ PSC (non-engineer)
- ❑ PSC (engineer)
- ❑ PSC (professional licensed engineer)
- ❑ A&E firm (US)
- ❑ A&E firm (Host Country)
- ❑ A&E firm (Third Country National)
- ❑ Host country government engineer
- ❑ Other USG Agency (e.g. Army Corps of Engineers)
- ❑ Other (specify): _______________
- ❑ Don't know

[MOD1_DES] For the 1st modification please tell us if the modification covered any of the following reasons?

- ❑ Increase in quantity delivered/requested
- ❑ Decrease in quantity delivered/requested
- ❑ Increase in capacity delivered/requested
- ❑ Decrease in capacity delivered/requested
- ❑ Schedule extended
- ❑ Schedule shortened

- ❑ Rework needed
- ❑ Sustainability - anything to improve the longevity of the facilities constructed (improve design standards, functionality, improved future O&M funding, resilience to natural hazards)
- ❑ Compliance to meet Health & safety requirements
- ❑ Compliance to meet environmental requirements
- ❑ Compliance to meet disability access requirements (local or international)
- ❑ Other Requirements

[MOD1_VALUE] What was the value of the modification (USD)?

Amount___________________________

LOGIC: Loop MOD1_DES for each iteration identified in MOD_NO

[CONT_END_AMD] What is the current completion date of the award?

_______________(MM/YYYY)

LOGIC: If CONT_END_AMD = 'no change' skip to AMEND_FIN_BUDG

[CONT_END_REASON] Which of these external factors below contributed to the award end date being modified? (Select all that apply.)

- ❑ Natural Disasters
- ❑ Weather-related delays
- ❑ Materials shortages
- ❑ Permits
- ❑ Skilled labor shortages
- ❑ Fuel shortages
- ❑ Elections
- ❑ Political unrest/demonstrations
- ❑ Labor unrest/strikes

- ❑ Local insurgency
- ❑ Other security concerns
- ❑ Reduced donor financing
- ❑ USAID specific requirements
- ❑ Other USG requirements
- ❑ Other (specify): ____
- ❑ No factors external to the award contributed to the award end date being modified

[AMEND_FIN_BUDG] What was the revised award or award amount after modifications?

______________(USD)
- ❑ Do not know

[FIN_CONST_AMT] What was the revised amount budgeted within the award for construction activities after modifications?

______________(USD)
- ❑ Do not know

[FIN_CONST_REASON] Which of these external factors below contributed to the amount budgeted within the award for construction activities being modified? (Select all that apply.)

- ❑ Natural Disasters
- ❑ Permits
- ❑ General price inflation
- ❑ Building materials cost increases
- ❑ Skilled labor wage increases
- ❑ Fuel cost increases
- ❑ Weather-related delays
- ❑ Elections
- ❑ Political unrest/demonstrations
- ❑ Labor unrest/strikes
- ❑ Local insurgency

- ❑ Other security concerns
- ❑ Reduced donor financing
- ❑ USAID specific requirements
- ❑ Other USG requirements
- ❑ Other (specify): ______________________________________
- ❑ No factors external to the award contributed to the amount budgeted within the award for construction activities being modified

[CO_AO] CO/AO

The next section asks for details on the current (for projects in progress) or most recent (for completed projects) Awarding/Assistance Officer supervising the award.

[CO_NO] Over the life of the award to date, how many Awarding Officers (CO)/Assistance Officers (AO) administered the award?

________________(Number of COs/AOs)
❑ None, eg in the case of G2G agreements

LOGIC: If CO_NO = 'none' skip to COR_AOR

[CO_SUP_PER] For what period was the current/most recent CO/AO administering the award?

Start_Month/Year________________(MM/YYYY)
End Month/Year________________(MM/YYYY)

[CO_SITEVISIT] Throughout the construction period, on average, how many times annually did the current/most recent CO/AO visit construction sites associated with the award?

_________(Average number of site visits annually)
❑ Don't know

[CO_CERT] Did the current/most recent CO/AO receive training in construction awards and/or A&E awarding?

- ❑ Yes, construction only
- ❑ Yes, A&E only
- ❑ Yes, both A&E and construction
- ❑ No
- ❑ Don't know

[CO_PROC_ORD] Is/was the current/most recent CO/AO familiar with processing construction change orders prior to this award?

- ❑ Yes, under general form of awards
- ❑ Yes, under construction form of award – other than FIDIC-based
- ❑ Yes, under FIDIC-based construction award
- ❑ No
- ❑ Don't know

[CO_PRIOR_EXP] Prior to the award, how many years of USG or other construction awarding experience did the current/most recent CO/AO have?

- ❑ Less than 2 years
- ❑ 2-5 years
- ❑ More than 5 years
- ❑ Don't know

[CO_SUP_PRIOR] Not including this award, how many prior construction awards had the current/most recent CO/AO administered?

- ❑ None
- ❑ 1-3
- ❑ 4-5
- ❑ 6-10
- ❑ More than10
- ❑ Don't know

[CO_FIDIC_SUP] Did the current/most recent CO/AO have previous experience managing FIDIC awards?

- ❑ Yes
- ❑ No
- ❑ Don't know

[COR_AOR] COR/AOR

The next section asks for details on the current (for projects in progress) or most recent (for completed projects) Awarding Officer Representative/Agreement Officer Representative on the award.

[COR_NO] Over the life of the award to date how many Awarding Officer Representatives (COR) / Agreement Officer Representatives (AOR) or equivalent for other award types administered the award?

__________________(Number of COR/AOR)

[COR_SUP_PER] For what period was the current/most recent COR/AOR administering the award?

Start_Month/Year________________(MM/YYYY)
End Month/Year________________(MM/YYYY)

[COR_SITEVISIT] Throughout the construction period, on average, how many times annually did the current/most recent COR/AOR visit construction sites associated with the award?

_________(Average number of site visits annually)

- ❑ Don't know

[COR_CERT] Did the current/most recent COR/AOR receive training in construction awards and/or A&E awarding?

- ❑ Yes, construction only
- ❑ Yes, A&E only

- ❑ Yes, both A&E and construction
- ❑ No
- ❑ Don't know

[COR_PROC_ORD] Was current/most recent COR/AOR familiar with processing construction change orders and administering construction claims?

- ❑ Yes, under general form of awards
- ❑ Yes, under construction form of award – other than FIDIC-based
- ❑ Yes, under FIDIC-based construction award
- ❑ No
- ❑ Don't know

[COR_SUP_PRIOR] Not including this award, how many prior construction awards had the current/most recent COR/AOR been delegated?

- ❑ None
- ❑ 1-3
- ❑ 4-5
- ❑ 6-10
- ❑ More than 10
- ❑ Don't know

[COR_FIDIC_TRAIN] Did the current/most recent COR/AOR receive FIDIC training or have previous experience managing a FIDIC award?

- ❑ Yes
- ❑ No
- ❑ Don't know

[COR_LIC_ENG] Is/was the current/most recent COR/AOR a professional licensed engineer?

- ❑ Yes, US licensed
- ❑ Yes, Host Country licensed
- ❑ Yes, internationally licensed

- ❑ No
- ❑ Don't know

[COR_MGMT _CERT] Does/did the current/most recent COR/AOR have any of the following certifications (select all that apply):

- ❑ PMP (Project Management Professional)
- ❑ CCM (Certified Construction Manager)
- ❑ CCC (Certified Cost Consultant)
- ❑ CCE (Certified Cost Engineer)
- ❑ Other equivalent certification ________________________

[RELATION_US_PRIME] USAID-PRIME RELATIONSHIP

The following section collects information on the post-award documentation submitted for this award as well as the USAID and Awardee relationship.

[CONST_DOC] Which of the following were provided to the awardee prior to initiation of construction? (Select all that apply)

- ❑ Blueprints
- ❑ IEE (Initial Environmental Evaluation)
- ❑ Geo-Technical Reports
- ❑ CBA (Cost benefit Analysis)
- ❑ Environmental Assessment
- ❑ Site topographic surveys
- ❑ Schedule
- ❑ Terms and conditions
- ❑ None
- ❑ Don't know

LOGIC: If CONST_DOC = 'none' skip to PROJAUDIT

[DOC_PRVD] Who provided these documents to the Awardee or awardor?

- ❑ USAID
- ❑ Host country government
- ❑ Other specify__________

[DOC_WHEN] When were these documents given to the Awardee or awardor?

- ❑ Tendering Process
- ❑ Prior to notice to proceed
- ❑ After notice to proceed
- ❑ Other specify____________
- ❑ Don’t know

[PROJAUDIT] Is/Was a USAID performance evaluation of the construction components performed during the life of the award?

❑Yes; mid-term evaluation
❑Yes; final evaluation
❑No
❑Don’t know

[STKRCH] Did the award have a stakeholder engagement plan developed for the construction components?

❑Yes
❑No
❑Don’t know

[REP_FREQ] How often is/was a progress report required?

	Weekly	Monthly	Quarterly	Other (Specify)	Don’t know/Not

					applicable
To CO/AO or COR/AOR, or Equivalent	❑	❑	❑	________	❑
To Supervising Engineer (USAID or awarded)	❑	❑	❑	________	❑

[PROG_REP]
When reporting for the infrastructure component to USAID or the supervising engineer, what is included in progress reporting? (Select all that apply.)
? (Select all that apply.)

- ❑ Daily site reports
- ❑ Financial status (actual work done and its actual cost)
- ❑ Schedule status (actual work completed versus planned work)
- ❑ Health and safety record
- ❑ Non-compliance with award
- ❑ Potential delays and cost changes
- ❑ Claims status
- ❑ Issues for Engineer determination
- ❑ Design issues and unforeseen conditions
- ❑ QA/QC procedures
- ❑ Forward reporting period work plan
- ❑ Environmental management and monitoring
- ❑ Other (specify): ________________________
- ❑ Don't know

[SAFETY_ENV] SAFETY AND ENVIRONMENTAL INCIDENTS

LOGIC: If PROJ_PHASE = 'Award/Mobilization', skip to END

The next section asks for information on safety and environmental incidents that may have taken place during construction associated with this award

[HS_REP] Is the awardee required to report to USAID and/or the supervising engineer, any health and safety incidents (defined as any death or injury that causes any of the following: days away from work, restricted work or transfer to another job, medical treatment beyond first aid, or loss of consciousness or if it involves a significant injury or illness diagnosed by a physician or other licensed health care professional, even if it does not result in days away from work, restricted work or job transfer, medical treatment beyond first aid, or loss of consciousness.)

- ❑ Yes
- ❑ No
- ❑ Don't know

[NUM_INCI] How many incidents of death or injury were reported during the life of the award?

________________(Number of incidents where death or injuries were reported)

Logic: For each NUM_INCI (up to 10) ask INCI_DES, NUM_INJUR and NUM_DEATH

[INCI_DES] Please describe the incident, and the severity of injuries.

____

____

____

[NUM_INJUR] Number of injuries

_________________(Number of injuries that occurred as a result of the incident)

[NUM_DEATH] Number of deaths

________________(Number of deaths that occurred as a result of the incident)

[ENV_REP] Is the awardee required to report to USAID environmental incidents/impacts (any unplanned change to the environment caused in whole or in part by the infrastructure component as otherwise defined in the award environmental mitigation and monitoring plan)?

- ❑ Yes
- ❑ No
- ❑ Don't know

Logic: If ENV_REP = 'yes' ask NUM_ENV_INC else skip to CON_OVER

[NUM_ENV_INC] How many environmental incidents were reported during the life of the award?

_______________(Number of environmental incidents)

Logic: For each NUM_ENV_INC ask ENV_INC_DES

[ENV_INC_DES] Please describe the incident

____
____
____

[ENG_OVER_AWARD] ENGINEERING OVERSIGHT

The following section collects information on engineering oversight

[ENG_APPROV] Prior to construction, what documents was the awardee or awardor required to provide to USAID or Supervising Engineer for approval? (Check all that apply.)

- ❑ Detailed Work Program with implementation schedule
- ❑ Health and Safety Plan
- ❑ Quality Assurance/Quality Control Plan
- ❑ Site-Specific Environmental Management Plan
- ❑ Methods and Materials Statement/Shop drawing
- ❑ Staffing Plan
- ❑ Other (specify): _____________

- ❑ None

[DES_OVER] Was there a supervising engineer for the engineering design process?

- ❑ Yes, USAID
- ❑ Yes, Other organization
- ❑ No
- ❑ Don’t know

LOGIC: If DES_OVER = ‘No’ or ‘DK’ skip to CON_OVER
LOGIC: If DES_OVER = ‘Yes USAID’ ask ENG_OVER
LOGIC: If DES_OVER = ‘Yes Other organization’ ask ENG_OVER2

[ENG_OVER] Who provided the engineering design oversight? Note: A licensed professional engineer is an engineer with an internationally recognized credential such as US professional engineer, UK chartered engineer, or other rigorous national accreditation)

- ❑ USAID Direct Hire (non-engineer)
- ❑ USAID Direct Hire (engineer)
- ❑ USAID Direct Hire (professional licensed engineer)
- ❑ FSN (non-engineer)
- ❑ FSN (engineer)
- ❑ FSN (professional licensed engineer)
- ❑ PSC (non-engineer)
- ❑ PSC (engineer)
- ❑ PSC (professional licensed engineer)
- ❑ A&E firm (US)
- ❑ A&E firm (Host Country)
- ❑ A&E firm (Third Country National)
- ❑ Host country government engineer
- ❑ Other USG Agency (e.g. Army Corps of Engineers)
- ❑ Other (specify): _______________
- ❑ Don’t know

[ENG_OVER2] Who provided the engineering design oversight?

- ❑ US or international staff/consultant (non-engineer)
- ❑ US or international staff/consultant (engineer)
- ❑ US or international staff/consultant (professional licensed engineer)
- ❑ HOST COUNTRY staff/consultant (non-engineer)
- ❑ HOST COUNTRY staff/consultant (engineer)
- ❑ HOST COUNTRY staff/consultant (professional licensed engineer)
- ❑ A&E firm (US)
- ❑ A&E firm (Host Country)
- ❑ A&E firm (Third Country National)

[SUP_CON] Was the engineering design oversight awarded, or on staff, prior to the construction award execution?

- ❑Yes
- ❑No
- ❑Don't know

LOGIC: If ENG_APPROV = 'None', skip to CON_OVER

[SUP_REV] Did the supervising engineer review design documents prior to construction award execution?

- ❑ Yes
- ❑ No
- ❑ Don't know

[SITE_INSPCT] Were construction site inspections conducted?

- ❑ Yes, USAID

- ❑ Yes, Other organization
- ❑ No
- ❑ Don't know

LOGIC: If SITE_INSPCT = 'Yes USAID' ask CON_OVER
LOGIC: If SITE_INSPCT = 'Yes Other organization' ask CON_OVER2

[CON_OVER] Who is/was the main provider of construction site inspections? Note: A licensed professional engineer is an engineer with an internationally recognized credential such as US professional engineer, UK chartered engineer, or other rigorous national accreditation)

- ❑ USAID Direct Hire (non-engineer)
- ❑ USAID Direct Hire (engineer)
- ❑ USAID Direct Hire (professional licensed engineer)
- ❑ FSN (non-engineer)
- ❑ FSN (engineer)
- ❑ FSN (professional licensed engineer)
- ❑ PSC (non-engineer)
- ❑ PSC (engineer)
- ❑ PSC (professional licensed engineer)
- ❑ A&E firm (US)
- ❑ A&E firm (Host Country)
- ❑ A&E firm (Third Country National)
- ❑ Host country government engineer
- ❑ Other USG Agency (e.g. Army Corps of Engineers)
- ❑ Other (specify): _______________
- ❑ Don't know

[CON_OVER2] Who is/was the main provider of construction site inspections?

- ❑ US or international staff/consultant (non-engineer)
- ❑ US or international staff/consultant (engineer)
- ❑ US or international staff/consultant (professional licensed engineer)
- ❑ HOST COUNTRY staff/consultant (non-engineer)
- ❑ HOST COUNTRY staff/consultant (engineer)
- ❑ HOST COUNTRY staff/consultant (professional licensed engineer)
- ❑ A&E firm (US)
- ❑ A&E firm (Host Country)
- ❑ A&E firm (Third Country National)

LOGIC: Options should be provided as drop-down menu.

[INSPCT_NUM] Throughout the construction period, on average, how often did the site inspector visit construction sites associated with the award or award?

- ❑ Daily
- ❑ Weekly
- ❑ Bi-weekly
- ❑ Monthly
- ❑ Quarterly
- ❑ Don't know

[MATL_TEST] Which of the following describes the construction material testing associated with this construction activity? Examples of material testing include: concrete strength testing, rebar tensile testing, geotechnical foundation and material tests.

- ❑ Award requirement, the award or provided material submittals and USAID confirms engineering oversight
- ❑ USAID confirms that the award or conducted testing, but no award requirements and no engineering oversight
- ❑ USAID cannot confirm any testing was completed
- ❑ Other; please describe: ________________________________
- ❑ Don't know/cannot answer; please explain:________________________________

[CLOSEOUT] CLOSEOUT

The following section asks about closeout activities on this award. When answering please focus on the construction aspects of the award only.

LOGIC: Ask CLOSEOUT only if PROJ_PHASE = ‘closeout’ or ‘completed’

[CLOSEOUT_ACT] What construction closeout completion activities were completed or are planned (Select all that apply)?

- ❑ Develop a project commissioning plan and checklist (i.e. equipment inspections and start-up test plan)
- ❑ Conduct and monitor project commissioning and start-up
- ❑ Receive project operations manual
- ❑ Receive all equipment warranties and operation manuals
- ❑ Receive and approve all as-built drawings
- ❑ Conducted detailed turn-over inspection/final inspection and punch-list
- ❑ Receive Certificate of project warranty
- ❑ Receive Certificate of final release of liens and indemnity
- ❑ Provide Official Project Acceptance Letter
- ❑ Other specify_______________
- ❑ Don’t know

[PROJ_FOLLOW] What follow-up activities were conducted in association with the construction portion of the award? Select all that apply.

- ❑ Warranty period inspection by USAID
- ❑ Follow up review by implementer
- ❑ Verification of the facility use by beneficiaries
- ❑ Verification of appropriate operational practices and procedures
- ❑ None of the above

[SUB_LEVEL] SUBAWARD LEVEL

The next section is going to ask you about the specific construction components of the award we’ve been discussing. As you may know, construction projects are often divided among different sub-awards either by USAID or the awardee of the overall award. If there are no sub-awards associated with this award then you will be answering for the award as a whole. However, if the awardee sub-awarded the work into several packages you will need to answer for each individual sub-award made. This **EXCLUDES** sub-awards that are only trades (i.e. painters, electricians, stone masons, etc.).

[SUB_DET] SUB-AWARD DETAILS

[SUBNO] How many construction related sub-awards did/does this award or award have? If there were no sub-awards associated with this award please enter '1' in the space below.

____

Logic: Note: If SUBNO = 1, do not display any questions with variable ending '_SAME'

You will now be asked questions about each sub-award in turn.

[SUBNAME1] Please provide the name/description for construction sub-award 1.

[SUBAWARD1]____________________

LOGIC: Begin loop for CONSTRUCT_TYPE asking for SUBNAME1, SUBNAME 2, SUBNAME3, etc. through to SUBNAME300

[CONSTRUCT_TYPE1] What types of construction were/are included in **[INSERT NAME FROM SUBNAME]**? Please check all that apply. (Note: Airports runways and railway rail beds should be counted under the transportation category and airport terminals and train station are to be counted under the building category.

- ❑ Transportation (roads, bridges, rail beds, ports, etc.)
- ❑ Buildings (new construction, renovation, and/or repair; includes airport terminals and railway stations)
- ❑ Water/wastewater facilities (potable water distribution, water treatment plants, wastewater treatment plants, community septic systems, sewers, etc.)
- ❑ Energy related facilities (including biomass/waste to energy, <u>excludes hydroelectric dams</u>)
- ❑ Telecommunication facilities (cell towers, antennae, switching stations)
- ❑ Solid waste management facilities (landfills, transfer stations, recycling centers, incinerators,)
- ❑ Water resources facilities (dams, irrigation systems, <u>includes hydroelectric dams</u>)

Logic:

1. **(Text piping) If SUBNO = 0, [----] = 'award'; else, [----] = [SUBNAME#]**
2. **After [CONSTRUCT_TYPE#] is completely filled, skip to the following sections for each package, collecting all details about a single package before moving to the next. Sections: (*for Transportation Category*) [ROADWAY_ITEM], [BUILD_ITEM], [WASTEWATER_FAC_ITEM], (*for Energy category*) [ENER_CARBON_ITEM], [TELECOMM_LINE_ITEM], [WASTEMGMT_ITEM], [WATERRES_DAM_ITEM], [WATERSTORE_ITEM]**
3. **Loop through based on SUBNO**
4. **Logic Check: In CONSTRUCT_TYPE#, if a respondent selects a particular construction type, at least one question of type '_ITEM' in corresponding section should be 'Yes'**

[TRANSPORT] TRANSPORTATION

The following section asks about the transportation related construction activities associated with this award such as roadways, bridges, railways, airport runways, and ports.

[ROADWAY] ROADWAYS

[ROADWAY_ITEM] Does the sub award include any roadway related items?

- ❑ Yes
- ❑ No

Logic: If [ROADWAY_ITEM] = 'no' skip to [ROAD_BRIDGE]

[ROADWAY_TYPE] For roadway construction under the sub-award, please select all that apply and provide as much information as possible.

	Construction location	Was/Is construction in a conflict area?	Did this facility include any major pre-fabricated components?	Surface type	Typical # of travel lanes	Planned # of segments	Actual(if complete)/ Estimated (if ongoing)# of segments	Plan ned tota l km	Actual/ Estimated total km	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS coordinates for all related construction structures (provide coordinates separated by semicolon in AT-LONG or UTM format)
Urban Primary roads	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Yes ❑No ❑Don't know	❑Concrete ❑Asphalt ❑Gravel ❑Dirt ❑Other ❑Don't know	❑1 ❑2 ❑3 ❑4 or more ❑Varies ❑Don't know	________ ❑Don't know	❑Don't know	❑Don't know	❑Don't know	❑Don't know	❑Don know	❑Yes, minor defects 't ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: _______ ❑Yes, completely unusable ❑No ❑Don't know; explain:	
Urban Secondary roads	"	"		"	"	"	'	"	"	"	"	'	"
Rural Primary roads	"	"		"	"	"	'	"	"	"	"	'	"
Rural Secondary roads	"	"		"	"	"	'	"	"	"	"	'	"
Farm to market roads	"	"		"	"	"	'	"	"	"	"	'	"
Other (specify): ________	"	"		"	"	"	'	"	"	"	"	'	"

[ROADWAY_DIS] What is the closest major city or town to the project site (50k people or more)?

City Name_________________

[ROAD_BRIDGE] ROADWAY BRIDGES

[ROAD_BRIDGE_ITEM] Did/Does this sub-award include any road bridges-related items?

- ❑ Yes
- ❑ No

Logic: If [ROAD_BRIDGE_ITEM] = ‘no’ skip to [RAILBED]

[ROAD_BRIDGE_TYPE] For bridges along roads, please select all that apply and provide as much information as possible.

Structure Type	Construction location	Was/Is construction in a conflict area?	Did this facility include any major pre-fabricated components?	Location	Planned # of sites	Actual/ Estimated # of sites	Typical span (m)	Typical Number of spans	Typical # of travel lanes	Planned/ designed economic life of the constructed facility (in years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS coordinates for all related construction structures (provide coordinates separated by semicolon in AT-LONG or UTM format)
Steel	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Yes ❑No ❑Don't know	❑Urban ❑Rural	________ ❑Don't know	________ ❑Don't know	❑<5 ❑5-9 ❑10-14 ❑15-19 ❑20 or more ❑ Don't Know	________ ❑Don't know	❑1 ❑2 ❑3 ❑4 ❑5 or more ❑ DK	________ ❑Don't know	________ ❑Don't know	❑Yes, minor defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: _______ ❑Yes, completely unusable ❑No ❑Don't know; explain: ___________	
Concrete	"	"		"	"	"	"		"	"	"	"	
Wood	"	"		"	"	"	"		"	"	"	"	
Other (specify):	"	"		"	"	"	"		"	"	"	"	

[BRIDGE_DIS] What is the closest major city or town to the project site (50k people or more)?

City Name__________________

[RAILBED] RAILBEDS

[RAILBED_ITEM] Does this sub-award include any railbed-related items?

- ❑ Yes
- ❑ No

Logic: If [RAILBED_ITEM] = ‘no’ skip to [RAIL_BRIDGE]

[RAILBED_TYPE] For rail bed construction components, please select all that apply and provide as much information as possible.

Railbed type	Construction location	Was/Is construction in a conflict area?	Location	Planned # of segments	Actual # of segments	Planned total km	Actual total km	Planned/ designed economic life of the constructed facility (in years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS coordinates for all related construction structures (provide coordinates separated by semicolon in AT-LONG or UTM format)
Single track	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Urban ❑Rural	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	❑Yes, minor defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: ______ ❑Yes, completely unusable ❑No ❑Don't know; explain: __________	
Double track	"	"	"	"	"	"	"	"	"		
Other (specify): ________	"	"	"	"	"	"	"	"	"		

[BED_DIS] What is the closest major city or town to the project site (50k people or more)?

City Name________________

[RAIL_BRIDGE] RAILWAY BRIDGES

[RAILWAY_BRIDGE_ITEM] Did/Does this sub-award include any railway bridges-related items?

- ❑ Yes
- ❑ No

Logic: If [RAILWAY_BRIDGE_ITEM] = 'no' skip to [RUNWAY]

[RAILWAY_BRIDGE_TYPE] For bridges along railways, please select all that apply and provide as much information as possible.

Structure Type	Construction location	Was/Is construction in a conflict area?	Did this facility include any major pre-fabricated components?	Location	Planned # of sites	Actual/ Estimated # of sites	Typical span (m)	What is the typical number of spans	Typical # of tracks	Planned/ designed economic life of the constructed facility (in years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS coordinates for all related construction structures (provide coordinates separated by semicolon in AT-LONG or UTM format)
Steel	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Yes ❑No ❑Don't know	❑Urban ❑Rural	________ ❑Don't know	________ ❑Don't know	❑<5 ❑5-9 ❑10-14 ❑15-19 ❑20 or more	________ __ ❑Don't know	❑1 ❑2 ❑Other; specify: ________	________ ❑Don't know	________ ❑Don't know	❑Yes, minor defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: _______ ❑Yes, completely unusable ❑No ❑Don't know; explain: ___________	
Concrete	"	"		"	"	"	"		"	"	"	"	
Wood	"	"		"	"	"	"		"	"	"	"	
Other (specify):	"	"		"	"	"	"		"	"	"	"	

[RAIL_DIS] What is the closest major city or town to the project site (50k people or more)?

City Name___________________

[RUNWAY] AIRPORT RUNWAYS

[RUNWAY_ITEM] Does the sub award include any airport runway related items?

- ❑ Yes
- ❑ No

Logic: If [RUNWAY_ITEM] = 'no' skip to [PORT]

[RUNWAY_TYPE] For runway construction under the sub-award, please select all that apply and provide as much information as possible.

	Construction location	Was/Is construction in a conflict area?	Surface type	Planned # of segments	Actual/ Estimated # of segments	Planned typical width (m)	Actual/ Estimated typical width (m)	Planned total length (m)	Actual/ Estimated total length (m)	Planned/ designed economic life of the constructed facility (years)?	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS coordinates for all related construction structures (provide coordinates separated by semicolon in AT-LONG or UTM format)
Runways	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Concrete ❑Asphalt ❑Gravel ❑Dirt ❑Other ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	❑Yes, minor defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: _______ ❑Yes, completely unusable ❑No ❑Don't know; explain: ___________	
Taxiways	"	"	"			"	"	"	"	"	"		
Other (Please specify):													

[PORT] PORTS

[PORT_ITEM] Does this sub-award include any port-related items?

- ❑ Yes
- ❑ No

LOGIC: If [PORT_ITEM] = 'no' skip to next section selected in CONSTRUCT_TYPE

[PORT_TYPE] For ports, please select all that apply and provide as much information as possible.

	Construction location	Was/Is construction in a conflict area?	Location	Cargo handling equipment	Planned # of sites	Actual/ Estimated # of sites	Planned # of berths	Actual/ Estimated # of berths	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS coordinates for all related construction structures (provide coordinates separated by semicolon in AT-LONG or UTM format)
Sea	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Urban ❑Rural	❑Yes ❑No ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	❑Yes, minor defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: ______ ❑Yes, completely unusable ❑No ❑Don't know; explain: ________	
River or other inland	"	"	"	"	"	"	"	"	"	"		

[PORT_DIS] What is the closest major city or town to the project site (50k people or more)?

____

[BUILD] BUILDINGS

The following section deals with buildings associated with the award such as schools, clinics, hospitals, and other building types.

[BUILD_ITEM_SS] Does this sub-award include any single story buildings?

- ❑ Yes
- ❑ No

LOGIC: If BUILD_ITEM_SS = 'No', skip to BUILD_ITEM_MS

[BUILD_TYPE_SS] For single-story buildings, please select all that apply and provide as much information as possible.

	Construction location	Was/Is construction in a conflict area?	Location	Did this facility include any major pre-fabricated components?	Planned # of sites	Actual/ Estimated # of sites	Planned typical area per building (m^2)	Estimated typical area per building (m^2)	Energy efficiency standards required by the award	Green building standards required by the award (e.g. LEED)	Specifications and /or clauses requiring use of safe, nonhazardous materials (e.g. no asbestos materials, no lead-based paint, formaldehyde free materials, etc.)	Did/Does the sub-award(s) incorporated design elements to accommodate people with disabilities	Planned/ designed economic life of the constructed facility (years)	Actual on completion economic life of the constructed facility (years)	Rework required not completed prior to award end date
Schools [Schools]	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Urban ❑Rural	❑Yes ❑No ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	❑Yes ❑No ❑Don't know	❑Yes; describe standards: ________ ❑No ❑Don't know	❑Yes; describe standards: ________ ❑No ❑Don't know	❑Yes; Describe standards: ________ ❑No ❑Don't know	________ ❑Don't know	________ ❑Don't know	❑Yes, minor defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: _______ ❑Yes, completely unusable ❑No ❑Don't know; explain: ___________
Clinics [Clinics]	"	"	"		"	"	"	"	"	"	"	"	"	"	
Hospitals [Hospitals]	"	"	"		"	"	"	"	"	"	"	"	"	"	
Community centers [Community centers]	"	"	"		"	"	"	"	"	"	"	"	"	"	

	Construction location	Was/Is construction in a conflict area?	Location	Did this facility include any major pre-fabricated components?	Planned # of sites	Actual/ Estimated # of sites	Planned typical area per building (m^2)	Estimated typical area per building (m^2)	Energy efficiency standards required by the award	Green building standards required by the award (e.g. LEED)	Specifications and /or clauses requiring use of safe, nonhazardous materials (e.g. no asbestos materials, no lead-based paint, formaldehyde free materials, etc.)	Did/Does the sub-award(s) incorporated design elements to accommodate people with disabilities	Planned/ designed economic life of the constructed facility (years)	Actual on completion economic life of the constructed facility (years)	Rework required not completed prior to award end date
Libraries [Libraries]	“	“	“		“	“	“	“	“	“	“	“	“	“	
Government offices [Government offices]	“	“	“		“	“	“	“	“	“	“	“	“	“	
Storage facilities/ warehouses/ hangars [Storage facilities/ warehouses]	“	“	“		“	“	“	“	“	“	“	“	“	“	
Cold Storage facility and warehouse (i.e. for medical or farm products)															
Factories [Factories]	“	“	“		“	“	“	“	“	“	“	“	“	“	
Agricultural processing center															

	Construction location	Was/Is construction in a conflict area?	Location	Did this facility include any major pre-fabricated components?	Planned # of sites	Actual/ Estimated # of sites	Planned typical area per building (m²)	Estimated typical area per building (m²)	Energy efficiency standards required by the award	Green building standards required by the award (e.g. LEED)	Specifications and /or clauses requiring use of safe, nonhazardous materials (e.g. no asbestos materials, no lead-based paint, formaldehyde free materials, etc.)	Did/Does the sub-award(s) incorporated design elements to accommodate people with disabilities	Planned/ designed economic life of the constructed facility (years)	Actual on completion economic life of the constructed facility (years)	Rework required not completed prior to award end date
Cultural heritage (e.g. historic sites, museums) [Cultural heritage]	"	"	"		"	"	"	"	"	"	"	"	"	"	
Airport terminals [AIRPORT_TERM]	"	"	"		"	"	"	"	"	"	"	"	"	"	
Railway stations [RAILWAY_STN]	"	"	"		"	"	"	"	"	"	"	"	"	"	
Other (Please specify):	"	"	"		"	"	"	"	"	"	"	"	"	"	

[BUILD_ITEM_MS] Does this sub-award include any multi-story building items?

- ❑ Yes
- ❑ No

LOGIC: If BUILD_ITEM_SS = 'No', skip to WASTEWATER_NET_ITEM

[BUILD_TYPE_MS] For multi-story buildings, please select all that apply and provide as much information as possible.

	Construction location	Was/Is construction in a conflict area?	Location	Did this facility include any major pre-fabricated components?	Planned # of sites	Actual/ Estimated # of sites	Planned typical area per building (m^2)	Estimated typical area per building (m^2)	Energy efficiency standards required	Green building standards applied (e.g. LEED)	Specifications requiring use of safe, nonhazardous materials (e.g. no asbestos materials, no lead-based paint, formaldehyde free materials, etc.)	Did/Does the sub-award(s) incorporated design elements to accommodate people with disabilities	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date
Schools [Schools]	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Urban ❑Rural	❑Yes ❑No ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	❑Yes ❑No ❑Don't know	❑Yes; describe standards: ________ ❑No ❑Don't know	❑Yes; describe standards: ________ ❑No ❑Don't know	❑Yes; Describe standards: ________ ❑No ❑Don't know	________ ❑Don't know	________ ❑Don't know	❑Yes, minor defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: _______ ❑Yes, completely unusable ❑No ❑Don't know; explain: ___________
Clinics [Clinics]	"	"	"		"	"	"	"	"	"	"	"	"	"	
Hospitals [Hospitals]	"	"	"		"	"	"	"	"	"	"	"	"	"	

	Construction location	Was/Is construction in a conflict area?	Location	Did this facility include any major pre-fabricated compone nts?	Planned # of sites	Actual/ Estimated # of sites	Planned typical area per building (m^2)	Estimated typical area per building (m^2)	Energy efficiency standards required	Green building standards applied (e.g. LEED)	Specifications requiring use of safe, nonhazardous materials (e.g. no asbestos materials, no lead-based paint, formaldehyde free materials, etc.)	Did/Does the sub-award(s) incorporated design elements to accommodate people with disabilities	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date
Community centers [Community centers]	“	“	“		“	“	“	“	“	“	“	“	“	“	
Libraries [Libraries]	“	“	“		“	“	“	“	“	“	“	“	“	“	
Government offices [Government offices]	“	“	“		“	“	“	“	“	“	“	“	“	“	
Storage facilities/ warehouses/ hangars [Storage facilities/ warehouses]	“	“	“		“	“	“	“	“	“	“	“	“	“	
Factories [Factories]	“	“	“		“	“	“	“	“	“	“	“	“	“	
Cultural heritage (e.g. historic sites, museums) [Cultural heritage]	“	“	“		“	“	“	“	“	“	“	“	“	“	

	Construction location	Was/Is construction in a conflict area?	Location	Did this facility include any major pre-fabricated components?	Planned # of sites	Actual/ Estimated # of sites	Planned typical area per building (m^2)	Estimated typical area per building (m^2)	Energy efficiency standards required	Green building standards applied (e.g. LEED)	Specifications requiring use of safe, nonhazardous materials (e.g. no asbestos materials, no lead-based paint, formaldehyde free materials, etc.)	Did/Does the sub-award(s) incorporated design elements to accommodate people with disabilities	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date
Airport terminals [AIRPORT_TERM]	“	“	“		“	“	“	“	“	“	“	“	“	“	
Railway stations [RAILWAY_STN]	“	“	“		“	“	“	“	“	“	“	“	“	“	
Other (Please specify):	“	“	“		“	“	“	“	“	“	“	“	“	“	

[BUILD_DIS] What is the closest major city or town to the project site (50k people or more)?
City Name__________________

[WASTEWATER_TREAT] WATER/WASTEWATER TREATMENT

The next section collects information on water and wastewater treatment facilities.

[WASTEWATER_FAC_ITEM] Does this sub-award include any wastewater treatment facilities?

- ❑ Yes
- ❑ No

Logic: If [WASTEWATER_FAC_ITEM] = 'no' skip to [WATER_FAC_ITEM]

[WASTEWATER_FAC] For Wastewater Treatment facilities, please select all that apply and provide as much information as possible.

	Construction location	Was/Is construction in a conflict area?	Location	Planned # of sites	Actual # of sites	Planned population served	Actual/ Estimated population served	Level of treatment	Disinfection system	Planned typical capacity (liters/day)	Actual typical capacity (liters/day)	What is the planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS coordin for all relate construction structures (provide coordinates separated b semicolon in LONG or UT format)
Waste-water treatment facilities	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Urban ❑Rural	________ ❑Don't know	❑Don't know	❑Don't know	________ ❑Don't know	❑Primary) ❑Secondary ❑Tertiary	❑Chlorination ❑UV ❑Other; specify ______	________ ❑Don't know	❑Don't know	❑Don't know	❑Don't know	❑Yes, minor defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: ______ ❑Yes, completely unusable ❑No ❑Don't know; explain:	

[WATER_FAC_ITEM] Does this sub-award include any water treatment facilities-related items?

❑ Yes

❑ No

Logic: If [WATER_FAC_ITEM] = 'no' skip to [WASTEWATER_NET_ITEM]

[WATER_FAC] For Water Treatment facilities, please select all that apply and provide as much information as possible.

	Construction location	Was/Is construction in a conflict area?	Location	Planned # of sites	Actual/ Estimated # of sites	Planned population served	Actual/ Estimated population served	Water source	Type of treatment (Select all that apply)	Planned typical capacity (liters/day)	Actual typical capacity (liters/ day)	What is the planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS coordin all related construction structures (p coordinates separated b semicolon in LONG or UT format)
Water treatment facilities	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Urban ❑Rural	________ ❑Don't know	❑Don't know	❑Don't know	________ ❑Don't know	❑Shallow well (less than 10 m) ❑Deep well (over 10 m) ❑ Lake/ reservoir ❑Major river (requires significant treatment ❑ Small river or creek (limited treatment needed) ❑Spring\ ❑ Don't Know	❑Flocculation and settling system ❑Sand filtration ❑Fluidized carbon or other carbon-based treatment system ❑Other filtration system (i.e. membrane-type filtration) ❑Desalination (reverse osmosis) ❑Desalination (other) ❑Water softening ❑Chlorine disinfection ❑Ultraviolet disinfection ❑ Don't Know	________ ❑Don't know	___ ❑Don't know	❑Don't know	❑Don know	❑Yes, minor defects 't ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: _______ ❑Yes, completely unusable ❑No ❑Don't know; explain:	

[WASTEWATER_NET_ITEM] Does this sub-award include any water or wastewater networks?

- ❑ Yes
- ❑ No

LOGIC: If [WASTEWATER_NET_ITEM] = 'no' skip to next section selected in CONSTRUCT_TYPE

[WASTEWATER_NET] For Water or Wastewater network.

	Constuction location	Was/Is construction in a conflict area?	Location	Planned # of networks	Actual/ Estimated # of networks	Construction material	Typical pipe diameter (mm)	Planned population served	Actual population served	Planned km installed	Actual/ estimated km installed	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS coordinates for all related construction structures (provide coordinates separated by semicolon in AT-LONG or UTM format)
Water distribution networks	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Urban ❑Rural	_____ ❑Don't know	________ _ ❑Don't know	❑Cast iron ❑Non-rigid plastic ❑ Other; Specify ❑ DK	❑<100 mm ❑ 100-250 mm ❑ >250 mm ❑ DK	_________ ❑Don't know	❑Don't know	❑Don't know	_ ❑Don't know	❑Don't know	❑Don't know	❑Yes, minor defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: _______ ❑Yes, completely unusable ❑No ❑Don't know; explain:	

	Construction location	Was/Is construction in a conflict area?	Location	Planned # of networks	Actual/ Estimated # of networks	Construction material	Typical pipe diameter (mm)	Planned population served	Actual population served	Planned km installed	Actual/ estimated km installed	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS coordinates for all related construction structures (provide coordinates separated by semicolon in AT-LONG or UTM format)
Waste-water collection networks	"	"	"	"	"	❑Concrete ❑Reinforced fiberglass ❑ PVC ❑ Cast iron ❑ Other; Specify ________	"	"	"	"	"	"	"		

[ENERGY] ENERGY

The following section collects information on energy related facilities and construction such as carbon based facilities, solar and wind facilities, hydroelectric plants, and electric and natural gas facilities.

[CARB_ENER] CARBON-BASED

[ENER_CARBON_ITEM] Does this sub-award include any non-renewable or biomass power generation facilities (e.g. diesel. Coal….)?

- ❑ Yes
- ❑ No

LOGIC: If [ENER_CARBON_ITEM] = 'no' skip to [ENER_SOLWIND_ITEM]

[ENER_CARBON_TYPE] For non-renewable or biomass (diesel, heavy fuel oil, natural gas, coal and biomass) power generation facilities, please select all that apply and provide as much information as possible.

	Construction location	Was/Is construction in a conflict area?	Location	Planned # of sites	Actual # of sites	Planned typical generation capacity (MW)	Actual typical generation capacity (MW)	Planned population served	Actual population served	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS coordinates for all related construction structures (provide coordinates separated by semicolon in AT-LONG or UTM format)
Diesel	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Urban ❑Rural	_____ ❑Don't know	_____ ❑Don't know	_____ ❑Don't know	_____ ❑Don't know	_____ ❑Don't know	_____ ❑Don't know	_____ ❑Don't know	_____ ❑Don't know	❑Yes, minor defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: _______ ❑Yes, completely unusable ❑No ❑Don't know; explain: ___________	
Heavy fuel oil	"	"	"	"	"	"	"			"	"		
Natural gas	"	"	"	"	"	"	"			"	"		
Coal	"	"	"	"	"	"	"			"	"		
Biomass	"	"	"	"	"	"	"			"	"		
Other (specify):	"	"	"	"	"	"	"			"	"		

[ENER_SOLWIND] SOLAR AND WIND ENERGY

[ENER_SOLWIND_ITEM] Does this sub-award include any solar and wind-based power generation facilities?

- ❑ Yes
- ❑ No

LOGIC: If [ENER_SOLWIND_ITEM] = 'no' skip to [ENER_HYDRO_ITEM]

[ENER_SOLWIND_TYPE] For solar and wind-based power generation facilities, please select all that apply and provide as much information as possible.

	Construction location	Was/Is construction in a conflict area?	Location	Planned # of sites	Actual/ Estimated # of sites	Planned typical generation capacity (MW)	Actual/ Estimated typical generation capacity (MW)	On/off grid	Planned population served	Actual population served	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS coordinates for all related construction structures (provide coordinates separated by semicolon in AT-LONG or UTM format)
Solar	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Urban ❑Rural	__________ ❑Don't know	__________ ❑Don't know	__________ ❑Don't know	__________ ❑Don't know	❑On grid ❑Off grid ❑Mixed	__________ ❑Don't know	__________ ❑Don't know	__________ ❑Don't know	__________ ❑Don't know	❑Yes, minor defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: ________ ❑Yes, completely unusable ❑No ❑Don't know; explain: ____________	
Wind	"	"	"	"	"	"	"	"			"	"		

[HYDROELEC] HYDROELECTRIC ENERGY

[ENER_HYDROELEC_ITEM] Does this sub-award include any streaming/run-of-the-river hydroelectric power generation facilities?

- ❑ Yes
- ❑ No

LOGIC: If [ENER_HYDROELEC_ITEM] = 'no' skip to [ENER_ELEC_NATGAS_ITEM]

[HYDROELEC_TYPE] For hydroelectric energy generation

Structure Type	Construction location	Was/Is construction in a conflict area?	Location	Planned # of sites	Actual/ Estimated # of sites	Planned typical generation capacity (MW)	Actual typical generation capacity (MW)	Planned population served	Actual population served	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS coordinates for all related construction structures (provide coordinates separated by semicolon in AT-LONG or UTM format)
Streaming/Run of the river	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Urban ❑Rural	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	❑Yes, minor defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: ________ ❑Yes, completely unusable ❑No ❑Don't know; explain: ____________	
										"			

[ELEC_NATGAS] ELECTRICAL AND NATURAL GAS TRANSMISSION

[ENER_ELEC_NATGAS_ITEM] Does this sub-award include any electricity or natural gas transmission items?

- ❑ Yes
- ❑ No

LOGIC: If [ENER_ELEC_NATGAS_ITEM] = 'no' skip to next section based on CONSTRUCT_TYPE

[ENER_ELEC_NATGAS_TYPE] For electricity or natural gas transmission lines, please select all that apply and provide as much information as possible.

	Construction location	Was/Is construction in a conflict area?	Location	Planned # of segments	Actual/ Estimated # of segments	Planned length (km)	Actual/ Estimated length (km)	Planned/ designed economic life of the construction (years)	Actual/ Estimated # of sub-stations	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS coordinates for all related construction structures (provide coordinates separated by semicolon in AT-LONG or UTM format)
High voltage electrical transmission lines (110kv)	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Urban ❑Rural	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	❑Yes, minor defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: _______ ❑Yes, completely unusable ❑No ❑Don't know; explain: ___________	
Low voltage electrical distribution lines	"	"	"	"	"	"	"	"	"	"	"		
High pressure pipelines for natural gas	"	"	"	"	"	"	"		"		"		

	Construction location	Was/Is construction in a conflict area?	Location	Planned # of segments	Actual/ Estimated # of segments	Planned length (km)	Actual/ Estimated length (km)	Planned/ designed economic life of the construction (years)	Actual/ Estimated # of sub-stations	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS coordinates for all related construction structures (provide coordinates separated by semicolon in AT-LONG or UTM format)
Distribution networks for natural gas	"	"	"	"	"	"	"		"		"		

[TELECOMM] TELECOMMUNICATIONS

The following sections collect information on telecommunications construction such as telecommunication lines and towers.

[TELECOMM_LINE] TELECOMMUNICATIONS LINE

[TELECOMM_LINE_ITEM] Does the sub-award include any telecommunications line-related items?

- ❑ Yes
- ❑ No

LOGIC: If [TELECOMM_LINE_ITEM] = 'no' skip to [TELECOMM_TOWER_ITEM]

[TELECOMM_LINE_TYPE] For telecommunications lines, please select all that apply and provide as much information as possible.

	Was/Is construction in a conflict area?	Location	Planned # of segments	Actual # of segments	Planned length (km)	Actual/ Estimated length (km)	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS coordinates for all related construction structures (provide coordinates separated by semicolon in AT-LONG or UTM format)
Copper tele-communications line	❑Yes ❑No ❑Don't know	❑Urban ❑Rural	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	❑Yes, minor defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: _______ ❑Yes, completely unusable ❑No ❑Don't know; explain:	
Fiber-optic tele-communications line	"	"	"	"	"	"	"	"		

[TELECOMM_TOWER] TELECOMMUNICATIONS TOWER

[TELECOMM_TOWER_ITEM] Does this sub-award include any telecommunications tower-related items?

- ❑ Yes
- ❑ No

LOGIC: If [TELECOMM_TOWER_ITEM] = 'no' skip to next section based on CONSTRUCT_TYPE

[TELECOMM_TOWER_TYPE] For telecommunications towers, please select all that apply and provide as much information as possible.

	Construction location	Was/Is construction in a conflict area?	Location	Planned # of sites	Actual/ Estimated # of sites	Planned total # of towers	Actual/ Estimated total # of towers	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS coordinates for all related construction structures (provide coordinates separated by semicolon in AT-LONG or UTM format)
Mobile tele-communications tower	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Urban ❑Rural	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	❑Yes, minor defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: ______ ❑Yes, completely unusable ❑No ❑Don't know; explain: ___________	
Microwave tele-communications tower	"	"	"	"	"	"	"	"	"		

[TELE_DIS] What is the closest major city to the project site?

City Name_________________

[WASTEMGMT] WASTE MANAGEMENT

The next section asks for information on waste management related construction.

[WASTEMGMT_ITEM] Does this sub-award include any waste management-related items?

- ❑ Yes
- ❑ No

LOGIC: If [WASTEMGMT_ITEM] = 'no' skip to next section based on CONSTRUCT_TYPE

[WASTEMGMT_TYPE] For waste management facilities, please select all that apply and provide as much information as possible.

	Construction location	Was/Is construction in a conflict area?	Location	Planned # of sites	Actual/ Estimated # of sites	Waste types (Select all that apply)	Planned capacity (tons/day)	Actual/ Estimated capacity (tons/day)	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS coordinates for all related construction structures (provide coordinates separated by semicolon in LAT-LONG or UTM format)
Collection	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Urban ❑Rural	________ ❑Don't know	________ ❑Don't know	❑Household ❑Industrial ❑Municipal (combined commercial and residential) ❑Hazardous	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	❑Yes, minor defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: ______ ❑Yes, completely unusable ❑No ❑Don't know; explain: __________	
Landfills	"	"	"	"	"	"	"	"	"	"		
Recycling facilities	"	"	"	"	"	"	"	"		"		
Incinerators	"	"	"	"	"	"	"	"		"		
Other (specify): ________	"	"	"	"	"	"	"	"		"		

[WATERRES] WATER RESOURCES

The following section collects information on water resources such as dams and irrigation systems

[WATERRES_DAM] DAMS

[WATERRES_DAM_ITEM] Does this sub-award include any dam-related items (including hydroelectric dams)?

- ❑ Yes
- ❑ No

LOGIC: If [WATERRES_DAM_ITEM] = ‘no’ skip to [WATERRES_IRRI_ITEM]

[WATERRES_DAM_TYPE] For dams, please select all that apply and provide as much information as possible. Note: For multiple dams of similar type and size, use a single row.

	Construction location	Was/Is construction in a conflict area?	Location	Dam construction material	Planned # of sites	Actual/ Estimated # of sites	Typical dam height (m)	Typical dam width (m)	Planned typical reservoir volume (m^3)	Actual typical reservoir volume (m^3)	Does this Dam include Hydroelectric generation	Planned Population served	Actual Population served	Planned typical megawatt generation	Actual typical megawatt generation	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	G c
Concrete Arch Dam or Gravity-type Dam	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Urban ❑Rural	❑Earth/Rock ❑Concrete ❑Both ❑ Other _____ ❑ Unknown ---	_______ ❑Don't know	_______ ❑Don't know	_______ ❑Don't know	_______ ❑Don't know	_______ ❑Don't know	_______ ❑Don't know	❑Yes ❑No ❑Don't know	_______ ❑Don't know	_______ ❑Don't know	_______ ❑Don't know	_______ ❑Don't know	_______ ❑Don't know	_______ ❑Don't know	❑Yes, minor defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: _______ ❑Yes, completely unusable ❑No ❑Don't know; explain: _______	
Barrage	"	"	"	"	"	"	"	"	"	"						"	"		
Rock-fill (embankment-type) Dam	"	"	"	"	"	"	"	"	"	"						"	"		

	Construction location	Was/Is construction in a conflict area?	Location	Dam construction material	Planned # of sites	Actual/ Estimated # of sites	Typical dam height (m)	Typical dam width (m)	Planned typical reservoir volume (m^3)	Actual typical reservoir volume (m^3)	Does this Dam include Hydroelectric generation	Planned Population served	Actual Population served	Planned typical megawatt generation	Actual typical megawatt generation	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	G c
Concrete-face rock-fill (embankment-type) dam	“	“	“	“	“	“	“	“	“	“						“	“		
Earth-fill (embankment-type) dam	“	“	“	“	“	“	“	“	“	“						“	“		
Asphalt-concrete core (embankment-type) dam	“	“	“	“	“	“	“	“	“	“						“	“		

[DAMS_DIS] What is the closest major city to the project site?

City Name_________________

[WATERRES_IRRI] IRRIGATION SYSTEMS

[WATERRES_IRRI_ITEM] Does this award include any irrigation systems-related items?

- ❑ Yes
- ❑ No

LOGIC: If WATERRES_IRRI_ITEM = ‘no’ skip to next section based on CONSTRUCT_TYPE

[IRRI_SOURCE] For Irrigation Systems – What is the source water – Check all that apply?

- ❑Existing impoundment
- ❑New impoundment built by award (Please answer question above)
- ❑Natural lake
- ❑Groundwater
- ❑ Don't know
- ❑Not applicable
- Other (please specify) ___________________________

[IRRI_TYPE] For irrigation systems, please select all that apply and provide as much information as possible.

	Construction location	Was/Is construction in a conflict area?	Planned primary canal length (km)	Planned secondary canal length (km	Planned tertiary canal length (km)	Actual/ Estimated primary canal length (km)	Actual/ Estimated secondary canal length (km)	Actual/ Estimated tertiary canal length (km)	Planned area irrigated (ha)	Actual/ Estimated area irrigated (ha)	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS coordinates for all related construction structures (provide coordinates separated by semicolon in AT-LONG or UTM format)
Canals	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	________ ❑Don't know	❑Yes, minor defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: _______ ❑Yes, completely unusable ❑No ❑Don't know; explain: ___________	
Piped	"	"	"	"	"			"	"	"	"	"		
Pivot	"	"	"	"	"			"	"	"	"	"		

[IRRI_DIS] What is the closest major city to the project site?

City Name_________________

[WATER_STORE] WATER STORAGE/RAINWATER CATCHMENT SYSTEMS

[WATERSTORE_ITEM] Does this award include any water storage systems-related items?

- ❑ Yes
- ❑ No

LOGIC: If WATERSTORE_ITEM = ‘no’ skip to BUDGET_INFO_PK

[WATERSTORE_TYPE] For water storage and rainwater catchment systems, please select all that apply and provide as much information as possible.

	Construction location	Was/Is construction in a conflict area?	Location	Planned # of Sites	Actual/ Estimated # of Sites	Construction material	Major Prefabricated elements?	Main use	Planned population served	Actual population served	Planned size installed – volume (Liters)	Actual/ estimated volume (Liters) installed	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS c for all const struct (provi coord separ semic LONG forma
Below ground or on-ground Cistern/water catchment (sides below ground)	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Urban ❑Rural	________ ❑Don't know	________ ❑Don't know	❑Plastic on ground ❑Plastic elevated ❑Earth and Geo-membrane (engineered fabric) ❑ Stone (on ground) ❑ Steel – on ground ❑ Steel – above ground ❑ Other; Specify ❑Don't know	❑Yes ❑No ❑Don't know	❑Drinking water ❑livestock ❑Industrial and food processing qIrrigation	________ ❑Don't know	❑Don't know	❑Don't know	❑Don't know	❑Don't know	❑Don know	❑Yes, minor 't defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: ❑Yes, completely unusable ❑No ❑Don't know; explain:	

	Construction location	Was/Is construction in a conflict area?	Location	Planned # of Sites	Actual/ Estimated # of Sites	Construction material	Major Prefabricated elements?	Main use	Planned population served	Actual population served	Planned size installed – volumevolume (Liters)	Actual/ estimated (Liters) installed	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS c for all const struct (provi coord separ semic LONG forma
Above-ground Cistern or water tower (sides above ground)	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Urban ❑Rural	______ ❑Don't know	______ ❑Don't know	❑Plastic on ground ❑Plastic elevated ❑Earth and Geo-membrane (engineered fabric) ❑ Stone (on ground) ❑ Steel – on ground ❑ Steel – above ground ❑ Other; Specify ❑Don't know	❑Yes ❑No ❑Don't know	❑Drinking water ❑livestock ❑Industrial and food processing qIrrigation	______ ❑Don't know	❑Don't know	❑Don't know	❑Don't know	❑Don't know	❑Don know	❑Yes, minor 't defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: ❑Yes, completely unusable ❑No ❑Don't know; explain:	

	Construction locaticn	Was/Is construction in a conflict area?	Location	Planned # of Sites	Actual/ Estimated # of Sites	Constr uction material	Major Prefabricated elements?	Main use	Planned population served	Actual population served	Planned size installed – volumevolume (Liters)	Actual/ estimated (Liters) installed	Planned/ designed economic life of the constructed facility (years)	Estimated economic life of the constructed facility (years)	Rework required not completed prior to award end date	GPS c for all const struct (provi coord separ semic LONG forma
Rainwater catchment System (For Buildings)	❑New – site no previous construction of any kind ❑New – on site with previous construction of any type ❑Upgrade Expansion of existing facility ❑Rehab of existing facility approximately same footprint	❑Yes ❑No ❑Don't know	❑Urban ❑Rural	______ ❑Don't know	______ ❑Don't know	❑Plastic on ground ❑Plastic elevated ❑Earth and Geo-membrane (engineered fabric) ❑ Stone (on ground) ❑ Steel – on ground ❑ Steel – above ground ❑ Other; Specify ❑Don't know	❑Yes ❑No ❑Don't know	❑Drinking water ❑livestock ❑Industrial and food processing qIrrigation	______ ❑Don't know	❑Don't know	❑Don't know	❑Don't know	❑Don't know	❑Don know	❑Yes, minor ’t defects ❑Yes, major defects ❑Yes, major requirements not met; estimate % not usable: ❑Yes, completely unusable ❑No ❑Don't know; explain:	

[PACKAGE_PREP] SUB-AWARD PREPARATION

The next set of questions is going to ask about how sub-awards were developed, including management plans and relationships with host country governments.

[RISK_REG_PK] Was a means to identify and track potential issues and risks (i.e. risk register) developed?

- ❑ Yes, for all sub-awards
- ❑ Yes, for this sub-award only
- ❑ No
- ❑ Don't know

Logic: If 'Yes, for all sub-awards', then display RISK_REG_PK only once. Else, display RISK_REG_PK for each package iteration.

[**GOV_CONSULT_PK**] Was the host country government consulted in the design of the infrastructure component of the sub-award before the sub-award was approved?

- ❑ Yes, by USAID, for all sub-awards
- ❑ Yes, by Prime Recipient, for all sub-awards
- ❑ Yes, by USAID, for this sub-award only
- ❑ Yes, by Prime Recipient, for this sub-award only
- ❑ No
- ❑ Don't know

Logic: If 'Yes, by USAID, for all sub-awards' or 'Yes, by Prime Recipient, for all sub-awards', then display GOV_CONSULT_PK only once. Else, display GOV_CONSULT_PK for each package iteration.

[**GOV_CONSULT_WHO_PK**] Which government entities were consulted in the design of the structures constructed under the sub-award? Select all that apply.

- ❑ Central government authorities/Ministry officials
- ❑ Regional officials
- ❑ Local officials
- ❑ Other (Specify): ____

[STKH_CONSULT_PK] Were non-governmental stakeholders consulted in the design of the infrastructure component of the sub-award before the sub-award was approved?

- ❑ Yes
- ❑ No
- ❑ Don’t know

Logic: If STKH_CONSULT_PK = ‘No’ or ‘DK’ skip to SITE_APPRV_PK

[**STKH_CONSULTWHO_PK**] Which non-governmental stakeholders were consulted in the design of the infrastructure? Select all that apply.

- ❑ NGOs/CSOs
- ❑ User/business associations
- ❑ Community groups
- ❑ Other (Specify): ____

[SITE_APPRV_PK] Was formal approval for the sub-award construction site(s) received by the Host Government?

- ❑ Yes, by USAID
- ❑ Yes, by awardee
- ❑ No
- ❑ Don’t know

Logic: If SITE_APPRV_PK = ‘No’ or ‘DK’ skip to CONSTRCT_EVAL_PK

[**SITE_APPRV_WHO_PK**] Which government entities gave formal approval for the sub-award construction site(s)? Select all that apply.

- ❑ Central government authorities
- ❑ Ministry officials
- ❑ Regional officials
- ❑ Local officials
- ❑ Other (Specify): ____
- ❑ Don’t know

[CONSTRCT_EVAL_PK] Was a constructability review completed?

- ❑ Yes, by USAID
- ❑ Yes, by awardee
- ❑ No
- ❑ Don't know

[USG_TECH_PK] Were USG officials outside of the implementing mission/bureau involved in directing technical aspects of the construction planning and implementation (e.g. timing, siting, materials used, design specifications, etc.).

- ❑ Yes
- ❑ No
- ❑ DK

LOGIC: If USG_TECH_PK = 'yes' ask TECH_WHO_PK else skip to MANAGE_PK

[TECH_WHO_PK] Which USG officials were involved? (Select all that apply)

- ❑ USAID/Washington
- ❑ Other country team
- ❑ State Department/Washington
- ❑ Congress
- ❑ Department of Defense
- ❑ Other specify
- ❑ Don't know

[MANAGE_PK] Was the prime awardee's senior project manager the same over the life of the sub-award?

- ❑ Yes

- ❑ No
- ❑ Don't know

[GOV_EST_PK] Was an independent cost estimate of sub-award construction activities developed?

- ❑ Yes
- ❑ No
- ❑ Don't know

LOGIC: If GOV_EST_PK = 'No' or 'DK' skip to GOV_SCHED_PK else ask EST_PREP_PK

[EST_PREP] Who prepared the cost estimate?

- ❑ US or international staff/consultant (engineer)
- ❑ US or international staff/consultant (professional licensed engineer)
- ❑ HOST COUNTRY staff/consultant (engineer)
- ❑ HOST COUNTRY staff/consultant (professional licensed engineer)
- ❑ Other (specify): _______________
- ❑ Don't know

LOGIC: Please provide options as drop down menu.

[EST_BASIS_PK] What was the basis of the cost estimate?

- ❑ Parametric models (i.e. cost square footage, cost per km, cost per cubic meter of water per day etc).
- ❑ Capacity standard (cost/student, cost/hospital bed, etc).
- ❑ Judgment estimate
- ❑ Budget authorization/control (Unit Cost Estimate based upon incomplete / limited design)
- ❑ Control/Bid and Tender (Detailed Unit Cost Estimate based upon complete design).

LOGIC: Please provide options as drop down menu.

[GOV_SCHED_PK] Was a sub-award planned schedule developed (i.e. a high level schedule that accounts for procurement and identifies awardor activities to establish reasonable project duration)?

- ❑ Yes
- ❑ No
- ❑ Don't know

LOGIC: If GOV_SCHED = 'yes' or 'ask EST_SCHED_PREP else skip to USG_INC

[SCHED_PREP_PK] Who developed the sub-award planned schedule?

- ❑ US or international staff/consultant (engineer)
- ❑ US or international staff/consultant (professional licensed engineer)
- ❑ HOST COUNTRY staff/consultant (engineer)
- ❑ HOST COUNTRY staff/consultant (professional licensed engineer)

LOGIC: Ask FINSTAT only if AWARD_MECH = Direct Award

[**FINSTAT**] Is the awardee required to submit financial statements as part of the sub-award process?

- ❑ Yes
- ❑ No
- ❑ Don't know

[**BONDING_PK**] Was a construction surety bond or other assurance required by the sub-award agreement?

- ❑ Yes

- ❑ No
- ❑ Don't know

[SUB_AWARD_COMP] Which of the following options would best characterize the sub-award competition?

- ❑ Full and open competition
- ❑ Qualifications-based short list
- ❑ Limited competition
- ❑ Sole source
- ❑ Don't know

[FINSTAT_PK] Is/Was the sub-awardee required to submit financial statements as part of the procurement process?

- ❑ Yes
- ❑ No
- ❑ Don't know

[SUB_STAT] Which of the following best characterizes the sub-awardee construction implementer?

- ❑ International Construction/Engineering Firm
- ❑ International Firm (not primarily construction focused)
- ❑ International NGO/PBO
- ❑ Other international organization (specify)_____________
- ❑ Local Construction/Engineering Firm
- ❑ Local form (not primarily construction focused
- ❑ Local NGO
- ❑ Local Government
- ❑ Other Local organization (specify)___________

[SUB_TEAM] Did the sub-awardee have any of the following as part of their construction management team? (Check all that apply)

- ❑ US or international staff/consultant (engineer)
- ❑ US or international staff/consultant (professional licensed engineer)
- ❑ HOST COUNTRY staff/consultant (engineer)
- ❑ HOST COUNTRY staff/consultant (professional licensed engineer)

[AMEND_ISSUE_PK] Were sub-award RFP/RFQ/IFB/RFA modifications issued?

- ❑ Yes
- ❑ No
- ❑ Don't know

LOGIC: If AMEND_ISSUE_PK = 'no' or 'dk' skip to SUB_AWARD_COMP

[AMEND_NO_PK] Please specify the number of modifications.

____

[CONT_DES_PK] AWARD DESIGN

[CONT_DES_PK_SAME] Were/Are the construction award terms and conditions the same across all sub-awards?

- ❑ Yes
- ❑ No
- ❑ Don't know

Logic: If CONT_DES_PK_SAME = 'No' or 'DK', display the remaining questions in CONT_DES_PK for each package iteration; else, ask the rest of the questions in CONT_DES_PK only once.

[AWARD_STD_PK] Is the construction award a construction standard form of award, e.g. FIDIC, or FIDIC based; American Institutes of Architects, American General Awards Association, etc.?

- ❑ Yes; Form of award: ____
- ❑ No
- ❑ Don't know

[DLP_PK] Does the construction award include a defects liability period (DLP)?

- ❑ Yes; enter length of the DLP in days: ______________________________
- ❑ No
- ❑ Don't know

[BUDGET_INFO_PK] BUDGET INFORMATION

The next section is going to ask about sub-awardee award details, including scheduling, budget histories, sub-award development and modifications, and project management details. To begin, we will ask a few questions about the sub-award schedule and budget, for each sub-award under the PRIME award.

[CON_ORIGDUR] What was the originally planned construction duration of the sub-award?

Start date________________(MM/YYYY)
End date_________________(MM/YYYY)

[CONSTRUCT_BUDGET_PLAN_PK] What was/is the original sub-award budget for construction activities?

______________(USD)

[AWARD_AMD_PK] Was the sub-award modified?

- ❑ Yes
- ❑ No
- ❑ Don't know

Logic: If AWARD_AMD_PK = 'No' or 'DK' skip to CONT_DES_PK

[MOD_NO_PK] How many sub-award construction related modifications have there been?

_______________(No. sub-agreement modifications)

[AWARD_AMD_DET_PK] Please list all of the modifications to the sub-award that were related to construction activities in column 1 of the table below and complete the respective row of the table for each modification.

(1)	(2a)	(2b)	(2c)	(2d)	(2e)	(2f)		(2f)	(2g)	(3)
	Please indicate what requirements/issues were addressed by the modification:									
Modification No.	Change in quantity	Change in capacity	Change in schedule	Quality of work	Sustainability	Compliance – Health & safety	Compliance - Environment	Compliance – Disability access	Other Requirements	Modification Value (USD)
______	❑ No change ❑ Increase ❑ Decrease	❑ No change ❑ Increase ❑ Decrease	❑ No change ❑ Extend ❑ Shorten	❑ No change ❑ USAID/Govt required change ❑ Rework ❑ Other: ___________	❑ No change ❑ USAID/Govt required change ❑ Rework ❑ Other: ___________	❑ No change ❑ USAID/Govt required change ❑ Rework ❑ Other: ___________	❑ No change ❑ USAID/Govt required change ❑ Rework ❑ Other: ___________	❑ No change ❑ USAID/Govt required change ❑ Rework ❑ Other: ___________	❑None ❑ Yes;specify: ___________	___________
______	"	"	"	"	"	"	"	"	"	"
	"	"	"	"	"	"	"	"	"	"
	"	"	"	"	"	"	"	"	"	"
______	"	"	"	"	"	"	"	"	"	"
______	"	"	"	"	"	"	"	"	"	"
	"	"	"	"	"	"	"	"	"	"
	"	"	"	"	"	"	"	"	"	"
	"	"	"	"	"	"	"	"	"	"
______	"	"	"	"	"	"	"	"	"	"

[SUB_AG_END_MOD] What was/is the modified end date of the sub-award?

_______________(MM/YYYY)
- ❑ **Don't know**

[SUB_AG_BUDG_MOD] What was/is the final sub-award budget amount after modifications?

______________(USD)
- ❑ Don't know

[LIC_APP_PK] Was/Is a licensed qualified professional engineer involved in approving award modifications?

- ❑ Yes
- ❑ No
- ❑ Don't know

[DES_STD] DESIGN STANDARDS

[DES_STD_SAME] Were/Are the design standards same across all sub-awards?

- ❑ Yes
- ❑ No
- ❑ Don't know

Logic: If DES_STD_SAME = 'No' or 'DK', display the remaining questions in [DES_STD] for each package iteration; else, ask the rest of the questions in DES_STD only once.

[DES_STD_CONT] What design standards were/are included in the design and specifications for the sub-award(s)? (Check all that apply.)

- ❑ International Building Code
- ❑ Uniform Building Code
- ❑ Local Codes

- ❑ AASHTO
- ❑ International Code Council
- ❑ ASCE
- ❑ ANSI
- ❑ OSHA
- ❑ Other (specify): ___________________
- ❑ Don't know

[SEIS_DES_PK] Was/Is seismic design included in the design?

- ❑ Yes
- ❑ No
- ❑ Don't know

[SEIS_DESSTD_PK] What standard was/are used for seismic design? Select all that apply.

- ❑ Regulations for Seismic Design: A World List, 1996
- ❑ Regulations for Seismic Design: Supplement, 2000
- ❑ Regulations for Seismic Design: A World List, 2004
- ❑ Practice of Earthquake Hazard Assessment
- ❑ International Handbook of Earthquake Engineering
- ❑ Seismic Design for Buildings
- ❑ Uniform Building Code, 1997
- ❑ International Building Code, 2003
- ❑ Other (specify): __________________
- ❑ Don't know

[HURDES_PK] Were/Are hurricanes/typhoons a consideration in the design?

- ❑ Yes
- ❑ No
- ❑ Don't know

[FLOOD_DES_PK] Was the potential for flooding taken into consideration during project design on this sub-award?

- ❑ Yes
- ❑ No
- ❑ Don't know

[WIND_STD_PK] What standards were/are used for wind design?

- ❑ IBC
- ❑ UBC
- ❑ Local building codes
- ❑ Other (specify): ________________________________
- ❑ Don't know

[SEIS_CAT] To what magnitude, seismic design category (IBC 2000) or UBC Zone, ground acceleration, etc. was/are used as basis of design?

________________________; specify units: _______________________

[RELATION_PRIME_SUB] PRIME-SUB-AWARDEE RELATIONSHIP

[CONST_DOC_SAME] Was/Will there be construction documentation provided in a similar manner across all sub-award?

- ❑ Yes
- ❑ No
- ❑ Don't know

Logic: If CONST_DOC_SAME = 'No' or 'DK', display the remaining questions in CONST_DOC_SCHED_PK for each package iteration; else, ask the rest of the questions in CONST_DOC_SCHED_PK only once.

[CONST_DOC_SCHED_PK] For each of the following elements, indicate when the documentation was/will be provided to the construction sub-awardee for the construction activities the sub-awardee that carried/is carrying out:

	With IFB/RFP	Before notice to proceed	Post notice to proceed	Closeout	Not provided	Don't know
Basis of design	❑	❑	❑	❑	❑	❑
A/E design plans and award specifications	❑	❑	❑	❑	❑	❑
Geo-technical report	❑	❑	❑	❑	❑	❑
Site topographic surveys	❑	❑	❑	❑	❑	❑
Environmental assessment	❑	❑	❑	❑	❑	❑

[STKRCH_PK] Was/Will there be a stakeholder outreach plan and/or community relations program developed for the construction components on the sub-award?

- ❑ Yes
- ❑ No
- ❑ Don't know

[STKPRSN_PK] Were there/Will there be assigned community relations/outreach staff on the sub-award?

- ❑ Yes, for all sub-awards
- ❑ Yes, for this sub-award only
- ❑ No
- ❑ Don't know

Logic: If 'Yes, for all sub-awards', then display STKPRSN_PK only once. Else, display STKPRSN_PK for each package iteration.

[REP_FREQ_PK] What was/is the frequency of required sub-awardee reporting?

	Weekly	Monthly	Quarterly	Don't know	Other (Specify)
To Prime Recipient	❑	❑	❑	❑	___________

To supervising engineer	❑	❑	❑	❑	___________

[PROG_REP_PK] What was/is required in progress reporting to the Prime Awardee? (Select all that apply.)

- ❑ Financial status (actual work done and its actual cost)
- ❑ Schedule status (actual work completed versus planned work)
- ❑ Health and safety record
- ❑ Non-compliance with award
- ❑ Potential delays and cost changes
- ❑ Claims status
- ❑ Issues for engineer determination
- ❑ Design issues and unforeseen conditions
- ❑ QA/QC procedures
- ❑ Forward reporting period work plan
- ❑ Other (specify): ________________________
- ❑ Don't know

Logic: If 'Yes, for all sub-awards', then display STKPRSN_PK only once. Else, display STKPRSN_PK for each package iteration.

[ENG_OVER_SUB] ENGINEERING OVERSIGHT_SUB-AWARDEE

[ENG_OVER_SAME] Was/Is engineering oversight from awardee to sub-awardee the same across all sub-awards?

- ❑ Yes
- ❑ No
- ❑ Don't know

Logic: If ENG_OVER_SAME = 'No' or 'DK', display ENG_APPROV_PK through SUP_REV_PK for each package iteration; else, ask ENG_APPROV_PK through SUP_REV_PK only once.

[ENG_APPROV_PK] What documents was/is the sub-awardee required to provide to the prime awardee for approval prior to construction.

- ❑ Detailed Work Program with implementation schedule
- ❑ Health and Safety Plan
- ❑ Quality Assurance/Quality Control Plan
- ❑ Site-Specific Environmental Management Plan
- ❑ Methods and Materials Statement/Shop drawing
- ❑ Other (specify): _______________
- ❑ Don't know

NOTE: capture knowledge of the sub-awardee capacity

[DES_SUBOVR] Was the sub-awardee involved in engineering design?

- ❑ Yes
- ❑ No
- ❑ Don't know

LOGIC: If DES_SUBOVR = 'No' or 'DK' skip to CON_OVER_SAME

[DES_OVER_PK] Was/Is there engineering design oversight on the sub-award?

- ❑ Yes
- ❑ No
- ❑ Don't know

[ENG_OVER_PK] Who provided/is providing the engineering design oversight? Note: A licensed professional engineer is an engineer with an internationally recognized credential such as US professional engineer, UK chartered engineer, or other rigorous national accreditation)

- ❑ US staff/consultant (non-engineer)
- ❑ US staff/consultant (engineer)

- ❑ US staff/consultant (professional licensed engineer)
- ❑ TCN staff/consultant (non-engineer)
- ❑ TCN staff/consultant (engineer)
- ❑ TCN staff/consultant (professional licensed engineer)
- ❑ HOST COUNTRY staff/consultant (non-engineer)
- ❑ HOST COUNTRY staff/consultant (engineer)
- ❑ HOST COUNTRY staff/consultant (professional licensed engineer)
- ❑ A&E firm (US)
- ❑ A&E firm (Host Country)
- ❑ A&E firm (Third Country National)
- ❑ Other (specify): _______________

[SUP_CON_PK] Was the engineering design supervision awarded or on staff prior to the construction sub-award execution?

- ❑ Yes
- ❑ No
- ❑ Don't know

[CON_OVER_SAME] Was/Is construction oversight the same across all sub-awards?

- ❑ Yes
- ❑ No
- ❑ Don't know

Logic: If CON_OVER_SAME = 'No' or 'DK', display CON_OVER_PK and SITE_INSP_PK for each package iteration; else, ask CON_OVER_PK and SITE_INSP_PK only once.

[CON_OVER_PK] Who was/is the main provider of construction oversight? Note: A licensed professional engineer is an engineer with an internationally recognized credential such as US professional engineer, UK chartered engineer, or other rigorous national accreditation)

- ❑ US staff/consultant (non-engineer)

- ❑ US staff/consultant (engineer)
- ❑ US staff/consultant (professional licensed engineer)
- ❑ TCN staff/consultant (non-engineer)
- ❑ TCN staff/consultant (engineer)
- ❑ TCN staff/consultant (professional licensed engineer)
- ❑ HOST COUNTRY staff/consultant (non-engineer)
- ❑ HOST COUNTRY staff/consultant (engineer)
- ❑ HOST COUNTRY staff/consultant (professional licensed engineer)
- ❑ A&E firm (US)
- ❑ A&E firm (Host Country)
- ❑ A&E firm (Third Country National)
- ❑ Other (specify): _______________

LOGIC: Options should be provided as drop-down menu.

[SITE_INSP_PK] Do any of the following individuals conduct construction site inspections? If so, please indicate how often (i.e. 1 time per week, 2 times per week, etc.) for the relevant type of inspector.

		Frequency of construction site inspections							
		Daily	Once per week	Twice per week	Three times per week	Bi-weekly	Monthly	Quarterly	Other (describe)
US Staff/Consultant	❑ Yes ❑ No	❑	❑	❑	❑	❑	❑	❑	
TCN Staff/Consultant	❑ Yes ❑ No	❑	❑	❑	❑	❑	❑	❑	
HOST COUNTRY Staff/Consultant	❑ Yes ❑ No	❑	❑	❑	❑	❑	❑	❑	
International A&E Awardor	❑ Yes ❑ No	❑	❑	❑	❑	❑	❑	❑	

HOST COUNTRY A&E Awardor	❑ Yes ❑ No	❑	❑	❑	❑	❑	❑	❑	

[MATL_TEST_PK] Which of the following describes material testing associated with this sub-award?

- ❑ Sub-award requirement; the sub-awardee provided material submittals and awardee confirms engineering oversight [no associated cost]
- ❑ Awardee confirms that the sub-awardee conducted testing, but no sub-award requirements and no engineering oversight [associated cost is 3% of value]
- ❑ Awardee cannot confirm any testing was completed [associated cost is 10% of value]
- ❑ Other; please describe: ________________________________
- ❑ Don't know/cannot answer; please explain:________________________________

[PROCURE_PK] Did the sub-award construction require materials procurement from outside the host country?

- ❑ Yes
- ❑ No
- ❑ Don't know

[SECINFRA_PK] Was the sub-award construction dependent on other infrastructure projects not funded by USAID?

- ❑ Yes
- ❑ No
- ❑ Don't know

[CAP_BUILD_PK] CAPACITY BUILDING

The following section discusses the capacity of the owner/operator of the structure(s) being constructed to assume ownership.

[CAP_ASSESS_SAME] Is there a common owner/operator of all the facilities?

- ❑ Yes

- ❑ No
- ❑ Don't know

Logic: If CAP_ASSESS_SAME = 'No' or 'DK', display the remaining questions in [CAP_BUILD_PK] for each package iteration; else, ask the rest of the questions in CAP_BUILD_PK only once. If CAP_ASSESS = 'Yes, by Prime Recipient', skip to ASSESS_OUTCOME_PK.

[CAP_ASSESS_PK] Was a capacity assessment undertaken of the owner and/or operator of the structure being constructed?

- ❑ Yes, by Prime Recipient
- ❑ Yes, by USAID
- ❑ Yes, by others
- ❑ No; explain why not:____
- ❑ Don't know

Logic: If CAP_ASSESS = 'Yes, by Prime Recipient' or 'Yes, by USAID', go to ASSESS_OUTCOME; else, skip to CON_TRAIN_PK

[ASSESS_OUTCOME_PK] What was the outcome of the assessment?

- ❑ Owner and/or operator had appropriate capacity
- ❑ Owner and/or operator did not have appropriate capacity
- ❑ Don't know

[CON_TRAIN_PK] Was/Will there be training provided to the owner and/or operator of the structure being constructed?

- ❑ Yes, by USAID; type of training provided: __________________________________
- ❑ Yes, by Prime Recipient; type of training provided: __________________________________
- ❑ No
- ❑ Don't know

[CAP_BUILD_PK] Was/Will there be capacity building for the owner and/or operator of the structure being constructed provided in a form other than training?

- ❑ Yes, by USAID; type(s) of capacity building provided: ____
- ❑ Yes, by Prime Recipient; type(s) of capacity building provided: ____
- ❑ No
- ❑ Don't know

[END]

Thank you for taking the time to complete the USAID construction assessment. If this was on the only award in your portfolio then you may stop now. Otherwise please select the next award from the login page to continue.

APPENDIX III

RISK ANALYSIS AND CONCLUSIONS

APPENDIX III

RISK ANALYSIS AND CONCLUSIONS

DATA CORRELATIONS AND RISK OUTCOMES

The objective of this analysis was to use the data from the survey to identify correlations between the incidence of different risk outcomes and construction process and management factors, controlling for factors such as geographic region, urban/rural location, the presence of conflict, and the type of construction activity ("confounding factors"). The analytic tool used for this analysis was regression analysis, which allows for the simultaneous consideration of multiple factors. The regression model used had the following general form:

$$Y = \alpha + \sum \beta_k X_k + \sum \gamma_l X_l + \varepsilon$$

where Y is the dependent variable (in this case, the various risk outcome measures for budget overrun, schedule delay, quality risk, and sustainability risk), k indexes the set of variables representing construction process and management factors (such as the type of award mechanism used, pre-award preparation, the experience and qualifications of relevant USAID staff, progress reporting, and so on), and l indexes confounding factors (characteristics which are not within USAID's construction management control).

The regression analysis was conducted at the subaward level, the level at which the type of construction was defined in the survey and most construction activity was directly implemented. The findings presented below are those for which the regression result has a confidence level of 95% or higher and for which there are sufficient data to draw inference.

RISK FACTOR 1 – BUDGET OVERRUN RISK (COST)

Survey data was collected on the planned and actual or estimated budgets for construction activities and the planned and actual or estimated quantity or capacity of the output of the construction activity at the subaward level. Budget overruns were calculated in terms of the planned and actual unit costs of the construction activity. This allows the capture of situations where an increase (or decrease) in budget was required to deliver the planned quantity or capacity and situations where the budget did not increase, but where less (or more) of the planned quantity or capacity was delivered for the budget. Results of regression analysis of the calculated budget overrun against construction process and management factors (at the 95% confidence level or higher) were as follows:

Construction activities where consultation was carried out with host country local governments in the design of infrastructure prior to the construction award/subaward showed lower budget overruns compared to projects where no such consultation took place.

This may reflect a better understanding of requirements and context for the construction activity, leading to a more appropriate and cost-effective design less likely to incur a budget overrun.

- For subawards where a means to identify and track potential issues and risks (i.e., a risk register) was developed, budget overruns were lower compared to construction activities where no risk register was developed. This suggests that use of a risk register or a method of evaluating risks has the desirable effect of reducing budget overruns.

- Where engineering design oversight was provided by a host country government engineer, budget overruns were lower than for construction activities where no engineering design oversight was provided. These results indicate that engineering design oversight may produce designs that are more efficient and cost-effective and thus reduce the likelihood of budget overruns.
- Developing a high level schedule that accounts for procurement and identifies contractor activities to establish reasonable project duration at the subaward level was associated with higher budget overruns than subawards where such a schedule was not developed. More than 75% of the subawards in the regression reported having developed such a schedule. Given the high frequency of this response, it may be that respondents were interpreting this question to refer to the existence of any subaward schedule (including notional ones included in subawards) rather than ones developed with a particular focus on management and controlling risk, so less weight should be given to this finding compared to the others listed above.

RISK FACTOR 2 – SCHEDULE DELAY RISK

Survey data was collected on the planned and actual or estimated completion dates for construction activities at the subaward level. Schedule delays were calculated as the change in the time period for completing each construction activity and applying an implicit interest rate to reflect the additional costs (mostly fixed costs associated each additional time period beyond that originally budgeted, such as management time and construction organization overhead). Although this additional time may not necessarily be reflected in an increase in the budget of the construction activity, the additional costs are assumed to be recovered by the implementing construction organization by reductions in other planned efforts that may affect construction quality or sustainability (for example, reduced efforts in quality control or supervision). Results of regression analysis between schedule delays and construction process and management factors found the following results (at the 95% confidence level or higher):

- Subawards made under fixed amount reimbursement agreements (FARA) were all associated with increased delays compared to the reference case (direct contracts). The result may be an indication of the lack of familiarity with USAID requirements by awardees and thus the need for extra time to ensure compliance as well as extra time being needed for negotiating multiple sets of institutional requirements when other government or international institutions are involved. Delays might also be attributable in the other two cases to the varying degrees of construction management expertise to be found within the awardee institution.
- Carrying out a pre-award survey was associated with an increase in schedule delays. As pre-award surveys are typically carried out with awardees who have not previously worked with USAID, the result may reflect a correlation with awardees which are not familiar with USAID requirements and approvals and thus more susceptible to schedule delays. Pre-award assessments in the “other” category also showed reduced schedule delays compared to those where no assessment was made.
- Construction activity carried out by awardees selected through a qualifications-based short list process showed increased schedule delays compared to the reference case (full and open competition), while sole source awards were associated with reduced schedule delays. Basing the award on qualifications may signal a lower priority for maintaining schedule to the awardee. The finding for sole source awards would obtain if the predominant basis for making sole-source selections was highly specialized technical expertise and/or experience that would make the awardees less likely to incur schedule delays.

- Subawards were observed to have reduced delays where the most recent COR/AORs received training in A&E contracting compared to subawards where the most recent COR/AOR did not receive any training. This suggests that such training may be useful in allowing COR/AORs to better mitigate problems that might otherwise lead to schedule delays.
- COR/AORs who were familiar with processing change orders under non-FIDIC construction forms of award were associated with subawards that showed increased schedule delays compared to those where the COR/AOR did not have such experience. This may be a case where the most COR/AORs with this experience are assigned to construction activities with higher levels of complexity and greater inherent risk of schedule delays; the regression reflects this correlation but the causality does not flow from the COR/AOR experience level to the negative schedule delay outcome.

RISK FACTOR 3 – QUALITY RISK

Assessing quality posed significant challenges, since the normal avenues for measuring quality (site inspection and testing) were not available and the knowledge of respondents concerning the quality of the completed construction activity may be very limited when reporting about construction activities where they have no first-hand knowledge. The survey collected data on factors related to quality and the need for rework as proxies for quality issues. Based on responses to these questions, an estimated quality risk factor (expressed as a percentage of subaward cost) was assigned to each subaward for which budget data and responses to the quality-related questions were available Results of regression analysis between estimated quality risk against construction process and management factors (at the 95% confidence level or higher) found the following:

- Construction activities carried out by NGOs/PVOs, both international and local, local firms not focused on construction and organizations not classified by the survey all showed higher levels of quality risk compared to the reference case of international construction/engineering firms. This result may reflect the lower level of familiarity with construction quality control processes compared the specialized knowledge of firms whose focus is construction management.
- Where the design standard used in the award was local building codes, construction activity demonstrated higher levels of quality risk compared to the reference case of where the International Building Code or International Code Council codes were used. This suggests that, depending on the type of structure, local codes may not be sufficiently rigorous detailed to ensure that adequate levels of quality are achieved.
- In contrast to the first result listed above, construction activities conducted under grants (excluding grants to PIOs) and cooperative agreements (which are typically the type of awards made to NGOs and PVOs) showed lower levels of quality risk compared to the reference case of direct contracts. This may, however, reflect a predominance of more complex construction activities (which may be subject to higher quality scrutiny and thus more likely to detect the need for rework) being carried out under direct contracts.

RISK FACTOR 4 – SUSTAINABILITY RISK

Sustainability risk is the cost associated with the constructed structure not delivering the full stream of services intended over its designed economic life. As most of the construction activities assessed are either recently completed or still in progress, there are no direct measures of sustainability available – we were not able to directly observe whether or not the structure constructed would fulfill its designed service life or fall short due to lack of operating and maintenance (O&M) funding. The survey collected data on sustainability risk impact by obtaining responses related to the provision of O&M funding for the construction activity. Based on the responses, an estimated sustainability risk factor (expressed as a percentage of subaward cost) was assigned to each subaward for which budget data and responses to the sustainability-related questions were available Results of regression analysis between estimated sustainability risk and construction process and management factors (at the 95% confidence level of higher) found the following:

- Grants (excluding PIO award), host country awards, and awards classified as “other” (government-to-government agreements, USG interagency agreements, Development Credit Authority awards, and multi-donor funds) all displayed higher levels of sustainability risk than the reference case (direct contracts). These award mechanisms are characterized by lower levels of USAID participation in construction activity planning and so may give less attention to sustainability-related issues.
- When USAID consulted with host country governments about site selection at the sub-national level or when USAID developed a stakeholder engagement plan, lower sustainability risk was found. This suggests that local consultation helps to ensure local support for the construction activity, which tends to lead to adequate O&M arrangements.
- Where the COR/AOR for a construction activity was more experienced with construction awards, lower levels of sustainability risk were observed. COR/AORs having prior experience with four to five construction awards were associated with lower sustainability risk. This may reflect a greater appreciation of the importance of O&M to the success of construction activities by COR/AORs who are more experienced.
- Higher sustainability risk was associated with construction activity where value engineering was part of the award. This suggests that survey respondents may not have a good understanding of what is involved with value engineering, which should include local consultation and so would be expected to be positively correlated with lower sustainability risk.
- Use of local building codes was associated with lower sustainability risk. This may reflect a better match between available O&M funding and/or local capacity and less advanced construction technology that conforms with local building code requirements.
- Where various assessments of the capacity of the implementing partner was carried out, lower sustainability risk was observed. A pre-award survey or technical evaluation in the competition process was associated with lower sustainability risk. Although not directly linked to the adequacy of O&M funding, these processes may be associated with a more thorough level of project preparation that is more likely to consider the adequacy of O&M funding. Conversely, responsibility determination was also associated with higher sustainability risk; as this process is typically supposed to occur with all awards, it is not clear why this should be associated with higher risk.

RISK FACTOR 5 – COMPLIANCE RISK

While the survey achieved a good response rate to questions concerning awardee requirements for reporting of health and safety (70%) and environmental incidents (76%), it returned very few responses relating to specific incidents upon which compliance risk in the areas of health and safety and environmental compliance could be based. As a result, there was insufficient data to undertake the planned regression analysis.

For health and safety compliance, only 267 of the 758 awards (35%) covered by the survey indicated that the awardee was required to report to USAID and/or the supervising engineer any health and safety incidents. Respondents representing 14 awards (2% of all awards and 5% of awards where such reporting was required) indicated that a total of 36 health and safety incidents had occurred; these incidents resulted in 12 deaths and 34 injuries.

In the area of environmental compliance, 470 of the 758 awards (62%) covered by the survey indicated that the awardee was required to report to USAID any environmental incidents/impacts that might occur. Respondents representing 18 awards (2% of all awards and 4% of awards where such reporting was required) indicated that a total of 29 environmental incidents had occurred.

LOSS RELATIONSHIPS

LOSS PIQ℠ RISK PANEL DEVELOPED EMBEDDED RISK COSTS

Four expert risk panels were conducted in March and April 2014. Each was designed to quantify the risks associated with the four USAID Construction Categories by addressing the significant and plausible loss scenarios identified by the panelists. Their potential impacts to types of construction USAID undertakes was rigorously assessed through focused group discussions and careful analysis by subject matter experts. The following summarizes some of the key findings.

The quantification of insurable risks is a function of frequency and severity, both of which were gleaned during the Risk Panels for each loss scenario and corresponding cost drivers. The cost impacts were calculated as a percentage of the average project value. Using this information, the quantitative outcomes of the risk panels, and the degree to which USAID has the ability to influence these risks, the loss scenarios and cost drivers for each Risk Panel have been characterized and mapped in the charts below. The frequency and severity are expressed in terms of high, medium, and low for each scenario; the specific values are defined in Table III-1.

TABLE III-1. DEFINING SEVERITY AND FREQUENCY FOR LOSS SCENARIOS AND COST DRIVERS

LOSS RELATIONSHIP VARIABLES	CHANCE OF OCCURRENCE		
	LOW	MEDIUM	HIGH
Frequency	<15%	15%–20%	>20%
Severity	<25%	25%–33%	>33%

Mapping the loss scenarios in this manner provides an important view of the concentration of scenarios and how each contributes to the inherent risk of the construction categories. Additionally, it provides some insight into the appropriate response from an insurance and risk management perspective. For example, a loss scenario with a low frequency and low severity would indicate that USAID accept the risk as part of the cost of operations. If the scenario is on the opposite end (high frequency and severity), the first recommendation would be to possibly avoid such an activity or ensure that identified risks are effectively mitigated.

Another element to consider is whether USAID has any control or influence over the loss scenario. If it is within USAID's control, as assessed from an insurer's perspective, insurers would expect implementation of some loss-control mechanism or mitigation strategy be undertaken, as opposed to scenario to which USAID is exposed without any direct control. Insurance, if it were applicable to government funded construction, would be a likely mitigation path in the latter case.

Figure III-1, Risk Response Strategies, provides a suggested set of responses and corresponding insurance perspective for insurability based upon where a specific risk scenario is located in a matrix. The suggested activities therein are defined as follows:

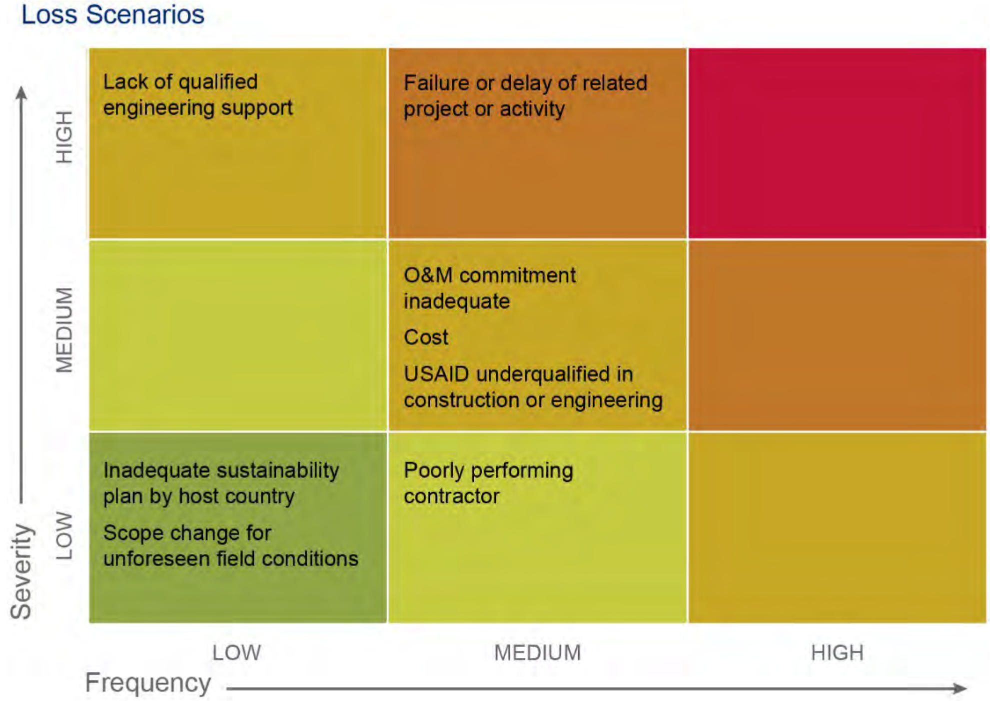
- **Retain** – represents generally commonly occurring and less severe risk scenarios, and might be accepted as part of operational expenses
- **Mitigate** – represents risk scenarios that should have more focused loss controls in place to reduce the potential frequency and/or severity
- **Insure** – determine acceptable options for risk transfer via an insurance instrument

- **Avoid** – represents risk scenarios that should be avoided and typically require greater evaluation and of the proposed construction activity (e.g., if the activity should be pursued, or are their alternatives to meeting needs) or may require an alternative way of performing the work to reduce the frequency or likelihood of the risk scenario from occurring.

USAID may or may not have influence over a risk scenario, but controls could be set in place to evaluate and manage such a risk. For emergency response for example, risk panels identified “challenging political environment” as a risk scenario that is encountered. In a private business environment, this would be a consideration for insurance (and thus the sale of political risk insurance products). Somewhat unique to USAID, it often accepts such risks given the political nature of its work and overriding mission and objectives; USAID’s activities are” self-insured”. A high potential for loss in going into such activities is recognized.

FIGURE III-1. RISK RESPONSE STRATEGIES

FIGURE III-2. STANDALONE INFRASTUCTURE



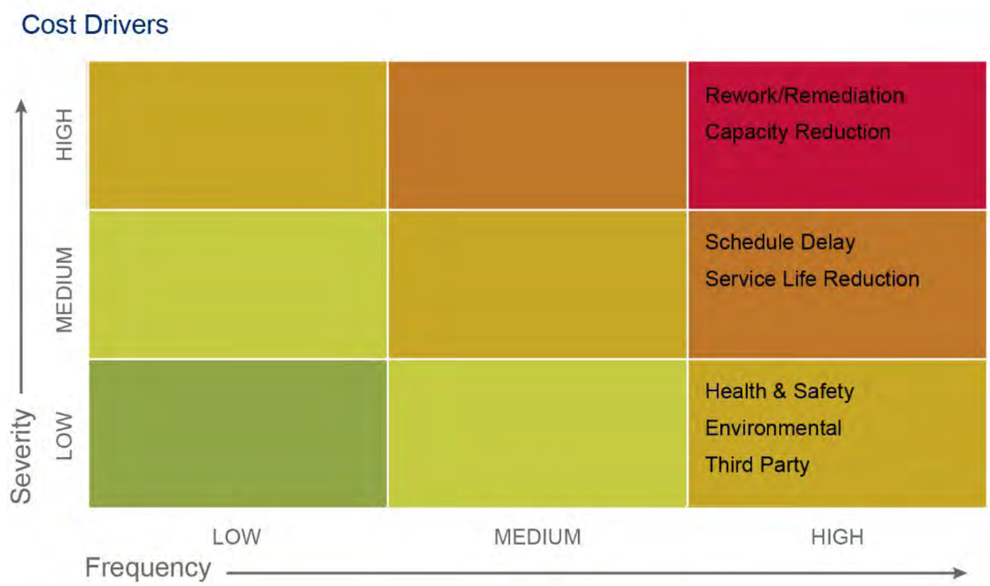
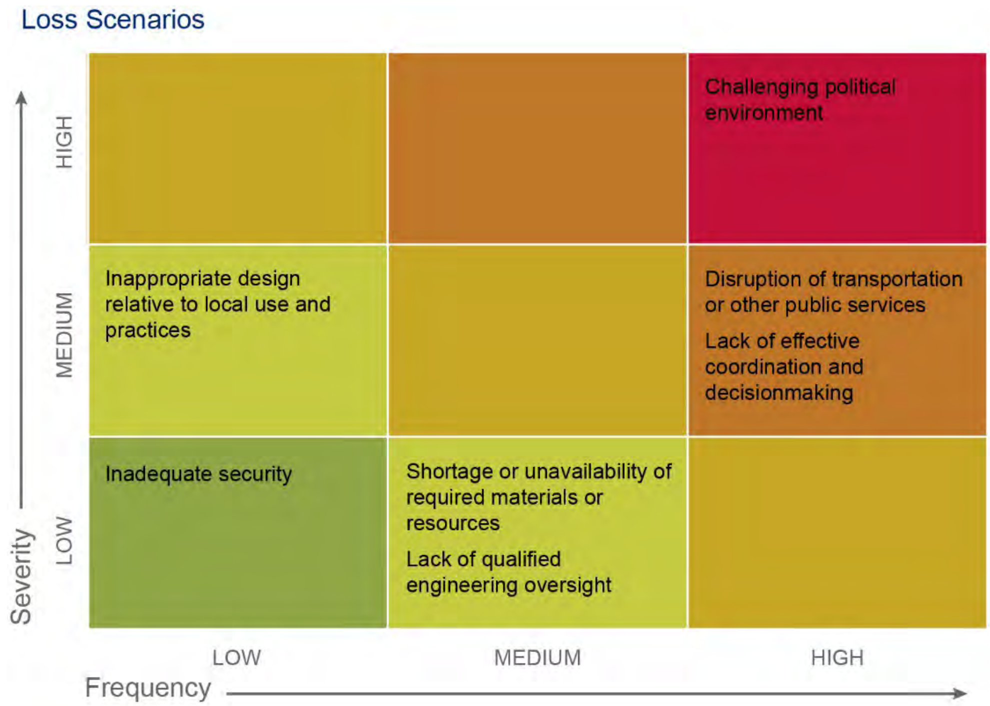


FIGURE III-3. EMERGENCY RESPONSE CONSTRUCTION



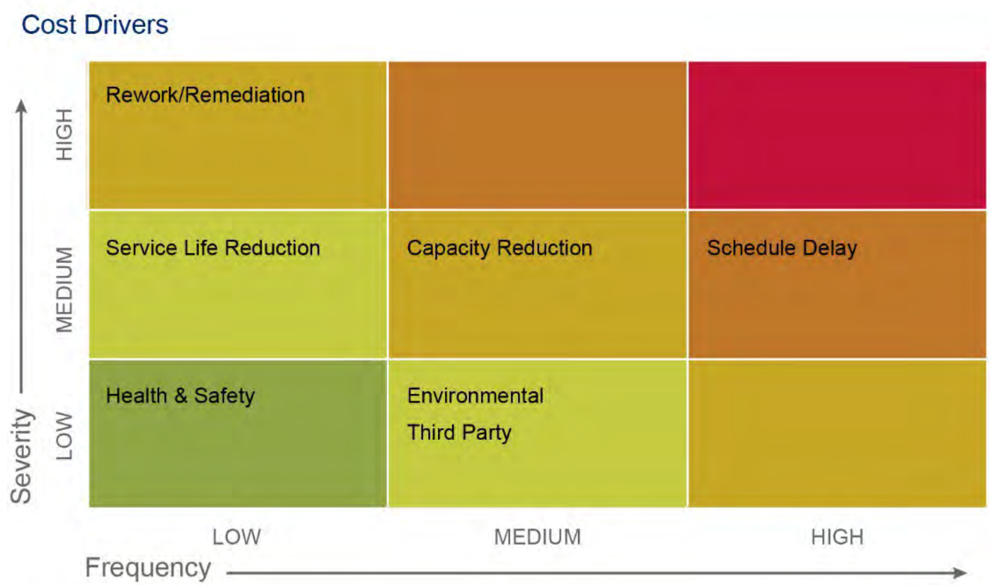
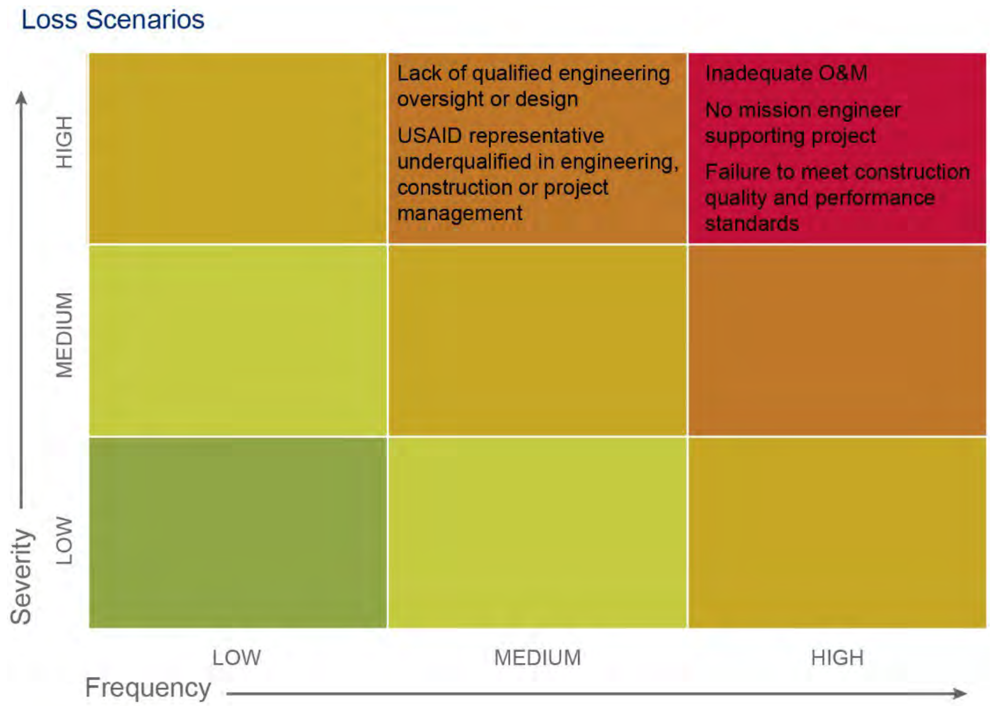


FIGURE III-4. CONSTRUCTION UNDER NON-INFRASTRUCTURE



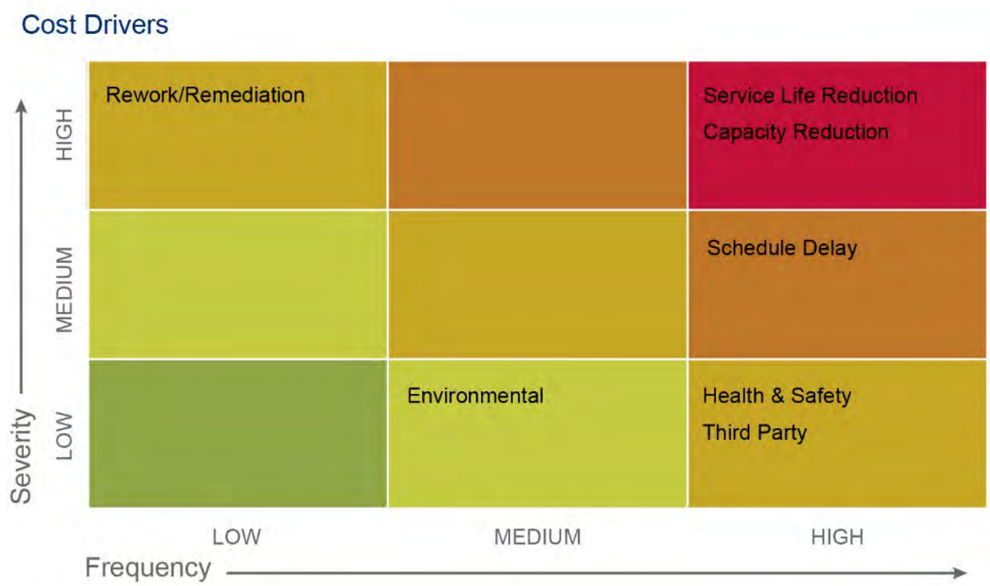
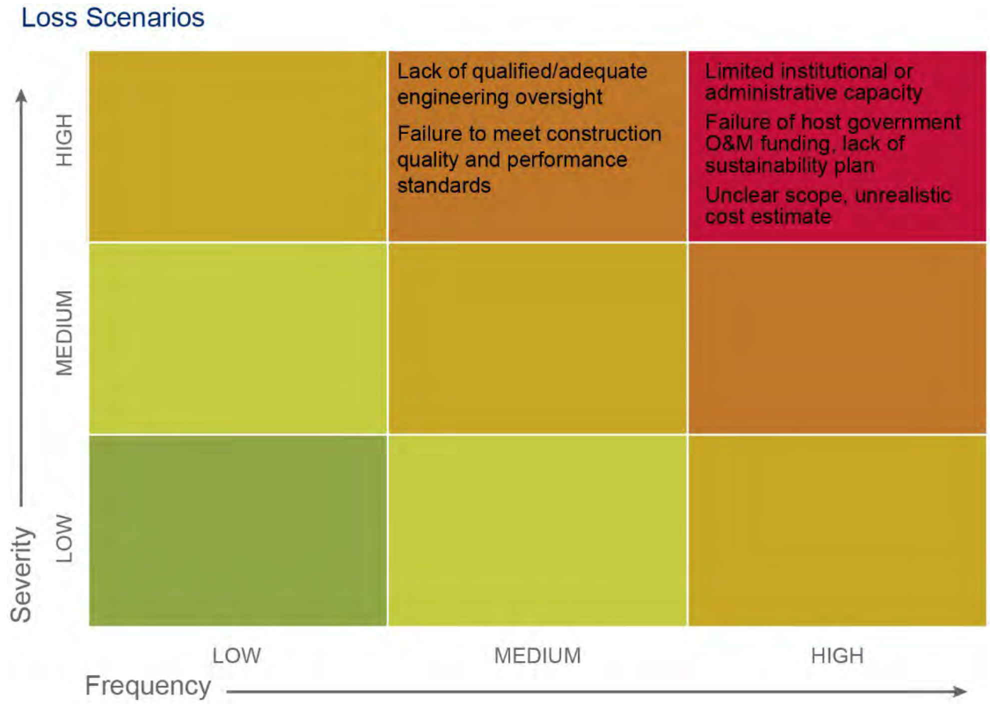
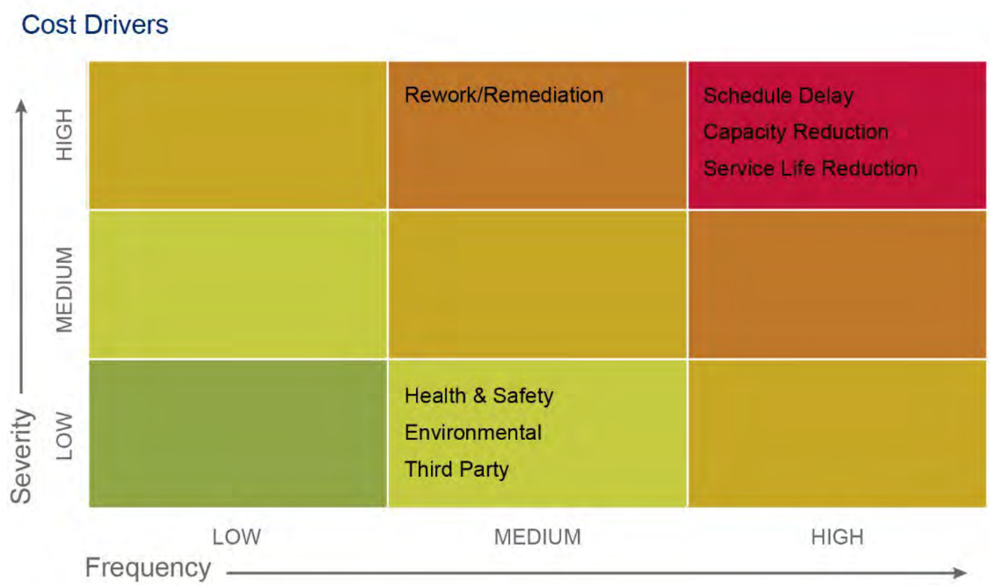


FIGURE III-5. GOVERNMENT TO GOVERNMENT INFRASTRUCTURE





All of the economic costs (schedule delay, capacity reduction, service life reduction, health and safety, third party bodily injury or property damage, and environmental) of the various risk scenarios, as well as rework/remediation, are a function of the planned construction cost of the project. For each iteration of the Monte Carlo analysis, the planned construction cost of the project is simulated using parameters developed from USAID's portfolio of projects for each category (Standalone Infrastructure, Emergency Response, Non-Infrastructure, and Government to Government.

Each of the four panels determined that risk events occurred between once every 1.2 to 1.4 projects, stand-alone infrastructure and construction under non-infrastructure, respectively, for all of the risk scenarios, showing that significant risk events occurs more often than not. At the same time the panelists also noted that embedded losses due to risks consistently represented 50% of the project cost for Risk Panels 1-3. The panelist identified embedded losses for government-to-government construction to be significantly higher than 50% suggesting that higher severity risks are much more common under Government to Government contracting.

Of particular note is the risk panelists' view that construction in non-infrastructure programs and government-to-government infrastructure risks are all in the "avoid" block or require focused mitigation. In the case of construction under non-infrastructure programs, the panel identified 4 out of the 5 risk scenarios that USAID could influence, such as improved oversight. Whereas the government-to-government risk scenarios included risk scenarios that were more difficult to influence such as limited institutional capacity.

Although the make-up of the panels was different in each case, the panels consistently identified a number of common risk scenarios that should be considered:

- Poor construction contractor performance and workmanship
- Lack of operations and maintenance funding and meeting sustainability commitments
- Lack of qualified engineering oversight
- Poor Terms of Reference or scope definition
- Under-qualified USAID engineering oversight.

USAID can generally influence and align these risks with the identified critical success factors. The results also suggest that the panelists, who made up a combination of USAID, members of other US government agencies and the private sector feel that USAID should target and manage program risks. The second type of risk, lack of operations and maintenance funding/sustainability commitments must be mitigated by the host country partners. USAID must explore different types of approaches to mitigating these risks since they can act directly.

ASSESSMENT OF INTEGRATED FINDINGS BY RISK FACTOR

To get a realistic picture of the overall performance of USAID's construction portfolio, it is helpful to draw on the combined results from all sources, including the data correlations from the survey, loss relationships identified in the risk panels, and industry best practices. The integrated findings of particular significance to USAID are summarized here for each of the five risk factors.

BUDGET OVERRUN

Budget overruns can manifest themselves either as additional funding required to complete a given construction output, or in a reduced output obtained for given fixed level of funding. In either case, the effect can be measured on a comparable basis by calculating planned and actual unit costs. The survey found sufficient data to develop a reasonably accurate snapshot, although it is important to note that only completed projects, with actual costs and outputs could be used for this assessment. The following are key observations:

- Total impact is highly sensitive to a small number of low-frequency, high impact cases. Even when such cases are removed from the analysis, high-severity, low-frequency events represent nearly 60% of the total over-run costs (they represent only 3% of the total overruns by numbers, but the overrun costs are quite high).
- Budget overruns are more likely on larger more complex programs. Budget overruns occur in only 11% of the total portfolio, but those programs in total represent more than 40% of USAID's construction budget.
- Grants are significantly underrepresented in the budget overrun assessment. This is likely due to the fact that grant mechanisms do not typically require cost changes and it is difficult to identify overruns.
- Regression analysis showed that consulting and engaging host country governments and key stakeholders in the design and planning process before construction had a major impact in reducing overruns. This observation is supported by industry practice – a recent publication by the Project Management Institute (PMI) reports that 55% of project managers agree that effective communications to all stakeholders is the most critical success factor in project management.
- Regression analysis also showed that use of risk management practices, such as risk registers, reduce overruns.
- Each of the risk panels identified rework as significant cost drivers for all categories of construction.

The management of budget risk is a major focus of industry best practices, with several of the 11 CSFs oriented to the effective development and management of construction budgets. From an overall perspective, one of the most important practices would be the establishment of an effective management information system, incorporating the practice of "earned value management" (EVM). Such a system would provide a dynamic picture of construction progress relative to budget at multiple levels, providing a basis for mitigation measures to be applied as required. Other related practices for budget and cost control include the incorporation of effective risk management and change management practices implemented by qualified construction oversight personnel.

SCHEDULE DELAY

The effect of schedule delay risk is also readily measurable from the survey data, although, as with budget overruns, the picture is not complete because both planned and actual schedules are required to accurately determine actual delays. Once again, an effective management information system, incorporating the practice of EVM will be required in the future to get a more comprehensive and reliable picture of schedule delay risk. The following are key observations:

- Schedule delays were shown to impact 34% of all sub-awards, although the distribution was once again uneven, with a small number of low-frequency, high-severity events affecting the overall impact. Specifically delays greater than 24 months represented 3% of the sub-wards but represented 65% of the total cost impacts.
- Grants were again somewhat underrepresented in this analysis, but less-so than budget overruns. At the same time, these types of award mechanism were also associated with increased schedule delays.
- Like the cost scenario, engagement of the host country government improved schedule performance.
- Regression analysis also showed that greater COR/AOR experience correlated with better schedule performance
- Similarly greater planning requirements, such as requiring subcontractors to provide schedules demonstrated reduced schedule delays.

- The risk panels described a similar scenario in that schedule delays were shown to have the highest frequency for 3 out of the 4 panels. At the same time, the risk panels described the overall cost impacts as significant as they were the second highest cost driver for 3 out of 4 panels.

Many of the industry best practices associated with budget risk apply equally to schedule delay, with effective project control systems being a fundamental requirement. The most widely accepted approach for accomplishing this is the EVM technique, which combines scope, schedule, and cost into an integrated set of measurements. Fully developed EVM requires qualified analytical staff to validate and interpret the data, and is therefore most applicable to larger, more complex projects. Nevertheless, the basic concepts are scalable and can be adapted to effectively monitor projects of all sizes.

QUALITY RISK

Unlike budget and schedule risk, quality could only be indirectly measured in the survey through quality-related proxies. Therefore, more emphasis must be placed on the results of the risk panels and consideration of construction practices employed.

Analysis of those proxies showed that quality issues were identified in approximately 45% of the cases. In general, this impact was more of a high frequency lower severity event, with a lower total cost impact as compared to budget or schedule. The following are important observations:

- The risk panels showed capacity reduction to be an important quality impact and critical cost driver; once again, though this impact was generally lower than budget overruns and schedule delays.
- Construction completed by NGOs/PVOs were more likely to have reduced quality.
- Use of local design standards and codes had a negative impact on overall quality.

SUSTAINABILITY RISK

As with quality, sustainability risk was only indirectly measured in the survey through sustainability proxies, related in this case to O&M. Even these proxy indicators provide only a partial measurement of risk, however, because sustainability cannot be observed until after construction is complete. Therefore they are not recorded in project files and would not have been captured by our survey approach. So in this case also, more emphasis must be placed on the results of the risk panels and cumulative experience to fill in the gaps and provide an estimation. In general, sustainability risk seems to be addressed to a greater extent on larger, more complex programs i.e. planning for operations and maintenance tends to receive more attention in more complex programs. It may remain as a hidden issue on non-infrastructure programs which should be further investigated. The following are some key observations:

- Local engagement and consultation was highly correlated to better sustainability i.e. operations and maintenance planning.
- COR/AOR experience and having a supervisory engineer was highly correlated to improved sustainability, indicating the importance of experience and engagement throughout the process
- Lack of O&M was identified in the risk panels as the greatest cost driver for construction under non-infrastructure programs and was identified as the second largest cost driver in the stand alone infrastructure program.

COMPLIANCE RISK

Compliance risk addresses the issues of health, safety and environment, not compliance with USAID policies or the ADS. As noted above, the survey reported a good response for questions related to the reporting of health and safety and environmental incidents, but very little information related to the specific incidents. Consequently, there was insufficient data to allow any meaningful correlations related to compliance risk. Only 35% of survey respondents indicated a requirement for reporting of health and safety incidents by awardees, although 62% of awardees were required to report environmental incidences/impacts.

When considering the relative significance of cost drivers, each of the four risk panels found that the impacts associated with health and safety, environmental, and third-party risks were relatively low in terms of both frequency and severity.

Nevertheless, the survey of industry practices found that compliance with established standards is commonly regarded as an essential aspect of international development construction projects because the impacts are often highly visible and attributed disproportionately to the international entities involved. The survey further noted the gap between required standards and local practice is often so great that compliance is often overlooked. To address this gap, the industry (including the multi-laterals and MCC) is focusing much of its efforts on the implementation of common standards, such as the EHS Guidelines by IFC.

USAID'S RISK IN THE CONTEXT OF INDUSTRY BEST PRACTICES

The combined experiences of the international development community point to a number of common conclusions on the key factors affecting implementation of constructions projects, and best practices that may be used to maximize the chance for success. The report on *International Development Construction Survey of Practices and Results*, produced as part of this project, identified eleven critical success factors (CSFs). These form an effective organizing structure for consideration of risks and corresponding best practices to address them. The reader is encouraged to go to this companion document for a more detailed discussion of CSFs and industry best practices.

Table III-2 is organized according to the Critical Success Factors, summarizing key findings for each CSF, together with corresponding best practices. It should be noted that the risk findings are very reflective of the expert risk panel's understanding of USAID practices and do not take account of the changes being initiated with the USAID Program Cycle (ADS Chapters 200-203). Therefore the tables represent the risks when the guidance is not followed well rather than reflective of USAID guidance and procedures. That said, The Construction team should work with PPL to ensure that Agency guidance and construction practices are best integrated to maximize success of construction activities.

TABLE III-2. SUMMARY OF KEY RISK FINDINGS ALIGNED TO CRITICAL SUCCESS FACTORS (CSFS)

CRITICAL SUCCESS FACTORS	KEY FINDINGS OF USAID RISKS	INDUSTRY & USAID BEST PRACTICES	RISK EXPOSURE
1. **Project definition.** Realistic assessment and approval based on sound technical information	This is high risk exposure area given its impact on all subsequent activities after a structured project review and definition analysis has been completed. • USAID lacks a clear process for conducting infrastructure project definition analysis in the preparatory phases to its construction projects. • No systematic problem and alternative analysis requirements. • Limited engagement of appropriately qualified technical personnel during development phase. • Limited flow-down of screening requirements to implementers	• Structured process using defined criteria to establish feasibility and buy-in • Establishment of project management organizational unit at project definition stage to take implementation responsibility • Threshold criteria establishing appropriate implementation mechanisms, contract amounts and risk levels • Initiate environmental and social assessment using locally appropriate standards at project definition stage Note: USAID primers on infrastructure, referenced herein, provide an overview for a number of alternatives analysis as well as some basic criteria for planning specific health, irrigation and housing construction programs	H
2. **Stakeholder engagement.** Active participation and support of individuals and organizations required for successful implementation and ownership of construction projects	USAID is a leader in stakeholder engagement. In most cases USAID engages government and other stakeholders in development of their construction projects. No specific risks associated with current practices were identified.	• Stakeholder analysis and planning • Disclosure and dissemination of information • Consultation and participation • Grievance mechanisms • Ongoing reporting The Pakistan Community Engagement Primer and the Colombia best practices provide a formal engagement process that could be used to strengthen an already robust stakeholder engagement practice within USAID.	L
3. **Procurement procedures, contract types and approaches.** Effective and locally appropriate contract mechanisms that are consistent, balanced, enforceable and well understood by the local construction industry	• 68% of total awards did not utilize standardized construction contracting documents. 20% did not know what types of construction contracting documents were used. • Only a small fraction of procurements used FAR 36.5 or referenced Clause 52.3, which are specifically for construction contracting.	• Selection of standard, scalable contract mechanisms aimed at target bidder group. • Introduction of internationally developed documents based on balanced treatment of all parties • Program management approach with qualified international prime and locally-based subcontracts for construction • Conduct pre-procurement outreach for training and familiarization.	C

TABLE III-2. SUMMARY OF KEY RISK FINDINGS ALIGNED TO CRITICAL SUCCESS FACTORS (CSFS)

CRITICAL SUCCESS FACTORS	KEY FINDINGS OF USAID RISKS	INDUSTRY & USAID BEST PRACTICES	RISK EXPOSURE
4. **Institutional capabilities to operate and maintain investments.** Engagement of competent organizations with responsibility and capability to effectively manage, operate, and maintain completed construction project.	• For capital projects greater than $1M, USAID is required through 611E to certify local capacity to operate and maintain investment. Respondents reported that a 611e was not completed in 58% of cases and 21% didn't know if it was completed. • Respondents reported that O&M capacity was not assessed in 29% of cases and 23% didn't know.	• Feasibility assessment to address verification of: – Technology vs. O&M requirements and approach – Governance structure – Infrastructure requirements • Assessment and development of staff capabilities: – Identification of staffing requirements and qualifications – Capacity development in conjunction with project • Preparation of financial assessment and plan at project feasibility stage • Host country commitments as conditions for funding	H
5. **Health, safety, environmental and social requirements (HSES).** Ability to address and assure compliance with applicable health, safety, environmental, and social requirements	• Tracking of HSES performance is currently very limited: – 37% of contracts required awardees to report on safety incidences. – 67% of contracts required awardees to report on environmental incidences. – Less than 50% of construction awards addressed the use of hazardous materials.	• Environmental, Health & Safety (EHS) Guidelines by IFC provide well recognized model and performance-based standards with general and industry-specific examples of Good International Industry Practice (GIIP) • USACE includes HSE compliance as part of contractor evaluation • USAID ADS Chapter 204 provides effective environmental procedures for compliance with 22 CFR 216.	M
6. **Appropriate design standards and technology.** Technical capability to develop project designs in accordance with all applicable standards, using locally appropriate technologies	• Design procedures, standards and qualification standards are generally limited and widely variable, depending on the mission. • Approximately 30% of respondents did not know what seismic, flooding, or wind standards were used	• Establish minimum design requirements based on project size and complexity • Establish qualification criteria for design personnel • Establish design standards and quality requirements contextualized to budget, local norms, and practices • Ensure operations/maintenance included as set of design criteria • Provide total life-cycle analysis of alternatives Note: USAID primers on infrastructure, referenced herein, provide extensive general guidance on application of design standards	H

TABLE III-2. SUMMARY OF KEY RISK FINDINGS ALIGNED TO CRITICAL SUCCESS FACTORS (CSFS)

CRITICAL SUCCESS FACTORS	KEY FINDINGS OF USAID RISKS	INDUSTRY & USAID BEST PRACTICES	RISK EXPOSURE
7. **Quality of cost estimating and scheduling.** Ability to establish realistic budgets and schedules within established levels of accuracy, while accounting for potential contingencies and risks	• Respondents reported that an independent USAID construction cost estimate was completed in less than 40% of cases • Parametric and judgment estimates made up 50 percent of the estimates. Control estimates made up 35% of estimates. • Regression analysis demonstrated that projects with a construction cost estimate, reviewed by a qualified engineer resulted in lower sustainability risk.	• GAO Cost Estimating and Assessment Guide provides comprehensive framework for establishment of scalable requirements • Standardized contingencies are common for most implementing organizations. Other Federal agencies, such as EPA, require 10% contingency for construction • GAO Guide provides useful risk-based approach for determination of contingency funding	H
8. **Appropriate levels of contractor qualifications.** Determination and assurance of required contractor capabilities for successful completion of work within established quality requirements	• 63% of respondents reported that contractor qualifications were assessed. 18% did not know if qualifications were assessed. • 55% of direct awardees were required to submit financial statements. 29% did not know if these were required. • 16% of projects required some type of surety. 18% were not sure if a surety was required.	• Establish general qualification thresholds based on size, complexity, and local risk factors. World Bank provides good example model • Conduct pre-market studies. Using a threshold matrix to determine procurement requirements. Provide for international or regional participation, with local capacity development • Verify contractor financial capacity. • USAID FARA Guidelines Primer provides some recommendations on how review host country risks and capacity in advance of a FARA.	M

TABLE III-2. SUMMARY OF KEY RISK FINDINGS ALIGNED TO CRITICAL SUCCESS FACTORS (CSFS)

	CRITICAL SUCCESS FACTORS	KEY FINDINGS OF USAID RISKS	INDUSTRY & USAID BEST PRACTICES	RISK EXPOSURE
9.	**Risk management methodology.** Incorporation of consistent and systematic approach for identification, assessment and mitigation of potential risks	• There is currently no overall risk management structure or requirements in place within USAID • 35% of respondents reported incorporation of risk management tools on projects. 20% did not know if risk management was used. • Regression analysis showed that use of a risk register reduces cost changes. This suggests that use of a risk register or a method of evaluating risks has the desirable effect of reducing budget overruns.	All of the principal engineering and construction industry organizations noted in the Best Practices Survey, including PMI, CII and ECRI, have placed a strong emphasis on risk management with applicable tools and guidelines. • Risk management tools – Conduct detailed project risk register all project phases – Establish scalable requirements based on size and complexity • Management of impacts – Develop budgets that account for potential project issues – Manage contingency based on quantitative risk assessment • Risk management process and communication – Owner required risk workshop during project start-up – Risk management plan review with project staff – Ensure regular updates and risk reviews to implement mitigation measures USAID *Construction Oversight Primer* provides best practices/risk mitigation recommendation	C

TABLE III-2. SUMMARY OF KEY RISK FINDINGS ALIGNED TO CRITICAL SUCCESS FACTORS (CSFS)

CRITICAL SU(SS FACTORS	KEY FINDINGS OF USAID RISKS	INDUSTRY & USAID BEST PRACTICES	RISK EXPOSURE
10. Construction oversight and quality verification. Assurance of successful execution and completion of construction by a qualified inspector and in accordance with established requirements and standards	Survey results indicate USAID does conduct oversight, although practices are not systematic or consistent across the Agency, with no centralized method of capturing oversight findings. This has been identified as critical exposure area given the risks that improper construction poses to health and safety and the current lack of formal requirements, particularly for potentially high-risk investments. • USAID was engaged in construction oversight in 41% of cases and other organizations conducted oversight in 54% of cases. 4% were not sure of oversight. • FSNs provided 23% of the oversight for USAID and A&E firms provided 30% of the oversight. • Respondents reported that site inspections were conducted daily in 20% of cases. Weekly in 13% of cases. 52% were unsure of the inspection intervals.	• Construction Oversight is broken into 3 requirements – contract documents aligned to oversight, oversight practices and ability for field team to respond to change conditions/requirements. • FIDIC provides scalable oversight with full set of contract documents ranging from Green Book for small contracts to Red and Yellow for larger ones. • Harmonized FIDIC documents, with emphasis on oversight role by “Engineer”, used extensively by international development community, including World Bank and MCC. • USACE provides extensive resources for training and certification of construction personnel • MCC model provides for role of “Independent Engineer” to ensure that required standards are applied by local engineering and oversight personnel • USACE procedures establish thresholds for delegated signature authority to AOR/COR for field changes	C
11. Monitoring and evaluation process. Established process for assessment of results and the ability of completed projects to achieve project objectives	Few construction programs included follow-on evaluations to determine effectiveness (less than 30% in total) and the fact that USAID needed to conduct this survey is evidence that USAID does not have management systems in place to effectively understand their construction portfolio. This has been identified as a critical exposure area given that USAID needs to capture critical aspects of its construction portfolio to help all levels of management understand and respond to potential program risks and issues.	• Recent comparative study of M&E practices by USG agencies engaged in foreign assistance provides useful assessment of approaches • MCC M&E program provides useful example for larger, more complex projects and programs	C

APPENDIX IV

INTERNATIONAL DEVELOPMENT CONSTRUCTION: A SURVEY OF PRACTICES AND RESULTS

USAID FROM THE AMERICAN PEOPLE

USAID Construction Risk Assessment Task 3 – Final Report

INTERNATIONAL DEVELOPMENT CONSTRUCTION A SURVEY OF PRACTICES AND RESULTS

April 2014, Revised November 2014
This report was produced for review by the United States Agency for International Development (USAID).
It was prepared by CH2M HILL.

USAID CONSTRUCTION RISK ASSESSMENT TASK 3 – FINAL REPORT

April 2014, Revised November 2014

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ACRONYMS

ADS	USAID Automated Directives System
AOR	Agreement Officer Representative
COR	Contracting Officer Representative
AUSAID	Australian Government Department of Foreign Affairs and Trade
CIPS	Chartered Institute of Purchasing and Supply
CSF	critical success factors
CSI	Construction Specifications Institute
DoD	US Department of Defense
DOE	US Department of Energy
DoD-SPI	Department of Defense Selling Price Index
ECRI	Engineering and Construction Risk Institute
EHS	Environmental, Health and Safety
EPFI	Equator Principles Financial Institutions
EVM	Earned Value Management
FAR	Federal Acquisitions Regulations
FARA	fixed amount reimbursable agreements
FEMA	Federal Emergency Management Agency
FIDIC	International Federation of Consulting Engineers
FY	fiscal year
GAO	Government Accounting Office
GIIP	Good International Industry Practice
G2G	Government to Government
HSES	health, safety, environmental, and social requirements
IBRD	International Bank for Reconstruction and Development
IAPWG	Inter-Agency Procurement Working Group
ICSID	International Centre for Settlement of Investment Disputes
IDA	International Development Association

IE	independent engineer
IEG	independent evaluation group
IFC	International Financial Corporation
IDIQ	Indefinite Delivery, Indefinite Quantity
IL	Inspection Level
IPRA	International Project Risk Assessment
IQC	Indefinite Quantity Contract
IT	Information Technology
JICA Japan	Japan International Cooperation Agency
MATOC	Multiple Award Task Order Contract
MDB	Multilateral Development Bank
MCA	Millennium Challenge Account
MCC	Millennium Challenge Corporation
MIGA	Multilateral Investment Guarantee Agency
MNA	Multi-National Agency
M&E	Monitoring & Evaluation
UN	United Nations
OFDA	Office of US Foreign Disaster Assistance, USAID
O&M	operations & maintenance
OTI	Office of Transition Initiatives, USAID
PDRI	Project Definition Rating Index
PIU	Project Implementation Units
PRINCE2	Projects IN Controlled Environments (version 2)
PMC	Project Management Consultant
PMI	Project Management Institute
PMU	Project Management Unit
RBS	risk breakdown structure
RPM	Regional Procurement Manager
RMS	resident management system
SCEA	Society of Cost Estimating and Analysis

SME	Subject Matter Expert
SMU	Special Management Units
SWIFT	Society for Worldwide Interbank Financial Telecommunications
UNOPS	United Nations Office of Project Services
UROC	Reachback Operations Center
US	United States
USACE	United States Army Corps of Engineers
USAID	United States Agency for International Development
USG	United States Government
WFEO	World Federation of Engineering Organizations
WOU	USAID Washington Operating Unit

A. INTRODUCTION

The objective of this report is to provide a context for evaluation and benchmarking of USAID construction risks in comparison with the experiences, results, trends, and best practices of other similar international development organizations. It presents a high-level summary from representative, comparable organizations and identifies key practices gained from their experiences that may be applicable to USAID. This report also identifies some applicable systems, tools, and guidelines that may be consulted by USAID as it continues to strengthen its own engineering and construction practices.

Although this report characterizes the general categories of construction practiced by USAID as a basis for comparison, it does not incorporate the results of the comprehensive survey of the USAID construction portfolio that was completed in early December, 2014. Integration of this review and the results of the construction survey will be undertaken in the overall construction assessment data analysis report.

1. Framework for Identification of Best Practices

It is important to note that consolidated summaries of related construction experiences and best practices within the international development community do not currently exist in a form that readily satisfies the objectives of this assessment. Consequently, this report first lays out a framework by which construction experiences can be compared, and then best practices are identified. The process shown in Exhibit 1 is a risk-based approach, which first identifies ***what*** needs to happen for a successful project outcome, and then identifies ***how*** that outcome is achieved.

Exhibit 1
Process for Identification and Implementation of Best Practices

The process has four essential steps:

- **Project Definition –** Determination of the most applicable project type. This step is important in such a broad study because of the wide range of project characteristics in terms of size, objective, and implementation mechanism.

- **Risk Identification –** This step considers what can go wrong with a project, but can also be framed in terms of "critical success factors" (CSFs), or what needs to happen right for a successful project outcome. Much of the literature on international development construction focuses on CSFs, so this report has adopted that approach.

- **Risk Management & Mitigation –** These are the measures, or "best practices" that can be taken to address the identified CSFs. Best practices identify how CSFs are achieved.

- **Outcome Determination –** This is a validation step to measure and evaluate performance to the effectiveness of practices, once they are implemented.

2. Major Elements of This Assessment

The focus of this report is on the identification of applicable practices from comparable organizations that can be considered by USAID as input for the formulation of desired "best practices." Exhibit 2 illustrates how the experiences and lessons observed from other organizations have been collected and assessed to identify candidate CSFs and best practices for consideration.

Exhibit 2
Identification of CSFs and Best Practices from Experiences and Lessons Observed

The following are the major elements of this assessment:

- **Characterization of USAID construction** – Identification of the general categories of construction practiced by USAID to facilitate comparisons with other organizations. Six categories are identified, representing the broad range of mission objectives, contract mechanisms, and project size.
- **Overview of construction in selected international development organizations** – A brief summary of procedures, practices, and experiences of other USG and multi-lateral agencies in the construction sector, taking into consideration the varied objectives of the respective organizations. Particular attention is paid to areas of commonality and overlap with USAID.
- **Identification of typical risks and critical success factors** – A summary of key factors affecting construction risk in international development settings, based on literature reviews and recommendations of industry organizations. This review provides a starting point for identification of potential best practices and their relative order of importance for USAID.
- **Suggested best practices** – Based on the collected experiences from a limited sampling of other international development organizations, this report finally summarizes potential best practices to address a broad range of commonly suggested CSFs.

3. Critical Success Factors Leading to Best Practices

The literature and lessons learned from international development organizations point to a broad range of *critical success factors* and *risks* that must be addressed for successful project execution. An important desired outcome of this assessment is a common understanding of these factors and an identification of corresponding best practices in order to address them. It is evident from the literature that the relationship between CSFs and best practices are presented in many different ways. In order to provide a common basis for comparison, the following combination of *key factors* was selected and then used as an interactive checklist during the assessment.

- Project screening and selection process
- Stakeholder engagement
- Procurement procedures, contract types, and approaches
- Institutional capabilities to operate and maintain investments
- Health, safety, environmental, and social requirements
- Locally appropriate design standards
- Quality of cost estimating and scheduling
- Appropriate levels of contractor qualifications
- Risk management methodology
- Construction oversight and quality verifications
- Monitoring and evaluation processes

B. CHARACTERISTICS OF USAID CONSTRUCTION

Construction as practiced in USAID encompasses a very wide range of characteristics including objectives, size, mechanisms, and type of oversight provided. In order to find comparable experience and guidelines from other organizations, it is helpful to first start with a brief description of the major categories of USAID's construction portfolio relative to the various contracting mechanisms, types, and scale of construction work USAID implements. The following categories are suggested as a starting point:

Exhibit 3
USAID Construction Categories and Characteristics of Construction

	USAID Construction Categories	Examples	Contract Mechanisms	Comments
1	Stand-alone infrastructure programs in conflict situations	Ongoing projects in Afghanistan and past projects in Iraq, Sri Lanka, and Haiti	Primarily FAR 15 & FAR 36 prime contracts, with lower-tier international or local contracts	Often large projects. May be implemented by design-build or program management methodologies
2	Stand-alone infrastructure programs in conventional mission setting	West Bank, Jordan, and Ethiopia; past projects in Egypt	FAR 15, FAR 36 or host country prime contracts, with lower tier international or local contracts	Common model from the past, with established construction programs using direct contracts
3	FFP/OFDA/OTI	SWIFT (OTI) and OFDA Emergency Response Grants	Significant use of grant mechanisms; some FAR 15 based contracts with lower-tier local contracts or grants	Mostly task orders under OFDA and OTI IQCs
4	Incidental construction for facilities as part of non-infrastructure projects	Health, education and agricultural programs (good examples in South Sudan, Mali and Liberia).	Primarily FAR 15 prime contracts or Cooperative Agreements with lower tier local contracts or grants	Generally multiple smaller construction projects with minimal engineering design and supervision
5	Significant construction embedded in non-infrastructure projects	Schools program in Ghana	Primarily FAR 15 prime contracts or Cooperative Agreements with lower tier local contracts or grants	Major construction projects requiring engineering design and supervision
6	Government-to-government infrastructure programs	Current programs in Pakistan, Jordan, and Georgia	Host country contracts, fixed amount reimbursable agreements (FARA) or resource transfer	Implementation letter agreements establishing scope and budget of projects to be performed by host country.

C. OVERVIEW OF CONSTRUCTION IN INTERNATIONAL DEVELOPMENT ORGANIZATIONS

This section provides a representative sample of organizations which allows for helpful comparisons with USAID. Review of these organizations focuses on key characteristics of construction programs that may be applicable to the identified categories of USAID construction presented above. The following factors have been considered:

- Agency and mission objectives
- Volume of construction contracting
- Construction procedures and guidelines
- Contract mechanisms (direct contracts, host country contacts, grants, etc.)
- Delivery methods (design-bid-build, design-build, program management, etc.)
- Contract types (FAR-based, FIDIC, locally developed, etc.)

The objective of these comparisons is to establish a basis to identify best practices by observing linkages between the current approaches employed by these organizations, their results, and their future trends. Like USAID, most organizations have important lessons learned from the past and have identified critical areas where improved practices are required. In many cases new approaches, resources, and guidelines have been developed incorporating these experiences.

There is a broad range of organizations with applicable experiences to draw from, including other US Government organizations, multilateral and bi-lateral donors/banks, and international relief institutions. Although no single organization encompasses the breadth and type of USAID's construction efforts around the world, many of these organizations have unique strengths and offer potential contributions to consider for application or scaling. The following four organizations together provide a good overlap with, and comparison to, USAID's current construction portfolio:

- World Bank – Plays a leadership role in the international development community, with established practices and resources that are now common to many other multi-lateral and bi-lateral institutions.

- United Nations Office of Project Services (UNOPS) – UN affiliated agencies such as UNOPS and UNHCR, often play a leading role in disaster response. They have developed response procedures and inter-organizational coordination activities.
- Millennium Challenge Corporation (MCC) – Focused specifically on infrastructure development to achieve "poverty alleviation through economic growth," MCC has created a consistent delivery model, processes, and tools to meet its given objectives.
- US Army Corps of Engineers (USACE) – Leading USG engineering and construction management organization. Provides services and resources that are accessible to USAID through interagency agreement, including established international estimating practice, construction management processes and procedures, and technical capabilities.

1. World Bank

The World Bank Group was established in 1944 to facilitate post-war reconstruction. Headquartered in Washington, DC, the Bank has more than 120 offices worldwide. The World Bank Group is a closely associated group of five development institutions (IBRD, IDA, IFC, MIGA and ICSID). These institutions play a leadership role in the international development community, working closely with governments, other multilateral institutions, commercial banks, export credit agencies, and private sector investors. The World Bank provides low-interest loans, interest-free credits, and grants to developing countries. These support a wide array of investment in such areas as education, health, public administration, infrastructure, financial and private sector development, agriculture, and environmental and natural resource management. For FY2013 the World Bank Group committed $52.6 billion in loans, grants, equity investment and guarantees. The World Bank has funded 11,690 projects in 172 countries since 1947.

The World Bank's construction is most similar to USAID Construction Category 2 (from Exhibit 3) – "stand-alone infrastructure within conventional Mission setting" and Category 6 – "government-to-government infrastructure programs." The World Bank generally follows a host-country contracting model requiring FIDIC-based contract documents.

The following aspects of the World Bank's construction program are particularly noteworthy:

- Procurement harmonization of standard contract documents – A number of Multilateral Development Banks (MDB), led by the World Bank, established a forum in 1999 for procurement harmonization, using FIDIC Conditions of Contract for Construction as the basis. The objective was to provide standardization of bidding documents considered to be best practices for procurement of goods, works, small works, plant design supply and installation, and a consultant's request for proposals. The result is greater consistency, familiarity, and efficiency of procurement among funding agencies and recipient countries. Altogether, there are currently eight participating MDBs and four participating international agencies, and bilateral banks have licenses to use the harmonized documents as their standards. A guide to the use of these documents is available both from the World Bank and FIDIC directly (Refs 1, 2, 3, 4).

- Project Implementation Units – Over the last 40 years the World Bank has practiced the establishment of Project Implementation Units (PIUs), also referred to as "autonomous units," "enclave projects," "Project Management Units (PMUs)," and "Special Management Units (SMUs)." The objective of this approach was to establish a team of dedicated professional managers and staff directly responsible for project execution. This practice was evaluated and determined to have had mixed results, however, especially with regard to the benefit of long-term capacity building. The Bank noted in its Guidance Note for Project Management (Ref 5) that "In all Regions and types of projects, PIUs have often undermined long-term institutional development in countries' line ministries, sustainability, and ownership, and have often created tensions with sector ministries." While the solutions vary based on local capacity, the Guidance Note recommended the use of existing institutional structures while establishing realistic expectations on implementation plans, and disbursement forecasts based on current capacity and the need for capacity development.
- World Bank Operational Manual – Bank projects and activities are governed by Operational Policies which are designed to ensure that projects are economically, financially, socially, and environmentally sound. The Bank's Operational Manual (Ref 6) describes them and provides compliance guidance in terms of "Bank Procedures" and "Good Practices".
- Investment Lending Reform – The Bank recently revised its operational policies, which were then promulgated in "Investment Lending Reform: Modernizing and Consolidating Operational Policies and Procedures" (Ref 7). The Bank's assessment of a proposed project is based on various country and project-specific considerations, including consistency with the Bank's strategy in support of the country, project development objectives, taking into account technical, economic, fiduciary, environmental, and social considerations, and related risks. The following are key considerations identified in the policies:
  - **Technical Analysis –** The Bank assesses technical aspects of the project, including design issues, appropriateness of design to the needs, capacity of the borrower and any project implementation entity, institutional arrangements, and organizational issues for the implementation of the project in the context of the long term development objectives of the borrower.
  - **Economic Analysis –** The Bank undertakes an economic analysis of the project. Taking into account the expected development objectives, the Bank assesses the project's economic rationale using approaches and methodologies appropriate for the project, sector, and country conditions, and assesses the appropriateness of public sector financing, and the value added of Bank support.
  - **Financial Management –** The borrower maintains financial management arrangements that are acceptable to the Bank and that provide reasonable assurance that the proceeds of the Investment Project Financing are used for the purposes for which they are granted. These arrangements include the planning, budgeting, accounting, internal control, funds flow, financial reporting, and auditing arrangements of the borrower and entities responsible for project implementation. The financial management arrangements rely on the borrower's existing institutions and systems, with due consideration of the capacity of those institutions.
  - **Environmental and Social –** Environmental and social policies applicable to Investment Project Financing are established in the operating policies.
  - **Risks –** The Bank assesses the risks to project development objectives with due consideration for the risks of inaction, taking in to account the assessments noted above and other relevant information.

- **Special Considerations –** There are some projects that may have specific policy requirements and special considerations. These include cases where the borrower/beneficiary is deemed by the Bank to: (i) be in urgent need of assistance because of a natural or man-made disaster or conflict; or (ii) experience capacity constraints because of fragility or specific vulnerabilities.

- Thresholds for Procurement Methods – The Bank's Regional Procurement Managers (RPMs) establish appropriate, country-specific monetary thresholds taking into consideration the domestic markets, conditions, size and depth of the market, capacity of local industry and level or procurement risk. During project implementation, the Bank team oversees procurement according to the procurement supervision plan, taking into consideration the established Maximum Prior Review Threshold (illustrated in Exhibit 4 Ref 16-16). Noteworthy in this practice is the country-specific procurement design based on project size, risk factors and contract type to ensure that projects engage the right consultants and contractors based upon project complexity and local conditions.

Exhibit 4

Maximum prior review thresholds under competitive procurement and consultant selection

Type of Procurement	Estimated Contract Cost (US million Dollars)			
	High Risk Implementing Agency	Substantial Risk Implementing Agency	Moderate Risk Implementing Agency	Low Risk Implementing Agency
Works	5	10	15	20
Goods	0.5	1	3	5
IT Systems	0.5	1	3	5
Consultant Firms	0.2	0.5	1	1
Consultant Individuals	0.1	0.2	0.3	0.5

- **The IFC Performance Standards –** The International Financial Corporation (IFC) has developed a set of environmental and social performance standards (Ref 8) which define client responsibilities for their environmental and social risks in eight key areas summarized below. The standards have become widely adopted, with other international organizations including MCC, other multi-lateral banks, the Equator Principles Financial Institutions (EPFI) (78 institutions in 35 countries) and some international equity funds using these standards as the basis for their financial support.

> - IFC Performance Standards
> - IFC Performance Standards
> - PS1. Assessment and Management of Environmental and Social Risks and Impacts
> - PS2. Labor and Working Conditions
> - PS3. Resource Efficiency and Pollution Prevention
> - PS4. Community Health, Safety, and Security
> - PS5. Land Acquisition and Involuntary Resettlement
> - PS6. Biodiversity Conservation and Sustainable Management of Living Natural Resources
> - PS7. Indigenous Peoples
> - PS8. Cultural Heritage

2. United Nations

The UN has undergone significant procurement reform since 1999. The objective has been to strengthen the principles of transparency, effectiveness, and efficiency. Procurement reform has been carried out at both the organizational and inter-agency level. Two working groups were established to harmonize and streamline best practices through the UN system, the Inter-Agency Procurement Working Group (IAPWG), and the Common Services Working Group on Procurement. One result has been the development of a synopsis of best practices within the UN system, the "UN Procurement Practitioner's Handbook." (Ref. 9)

UN experience that is most applicable to USAID is that of the United Nations Office of Project Services (UNOPS). Construction projects executed by this organization will primarily overlap USAID Construction Category 1 – Stand-alone infrastructure in conflict situations, and Category 3 – FFP/OFDA/OTI assistance. UNOPS is the organizational arm of the United Nations and helps its partners implement approximately $1 billion of aid and infrastructure each year. It is mandated to be the central resource for physical infrastructure development for the United Nations system and its partners. The UNOPS is a not-for-profit organization comprised of engineers, architects and project managers with experience in designing, constructing, rehabilitating and maintaining physical infrastructure in a variety of international development environments worldwide, including within conflict and post-disaster conditions.

UNOPS executes its works through three primary types of support (implementation, advisory, and transactional) in three main types of Sustainable Practices Areas: Infrastructure, Procurement, and Project Management. Advisory and Human Resource Management services are also offered in support of these three Practice Areas. UNOPS strives to promote sustainability in the work it executes by developing partnerships built on shared sustainability goals. Similar to USAID, UNOPS staff provides the experience and expertise to support these goals which promote community engagement, environmentally-friendly design and construction, the capacity development of local construction industries, disaster risk reduction, and gender equality.

The following are key aspects of the UNOPS approach that are of greatest potential interest to USAID:

- **Sustainable Infrastructure –** As infrastructure is a core component of development, sustainably designed and constructed schools, roads, bridges, hospitals, and police stations enable communities to achieve sustainable improvements in health, education, security, and economic stability. UNOPS staff works to support the development of these projects through utilizing the latest sustainable design and construction techniques, as well as contracting mechanisms containing international standards that are tailored and scalable to the meet the specific needs of international development construction environments. UNOPS infrastructure processes incorporates the following key elements:
- **Community engagement –** Utilizing local knowledge to engage all stakeholders, from national authorities to local communities and families, helps to create "owner-driven" infrastructure development by the people it serves, and helps to ensure its long-term operation and maintenance.
- **Environmentally-friendly construction –** Designing and managing works to include locally sourced and sustainable materials whenever possible, providing environmental impact assessments on future use, and considering construction options which reduce water and power consumption, are all ways to mitigate adverse impacts to the local environment.
- **Capacity development of local construction industries –** Improving key construction skills of local contractors and laborers through on-the-job or technical training, sharing construction best practices, and training contractors how to prepare quality bids helps to build local capacity and market-driven solutions. UNOPS helps to ensure construction designs are based on local expertise, while maintaining international standards for safety and quality.
- **Disaster risk reduction –** Assisting development and government partners to design and construct disaster-resistant infrastructure in order to increase the resilience and lessen the loss of communities subjected to natural disasters and extreme weather events.
- **Gender equality –** Working to empower women and girls by incorporating gender concerns in contracting requirements and building design through early identification and community engagement in planning.
- **Sustainable Procurement –** As the central resource for procurement within the United Nations, UNOPS has a partnership with Chartered Institute of Purchasing & Supply (CIPS, www.cips.org), a not-for-profit procurement and supply chain management consultant. The CIPS International Development team works with governments, International Funding Institutions and its members to plan, develop and deliver public procurement capacity building projects on national, regional, and local levels in order to help procurement professionals in low- and middle-income countries develop their skills and navigate supply chains. Together, UNOPS and CIPS work further to:
  - Identify "leaks" in the supply chain, where a lack of training or effective processes leads to money being lost.
  - Help procurement and supply chain professionals to improve key processes to stem these leaks.

- **Sustainable Project Management** – The UNOPS project management methodology incorporates global best practices such as PRINCE2 (www.prince2.com) and the *Project Management Institute's (PMI*, www.pmi.org) project management standards. This methodology is tailored to the international development sector emphasizing practice and rigor in:
  - Strong internal controls
  - Systematic stakeholder management
  - Good governance
  - Benefits and impact planning and management

Together with the utilization of effective project management tools such as their custom-built *Management Workspace* tool and online *Practice and Quality Management System*, integrated information about UNOPS projects, partners and offices gives project managers global oversight of projects through real-time access to information and linkage for guidance to knowledge-sharing systems.

UNOPS Contract Types – UNOPS uses four types of construction contracts for all infrastructure projects, each of which are based on those used by FIDIC and tailored for specific use in the United Nations context. Further, these FIDIC-like contracts provide the same mechanisms and structure, but allow for a desired level of flexibility in order to accommodate works that vary in size, scope, and the varying level of capacities of implementing contractors and governments. This allows for the utilization of proven and recognized contracting standards within the portfolio of UNOPS physical infrastructure projects worldwide, while enhancing efficiency, lowering risk, and improving quality for all stakeholders. The four types of UNOPS contract mechanisms include:

- **Measured Price Construction Contract –** For construction works priced on a measured price/re-measurement basis (based on the FIDIC Red Book).
- **Lump Sum Construction Contract –** For construction works priced on a lump sum basis (based on the FIDIC Red Book).
- **Short Form construction Contract –** For relatively basic construction works priced on a lump sum or measure price basis (based on FIDIC Green Book).
- **Minor Works Contract –** For use with the most basic of works when working with contractors of low capacity.
- **Implementation Partnerships –** In order to improve the speed, quality, and sustainability of infrastructure services that UNOPS delivers globally, joint consulting and implementation partnerships have been established with firms such as Arup, which has a not-for-profit international development arm. The resources that global consultancy, planning, design, and engineering firms have, and partnerships with professional and educational institutions can be drawn upon for the planning and execution of more complex construction projects.

3. MCC

MCC was created by Congress in 2004 with a very specific objective of reducing global poverty through economic growth. The MCC model fulfills this mission by focusing on policy reforms, economic growth opportunities that deliver tangible results, and shared learning on what is, and is not working. The primary mechanism for accomplishing this is through the execution of compacts, which are large 5-year grants for countries that pass MCC's economic criteria. Since its inception, MCC has granted compacts totaling over $7 billion to 25 countries. Most of this has been directly applied to infrastructure construction or indirectly to its administration and oversight. MCC's current infrastructure portfolio is approximately $2.2 billion.

By its original congressional authorization, MCC is limited to 300 staff. Currently at approximately 275 full-time employees, MCC employs 14 licensed engineers and several other technical staff. In addition to its direct hires, all MCC compacts utilize US-based independent engineering firms to provide a variety of specific engineering functions, including the role of Independent Engineer, to help ensure MCC interests over and above the project management and supervisory firms the MCAs are required to retain.

MCC's construction is most similar to USAID Construction Category 2 (from Exhibit 3) – "Stand-alone infrastructure in traditional Mission settings." To a great degree, this construction through MCC compacts has taken the place of Category 2 construction that was typically performed by USAID in past years. By focusing on this relatively narrow range of project characteristics, MCC has been able to optimize its delivery model and refine many of its processes and tools. This experience provides a good example of a host country contracting model through a US Federal organization, using FIDIC-based contract documents, and an approach that is similar to the World Bank harmonized approach. Because of fixed durations and budgets of 5-year compacts, MCC experience will also provide good examples of cost and schedule risk management.

The following aspects of MCC's construction program are particularly noteworthy:

- **Eligibility criteria and project selection** – The strict eligibility criteria for MCC compacts results in a relatively higher level of institutional capability for recipient countries at the outset. Before a country can become eligible, it must demonstrate its performance on independent and transparent indicators. Once it becomes compact-eligible, the country must then follow a rigorous process for project selection including feasibility studies, economic and social evaluations, and economic assessment. This emphasis on project selectivity is an important advantage for risk management that may often not be achievable for USAID projects, and may require a compensating emphasis on institutional strengthening and capacity development.

- **Local governance and oversight through establishment of MCAs** – MCC places a great deal of emphasis on country-led solutions and implementation through the establishment of a Millennium Challenge Account (MCA) for each compact. The MCA is a local entity that then becomes responsible for managing and overseeing all aspects of the compact implementation. Creation of the MCAs requires a significant investment of time and resources at the start of a compact, but results in a much smaller country footprint by MCC itself during compact execution. MCC's approach to country ownership balances country-led implementation with active engagement by MCC itself throughout the compact implementation period. Lessons learned from experiences with this approach are presented in an issue brief "Principles into Practice: Country Ownership" (Ref 10).

MCC Lessons Learned on Country Ownership

- Is a partnership based on mutual accountability that benefits from structure and clear expectations
- Is a balance between MCC's principles and operational approaches
- Goes beyond national governments, both in setting investment priorities during compact development and in implementing programs
- Includes capacity building, but not everything has to be about capacity building
- Includes using elements of country systems where feasible, but country ownership doesn't mean country partners have to do everything
- Pays off for results and leveraging policy reform

- **FIDIC-based standard contract documents and procurement process –** MCC-funded procurements are administered by the local MCAs and are open to international competitors, with the exception of excluded parties who do not meet identified eligibility criteria. In order to promote this competitive process while assuring effective and transparent contract administration, MCC elected to base its Program Procurement Guidelines (http://www.mcc.gov/pages/business/guidelines#ppg) on the World Bank's harmonized guidelines. MCC's guidelines differ from the World Bank's in five key ways:

  - Provides broader advertising requirements for procurement opportunities
  - Tightens restrictions on currency use
  - Prohibits national preference in the procuring of goods, works, and services
  - Includes the Excludes Parties list under US laws and policies
  - Identifies English as the official operating language for MCC funded procurements
  - Includes implementation requirements, an approvals matrix, and a glossary of terms

  Although US contractors are currently less familiar with the FIDIC-based approach, MCC has had good success in attracting qualified international competitors and executing the work using this model.

- **Effective construction oversight by MCA together with MCC –** In most cases, MCC places a strong emphasis on oversight using a combination of local and international resources. Primary responsibility for oversight belongs to the MCAs, which are required to procure the services of a qualified program management consultant (PMC) through a competitive international procurement. The PMC serves in the role of FIDIC "Engineer" and directly oversees the work of the "Contractor." MCC remains actively engaged throughout the entire compact period and retains the services of an "Independent Engineer" (IE) to monitor progress and provide technical reviews. Together, MCC and the IE typically make quarterly mission visits to meet with the MCA, PMC, and other local parties to monitor progress in the field and to assess overall performance. The engagement of international consultants in the two roles of PMC and IE provides an extra level of assurance, which may be warranted in many cases where local capabilities are not fully developed, but may possibly be an overly conservative approach in others. MCC routinely evaluates the balance within this model and, if warranted, may consider changes.

- **Cost and schedule control dictated by fixed conditions of compacts –** One of the most striking features of MCC compacts is the effect of the fixed five-year compact duration and fixed budgets. This drives an awareness by all parties of the need for effective project controls, risk management, and careful stewarding of contingencies. In order to spend all allocated funds while remaining within budget, compacts may typically be developed with optional add-on and deduct project components. In other cases, the recipient country may fund parallel project components that may be constructed beyond the compact end date.

- **Monitoring and evaluation (M&E)** – The current practice of M&E by USG agencies providing foreign assistance was recently evaluated in a study "Beyond Success Stories: Monitoring & Evaluation for Foreign Assistance Results" (Ref 11). The study noted that MCC has a greater commitment to impact evaluation than any other of the USG agencies, but with a relatively narrow objective of "reducing poverty through growth," there is an "income metric" that is common to all compacts. Unlike USAID, "this one overarching objective allows project appraisals across sectors based on the same objective." Nevertheless, the MCC model for M&E provides an important best practice example. Each compact has an M&E plan with quarterly progress reported against plan. Summaries and key indicators are available on the MCC website (http://www.mcc.gov/pages/results/m-and-e).

4. USACE

USAID's primary interface with Department of Defense (DoD) international construction activities is with the US Army Corps of Engineers (USACE), which is an organization focused primarily on infrastructure project delivery. USACE is a major Army command with approximately 37,000 dedicated civilians and soldiers delivering engineering services to customers in more than 130 countries worldwide. Its mission includes planning, design, and construction of public works projects in a wide variety settings, including those of international development.

USACE has a broad range of applicable experience that overlaps the categories of USAID construction identified in Section B, although primarily with larger, more complex programs in post-conflict or post-disaster situations. In other cases, USACE can provide a complimentary or support role to USAID for a wider range of project types. The Interagency and International Services (IIS) Division has a standing interagency agreement with USAID to provide a range of technical services upon request, including infrastructure design and construction services. Services provided under this agreement are coordinated by a permanent liaison assigned to USAID.

The following aspects of USACE experience and capabilities are potentially applicable to USAID:

- **IDIQ/MATOC mechanisms –** Much of the international engineering and construction work performed by USACE is accomplished through task orders issued under regional IDIQ/MATOC contracts. Contract holders are generally international teams of qualified companies, with heavy participation of US firms. Contract mechanisms are all FAR-based, with an emphasis on fixed price contracts and design-build delivery. Compared with USAID operating in similar settings (particularly for large, complex programs), the USACE approach follows processes that are more rigorous and well-defined, with results that are generally predictable and consistent. On the other hand, the USAID approach has proven to be more adaptable to local conditions and better able to integrate local and international resources and perspectives.
- **Engineering and design support –** USACE has extensive in-house engineering capability that can be accessed directly or online for technical support in a wide range of engineering applications and specialty areas. One of the primary means of access is through USACE Reachback Operations Center (UROC), which is available to USAID through interagency agreement. UROC provides a "reachback" engineering capability that allows personnel deployed worldwide to talk directly with experts in the United States when a problem in the field needs quick resolution (Ref 12). Field personnel can be linked to subject matter experts (SMEs) within the Corps of Engineers, private industry, academia, and other DOD and Government agencies to obtain detailed analysis of complex problems that would be difficult to achieve with the limited expertise available in the field. Reachback support may be particularly useful in remote operations where specialized technical expertise is required, although such support may have limited capability to incorporate local standards or practices.

USACE Reachback Operations Center (UROC) – Engineering Categories

- Water Resources Management
- Hydrology / Watershed Management
- Flood Forecasting / Early Warning
- Drought Forecasting / Early Warning
- Hydrometeorological Services
- Water Supply
- Water Use Allocation
- Water Demand Management
- Groundwater Supply & Management
- Agricultural Irrigation
- Water Pollution Control
- Wastewater Treatment
- Environmental Flows
- Water Quality Monitoring and Evaluation
- Desalination
- Coastal Engineering
- Riverbank / Streambank Erosion
- Estuaries and Coastal Management
- Roads / Bridges
- Civil Works
- Vertical Structures

- **Technical publications and standards** – There is a wide range of technical support material available through USACE that may be generally applicable to certain areas of international development construction. One of the primary sources is the set of engineering manuals available online at: http://www.publications.usace.army.mil/USACEPublications/EngineerManuals.aspx. Many of these are focused on specialized engineering applications for which accessible information may be otherwise limited. One publication of particular note through this source is Manual No. 385-1-1, "Safety and Health Requirements" (Ref 13), commonly referred to as the "Red Book".

- **Training resources for construction** – USACE provides both classroom and online training through the USACE Learning Center at (http://pdsc.usace.army.mil) for many of the fundamental skill sets required for engineering and construction. A catalog of courses is compiled annually in publication commonly referred to as the "Purple Book" (Ref 14). One broadly available course in numerous USACE locations that may be particularly applicable is "Construction Quality Management" (Ref 15).

- **Incorporation of capacity development for infrastructure** – Although traditionally focused on construction of infrastructure, USACE recognized the importance of supporting efforts in capacity development to accomplish its mission. It therefore established the Capacity Development Business Practice within IIS in 2008 to achieve a number of key benefits:

  - Conditions are improved for the population served.

  - The beneficiary of services is better able to manage its own affairs without reliance on external support.

  - The service provided is more likely to be successful over the long-term, so the investment made by the US Government or other stakeholders is better protected.

  USACE policy and guidance on capacity development is summarized in Engineer Regulation ER-5-1-16, and an accompanying "Capacity Development White Paper" (Ref 16). The white paper addresses the full spectrum of USACE operations, and provides a structure and approach for capacity development that is generally applicable to a broad range of infrastructure projects. USACE also participated in the joint development of a more comprehensive guideline, the "Guidebook for Capacity Building in the Engineering Environment," published by the World Federation of Engineering Organizations (WFEO).

- **Cost estimating and price evaluation –** USACE and other military construction agencies such as the Navy and Air Force, maintain unit cost data for military construction to develop their program budgets (Refs 17*)*. This unit cost database is maintained along with "area" cost factors and escalation factors. The area cost factor accounts for differences in climate, labor pools, production rates, exchange rates, and material cost differences within the US and for nearly 100 countries. Additionally, USACE maintains an index called the DoD Selling Price Index (DoD-SPI) which is used to escalate the cost from the database date. Information on development of these programmatic costs and associated cost tables can be found under the Unified Facilities Criteria in the "Whole Building Design Guide Website" (www.wbdg.org). USACE is working on a similar type database for civil works which is more difficult to utilize given the site issues typically associated with such work. USACE has provided cost estimating support to other Federal agencies through its Walla Walla District (FEMA, US Department of State) and Huntington District (DOE). The USACE Civil Works Cost Engineering Center of Expertise is located at the Walla Walla District which maintains cost engineering related to current regulations accepted best practices for estimating, scheduling and risk management; developed and updates the Civil Works Cost Index System, and develops and provides cost engineering instruction.

D. PREVIOUS STUDIES AND ASSESSMENTS OF CONSTRUCTION PRACTICES

There are no consolidated summaries available that cover the full range of USAID's construction portfolio; however, there are a number of useful independent sources of construction information and guidance available that can provide additional perspectives on applicable best practices. These include academic research and assessments performed through industry collaboration, specifically those developed by the Construction Industry Institute (CII) and the Engineering and Construction Risk Institute (ECRI). Combined, the tools and resources of these organizations are particularly useful to USAID as they provide proven enterprise-level risk management practices and solutions for owners and contractors developed through the experiences of construction risk experts from government, academia and government. Their approaches propose a risk sharing approach with participants that doesn't alleviate risk responsibility, but promote open dialogue and facilitate clear understanding of risk ownership and response.

1. Studies and Assessments of International Development Construction

The effectiveness and evaluation of investment in foreign aid projects is a popular topic for academics and researchers. As part of this task, Willis conducted a literature review of academic papers focusing on project effectiveness and construction risk management. Seven papers were identified of greatest applicability and results are summarized in a report which is presented in Appendix A. From these papers they drew out four key topics of relevance to this assessment and future interpretation of survey results:

- **Topic 1 – Need for data-driven monitoring and evaluation processes.** Several papers drew upon the Independent Evaluation Group (IEG) database, including more than 6,000 World Bank projects evaluated between 1983 and 2009, to investigate macro and micro correlates of project outcomes. Several of the papers identified correlations of key factors with project outcomes, although the conclusions are still very broad. One study found that at the country-level "macro" measures of the quality of policies and institutions are very strongly correlated with project outcomes, whereas the success of individual development projects varies much more within countries than it does between countries. The same study also found that measures of project size, the extent of project supervision, and evaluation lags are all significantly correlated with project outcomes, as are early-warning indicators that flag problematic projects during the implementation stage. One of the principal conclusions of another study drawing on the same database was that selectivity for well-designed projects and project governance are the tools through which successful infrastructure investment can be achieved. In order to improve project outcomes, development organizations may need to align their incentives toward this objective and strengthen their capacity building programs and place more attention on project governance.

- **Topic 2 – Clearly defined success criteria**. The literature review revealed that there is ambiguity in the definition of a "successful project" (and similarly a "failure project" and why and how it failed). This forms one of the key elements in a Monitoring and Evaluation (M&E) process. The review concluded 3 important features for a good standard:

  - Strict project review process
  - Clearly and explicitly stated objectives
  - Consistent measurement criteria across the project cycle (i.e., avoiding a "moving target")

  The referenced papers pointed to examples with the World Bank, which address this issue of project review substantially by requiring an intense project review process within sectors, and questioning whether the project is sufficiently ambitious, is feasible, and meets its poverty-fighting objectives.

- **Topic 3 – Project governance focusing on carefully selected Critical Success Factors (CSFs).** The referenced papers noted a large number of efforts to establish correlations between CSFs (or risks) and project outcomes. All of the studies confirmed that country-level factors such as the quality of policies and institutions are important for the effective use of aid resources, although some studies also observed significant variation within countries. The project-specific factors can be broadly classified into two categories: (a) factors related to the nature of the projects themselves, such as project complexity; and (b) controllable factors such as the effectiveness of the M&E process, and the quality of project governance. A common finding of the studies is that project governance is very important for project outcome. International development projects are likely to be very complex, and can include conditions such as multiple contractors and different political ideologies. These projects are more difficult to manage because the risks involved are more numerous and less predictable.

- **Topic 4 – Risk Mapping**. The literature review noted that risk management forms an important element for improving project performance and operating efficiency. This activity is typically broken into identification, assessment and evaluation, treatment, and communication phases. The review highlighted that a common tool for risk management at the project level is the "risk matrix", where risks are categorized and ranked according to their potential impact and their general probability of occurrence.

One significant observation from the literature review was the extent to which numerous studies had focused on identification of CSFs as an organizing mechanism for consideration of construction practices. Within the seven papers reviewed, there were several attempts made to synthesize the results of other studies and to establish a generalized set of CSFs as a common basis for further work in this area. The study performed by V. Hermano, et al. (Ref 18) compared the results from multiple sources to produce the set shown in the box below.

Synthesized CSFs Based on Literature Survey

- Project team characteristics – qualifications and motivation of implementing team
- Local environment – cultural and socio-political factors outside the project manager's direct control
- Implementation approach – ability to manage within an uncertain operating environment
- Learning opportunities – ability to transfer knowledge to beneficiaries
- Policy characteristics – alignment of project objectives with agency or country-level goals
- Availability of resources – ability to access resources that may often be in short supply
- Stakeholder acknowledgement/treatment – ability to work with and satisfy complex net of participants and beneficiaries

2. Construction Industry Institute (CII) best practices.

CII is a consortium of public/private owners, engineering and construction contractors, and suppliers with a mission to improve cost effectiveness of the capital projects – from pre-planning activities through project commissioning. Since 1995 the CII has operated a comprehensive program to track the performance of capital projects as they relate to project inputs and conditions. Although much of its research focus is on domestic projects, the results and recommended best practices are applicable to international development construction. Risk management is generally managed quite differently across project participants, and in many cases adversely. The CII industry group strongly recommends risk assessment be conducted at the "project level" and that multiple participants be engaged in the process. This does not alleviate or shift risk between groups, but it does improve an understanding as well as help identify risks early on. It improves communication between players and helps ensure a clear understanding of risk ownership and fleshes out potential mitigation actions between different players, which is often helpful in cases of dispute between parties. (IPRA – Page 2).

The following is a selection of documents and tools that are potentially applicable to USAID:

- **Front End Planning Process – Project Definition Rating Index (PDRI)**. The purpose of this process/tool (Ref 19) is to define planning functions and provide a process for both project owners and contractors for front-end project planning of capital projects. This tool integrates CII planning resources, such as the new "PDRI for Infrastructure Projects," information flows supporting the process, and "Project Condition Investigation Cards." Through detailed post-project evaluations, the tools have been shown to align proposed planning activities to results in reduced cost, schedule, and project performance. The hope is that this toolkit will promote consistency in planning in order to improve capital project effectiveness.
- **Integrated Project Risk Assessment (IPRA)**. The IPRA process was developed by the CII for international projects (Ref 20). The IPRA identifies and describes issues that are critical elements, often unique to an international project, and allow users to focus on risk factors typical to these projects. This tool is intended to support the evaluation of risk exposure and provide an indication of potential impact of risk during the project lifecycle. The IPRA provides a number of additional benefits including risk checklists, standard risk terminology for improved communication, tools for reconciling differences regarding risks, and a means for benchmarking projects. CII recognizes that due to cultural and, in particular, commercial practices and norms. This will help align diverse

construction teams with regard to risk ownership, which often becomes the point of dispute.

CII has identified the following actions to effectively implement risk analysis:

- **Begin Risk Assessment Early.** Initiate this process during the formative stages of a project when changes are less costly
- **Keep a broad perspective to get the diversified input required.** Include special expertise or subject matter experts from outside the project to get fresh insights and perspectives on risks. Include brainstorming or risk workshops guided by a person trained to conduct such sessions.
- **Undertake adequate pre-planning, analysis, and engineering**. CII emphasizes pre-project planning as one of the most significant phases and provides tools such as a Project Definition Rating Index to support decision making and project development.
- **Create a partnership between the Owner and contractor management**. Enhance the relationship between parties to promote effective overall project risk management.
- **Organize and formalize a risk management process**. Institute a systematic approach for identification, management, and reporting of risks on projects.
- **Recognize that certain projects are risk-prone**. Develop screening protocols; projects that have one or more of the following factors require a robust risk management process:
    - Substantial resources
    - Significant novelty
    - Long planning horizons
    - Large Size
    - Complexity
    - Multiple organizations
    - Significant political issues

- **CII Risk Tool** (Ref 21). CII has developed a risk management tool that supports three levels of risk identification and analysis, and provides a risk register template that can be easily deployed to help management teams manage and respond to risks throughout implementation. This tool was developed by a research team that interviewed 104 contractor and owner organizations worldwide, and identified likely impacts to the planning and execution of construction projects by using probabilistic management practices. The tool is intended to help managers: 1) better manage budgets and schedules, 2) enable risk managers to explicitly identify and communicate risks, 3) increase confidence in project decision-making, 4) improve internal collaboration and discussion with the project team and organization.

The tool uses three levels of risk analysis:

- **Level 1 – Risk Identification** – Provides a template to identify risks and opportunities
- **Level 2 – Deterministic Risk Analysis** – Provides a template to analyze risks through single point estimates of potential impacts
- **Level 3 – Probabilistic Risk Analysis** – Provides templates to analyze risks through probability distribution estimates of potential impacts

- **Constructability Implementation Guide.** Constructability is a sub-component of construction risk and helps to identify related risks that may be encountered during implementation, particularly by evaluating materials and construction methods that may pose issues, and by providing a venue for establishing alternative methods and technologies. This process is critical in international construction when designers are not necessarily aligned with local practices and methods. CII originally defined constructability as "the optimum use of construction knowledge and experience in planning, design, procurement, and field operations to achieve overall project objectives" (Ref 22). This definition further states that "maximum benefits occur when individuals with construction knowledge and experience become involved in the early stages of project development." Industry experience further indicates that continuous involvement in the early planning and design phases can generate significant improvements and payback in the key project objectives of reduced cost, shortened schedules, improved quality, security, safety, environmental impact, and enhanced management of risk. Specifically, the most significant cost impact potential occurs in the preliminary design stages. Considering all potential savings, CII has established that 75% of all savings are realized during the preliminary stages whereas only 10% of savings that can be achieved after the completion of the design. An effective constructability program on a project and a well-prepared set of construction documents can provide the following benefits to construction: fewer project change orders, improved designer/construction team coordination, simplified construction, reduced implementation risks, and improved procurement and materials delivery risks.

3. Engineering and Construction Risk Institute (ECRI) practices and procedures.

The ECRI, an initiative of the World Economic Forum, is an international risk management consulting forum that is focused exclusively on the risks associated with the engineering and construction industries. ECRI provides forums for the professional exchange of ideas on topics related to the management of risk in projects, and publishes papers on recommended best practices that overlap many areas common to international development construction. The following section describes a selection of documents that may be particularly applicable to USAID for creating structures or practices to reduce construction risk:

- **Risk Maturity Model.** This model serves as a "maturity" benchmark of an organization's risk management processes (Ref 23) based on the work of Dr. David Hillson, of Risk Doctor and Partners. Although developed for industry, this document is directly applicable to any organization that is engaged in the engineering and construction firm's risk management process (Ref 24). An organization can judge its practices against these benchmarks or practices. Candid organizational self-assessments established through standardized surveys can help organizations create appropriate action plans by applying new practices and training in risk management. The table below describes the different levels of organizational maturity as they relate to risk.

Exhibit 5
Maximum Risk Maturity Levels

Attribute:	Level 1 – Naïve (Innocent)	Level 2 – Novice (Competent)	Level 3 – Normalized (Proficient)	Level 4 – Natural (Expert)
Culture	• No risk awareness • Resistant to change • Tendency to continue with existing processes	• Risk process may be viewed as additional overhead with variable benefits • Risk management used only on selected projects	• Accepted policy for risk management • Benefits recognized and expected • Prepared to commit resources in order to reap gains	• Top-down commitment to risk management, with leadership by example • Proactive risk management encouraged and rewarded
Process	• No formal processes	• No generic formal processes, although some specific formal methods may be in use • Process effectiveness depends heavily on the skills of the in-house risk team and availability of external support	• Generic processes applied to most projects • Active allocation and management of risk budgets at all levels • Limited need for external support	• Risk management bases business processes • "Total-risk management" permeates entire business • Regular refreshing and updating of processes • Routine risk metrics with constant feedback for improvements
Experience	• No understanding of risk principles or language	• Limited to individuals who may have a little or no formal training	• In-house core of expertise, formally trained in basic skills • Development of specific processes and tools	• All staff risk-aware and using basic skills • Learning from experience as part of the process • Regular external training to enhance skills
Application	• No structured application • No dedicated resources • No risk tools	• Inconsistent application • Variable availability of staff • Ad-hoc collection of tools/methods	• Routine and consistent application to all projects • Committed resources • Integrated set of tools/methods	• Second-nature, applied to all activities • Risk-based reporting and decision-making • State-of-the-art tools and methods

Source: D.A. Hillson PhD., HVE Consulting, Risk Management Publications, 1997.

- **Risk Breakdown Structure.** ECRI's procedure ECRI – BP – 002 (Ref 25) provides a framework for establishing a Risk Breakdown Structure (RBS) and lists a hierarchy of possible project risks. The list is categorized by the potential source of the risk, and the risks contained in the RBS are, by definition, "uncertain events or conditions which, if they happen, will affect the project's objectives." The Level 2 risks illustrated are supplemented by a more detailed Level 3 breakdown tailored by the individual firm to their business methods and specific risk management process.

  According to Dr. David Hillson et al., the RBS has four principal uses:

  - **Risk identification aid** – The higher levels of the RBS are used as a "prompt list" to help risk management teams ensure complete identification of risks

- **Risk assessment** – Identified risks can be mapped into the RBS and categorized by source. This exposes the most significant sources of risk to the project and indicates areas of dependency or correlation between risks.
- **Comparison of alternatives** – Risks associated with competing activities that can be compared directly if the same RBS is used to structure their associated risks. This can also provide input to trade-off studies examining alternative development options or investment decisions.
- **Risk reporting** – Different project stakeholders need different levels of reporting, and the RBS can be used to roll up risk information to a higher level for senior management, as well as drill down into the detail required to report on project team actions.
- **Integration of lessons learned** – The RBS is used as an index to the organization's historical records of risks identified and managed.

- **ECRI – BP - 009 - A Structured Approach to Project Closeout.** This procedure defines the recommended approaches to documenting and sharing information which is available at the completion of a project that can have significant impacts on managing risks for future projects (Ref 26). A key step in the project screening and selection process for new projects is the consideration of completed projects of similar character and complexity. The best source of all of this information is a Project Close-Out Report and Summary of Lessons Learned from previous work. In this procedure, ECRI provides a framework and report template for what is considered to be an outline of Best Practice for Proposal and Project Close-Out/Lessons Learned reporting. Sections included:
  - Close-out Definition, Key Objectives, and Benefits
  - Close-out Process Steps
  - Close-out Timing
  - Close-out Report and Lessons Learned

4. FIDIC

The International Federation of Consulting Engineers (FIDIC) is an organization that has members in over 94 countries. Its primary members are national associations of consulting engineers. Founded in 1913, FIDIC is an organization that has spent many years developing methods of contracting including detailed clauses that create equitable contracts recognized worldwide. FIDIC has standard contract packages including the following types of construction:

- Red – Construction
- Yellow – Design Build
- Silver – EPC
- White – Sub-consultancy
- Green – Short form for smaller contracts

The most widely used and recognized book is the Red Book, used on the larger, complex infrastructure programs. The Green Book "short form" is a new book specifically for smaller, less complicated (ex. a dredging project) construction efforts under $500,000. Small, simple construction such as small buildings using local materials and contractors may be better suited to a general purchase order arrangement.

FIDIC is used directly or in adapted form by MCC and many of the development banks including World Bank, African and Asian Development banks, and the Council of Europe Development Bank as well as several agencies such as AUSAID, AFB France and JICA Japan. It has been used successfully by USAID for second tier construction contracts, most notably the Sri Lanka Tsunami Relief Program.

The following principle features of FIDIC contracts are noteworthy for USAID:

- Widely recognized as the most commonly used standard form in the global construction industry
- Widely used by development banks and agencies
- Known as a balanced risk approach, assigning risk to the party that can best assume and manage it
- Has been translated into multiple languages such as Arabic, Portuguese, and Spanish
- Training available worldwide
- Can be adapted to accommodate Federal regulations
- Detailed evaluation and qualification process
- Managed and updated as the industry changes
- Prescriptive process to manage the contract to successful completion
- Reduces claims and disputes through detailed requirements and management

5. Construction Insurance Industry

The international insurance industry has well-established mechanisms for monitoring and quantifying risk in all areas that it provides coverage for, including international development construction. Although many of the criteria it uses to quantify risk may be proprietary, the construction insurance industry offers a unique perspective relative to the factors that it considers during the application process, and provides useful input for the establishment of best practices.

Insurance companies and their underwriters are primarily concerned with the identification, assessment, and likelihood of any type of potential risk that, if it were to occur, would result in some type of total or partial 'loss'. Loss resulting in personal injury, damage to property, financial losses, direct or indirect to any or all stakeholders and, in many cases, the public at large (third party). In order for an insurance company to accurately accept and quote/price a construction activity for an insurable party (a project, owner, users, third party or otherwise), it will assess certain relevant elements related to insurability of construction projects across the industry. Each of the eight elements below ultimately assesses the type and likelihood of common construction risk factors in order to answer the following questions:

- How will loss prevention measures be planned in advance of the project, during project execution, and through its completion?
- What are the critical risk factors that drive the propensity for loss up or down?

The construction insurance industry therefore offers a unique perspective in construction project selection through its use of data analytics, actuarial modeling, and other specialized insurance risk tools and processes. This insurance perspective can be useful in assessing the viability, sustainability, and specific project risks in the realm of international development and in planning and execution.

Elements considered when assessing the insurability of a construction project include:

- **Pre-Construction Planning –** How rigorous will the construction plan, risk reviews, decision to go/no-go the project, and team/stakeholder planning be? Are risk tools or checklists specific to the work to be performed being applied and utilized for risk identification and mitigation? What is the contractor's past performance with respect to performance of similar work, health and safety, and loss?
- **Qualified Workforces –** What is the availability and sustainability of locally qualified workforces relative to goals, duration, and specifics of the construction project? This includes the critical leadership team from the contractor. Are there contingencies for senior leadership, workforce turnover, or incapacity?
- **Financial stability** – How financially stable and sustainable are the contractors on site? Can their balance sheets sustain a loss if one were to occur? What is their past financial performance? This includes the general contractors/management team and the critical path subcontractors. Subcontractor default is a leading challenge to finishing jobs on time and in budget.
- **Supply Chain –** Will the project be able to source, transport and replace required or damaged materials and components through the project lifecycle? The more complex a job (ex. water systems, power, manufacturing facilities), the more important it becomes to get critical elements on-site on-time and in-budget. Supply chain is a major issue with global construction firms and projects and many times the construction teams have little control over the material as it may have been specified by the design team for the job and may have very few suppliers.
- **Counter Party Dependent Projects –** What risks revolve around other projects in the particular geography and complementing jobs? Understand the risk factors of other jobs that need to be completed by others in order to facilitate the project to be insured, such as worker housing, road work, electric grids, etc.
- **Completeness of Design –** In recent years contractors have struggled with designs which are not fully complete by the time they bid and start work. In design build situation they have more control but in those cases where the owner separately procures design, there may be a risk that an incomplete design could cause delays, cost challenges, and change orders.
- **Schedule –** Is the schedule too aggressive or not taking into account obvious factors? When schedules are overly aggressive versus normal jobs of the same type contractors should build in contingencies to allow for accelerated work, additional shifts, and assessment of liquidated damages.
- **Political and Environmental Climate –** Current political conditions, unrest, military activity, etc. and local environmental conditions (e.g., typhoons, earthquakes, soil stability, landslides, etc.) typically result in further challenges to complete within schedule and budget.

E. SUMMARY OF CSFS AND CORRESPONDING BEST PRACTICES

The combined experiences of the international development community point to a number of common conclusions on the key factors affecting implementation of constructions projects, and best practices that may be used to maximize the chance for success. The terminology used to describe and categorize these factors often differs from one organization to the other, although there are continuing efforts within the industry to establish commonality. Drawing from these efforts, this section presents eleven success factors (CSFs), summarized in Exhibit 6 below, as a basis for identifying and comparing best practices. In each case, an illustrative range of corresponding risks and potential best practices for addressing them is suggested.

Exhibit 6
Summary of Critical Success Factors (CSFs) for Construction Projects

Critical Success Factors	Description
1. Project screening and selection process	Realistic assessment and approval based on sound technical information
2. Stakeholder engagement	Active participation and support of individuals and organizations required for successful implementation and ownership of construction projects
3. Procurement procedures, contract types and approaches	Effective and locally appropriate contract mechanisms that are consistent, balanced, enforceable and well understood by the local construction industry
4. Institutional capabilities to operate and maintain investments	Engagement of competent organizations with responsibility and capability to effectively manage, operate, and maintain completed construction project.
5. Health, safety, environmental and social requirements (HSES)	Ability to address and assure compliance with applicable health, safety, environmental, and social requirements.
6. Appropriate design standards and technology	Technical capability to develop project designs in accordance with all applicable standards, using locally appropriate technologies
7. Quality of cost estimating and scheduling	Ability to establish realistic budgets and schedules within established levels of accuracy, while accounting for potential contingencies and risks
8. Appropriate levels of contractor qualifications	Determination and assurance of required contractor capabilities for successful completion of work within established quality requirements
9. Risk management methodology	Incorporation of consistent and systematic approach for identification, assessment and mitigation of potential risks
10. Construction oversight and quality verification	Assurance of successful execution and completion of construction in accordance with established requirements and standards
11. Monitoring & evaluation process	Established process for assessment of results and the ability of completed projects to achieve project objectives

It is important to recognize that applicability of best practices presented here is very dependent on the type and size of the project being considered. The categories of USAID construction projects described in Section B represent a very broad range of characteristics for which construction practices and approaches should be tailored. Some of the best practices considered in this section may be more applicable to one particular size/category or another, although many practices are scalable and can be adjusted to fit. Within the international development community, most attention in the past has been paid to the larger, stand-alone infrastructure projects. Consequently, there are many lessons learned, and well-developed best practices and guidelines available. There is a more significant challenge for smaller projects, or those for which construction is incidental (USAID construction categories 3 and 4). Best practices for these types of projects are not as clearly defined or may have to be derived from others.

One source of guidance and best practices of particular relevance is the following set of nine engineering and construction primers produced by USAID in 2010-2011 (Refs 27 to 37):

- Basic Engineering and Construction Primer
- Engineering of Infrastructure Primer for Development Primer
- Construction Tendering
- Basic Engineering Construction Oversight Principles for Development Professionals
- Basic Host Country Construction Contracting for Development Professionals
- FARA Procurement and Implementation Guidelines
- Basic Principles for Health Infrastructure
- Building Back Housing in Post-Disaster Situations – Basic Engineering Principles for Development Professionals
- Introduction to Irrigation Project Design
- Seismic Retrofit of Housing in Post-Disaster Situations – Basic Engineering Principles for Development Professionals – A Primer (Draft)
- Site and Retaining Wall Hazard Mitigation in Post-Disaster Situations – A Primer (Draft)

This section presents a summary of the eleven CSFs, with an introduction of risks and best practices that are most applicable to USAID's construction portfolios. In each case, key risks and industry best practices are presented in tabular form and correlated to the six USAID construction categories. Degree of risk or applicability is indicated and color coded into four levels as defined in Exhibit 7 below:

Exhibit 7
Significance of Risk and Best Practice Assessments

Assessment		Risk Significance	Best Practice Significance
L	Low	Combination of low impact and probability	Existing practices requiring little or no improvement
M	Medium	Increased levels of probability or impact	Practices from which moderate and measurable improvements could be achieved
H	High	Combination of high probability and/or impact	Practices from which significant improvements could be achieved
C	Critical	Combination of high probability and/or impact leading to probable and significant failure	Practices from which essential improvements could be achieved.

1. Project Screening and Selection Process

Selecting the right project and determining whether or not to proceed with that project is a CSF that is common to almost all development banks and both public and private infrastructure investors. In many cases, however, the project screening process may not adequately consider aspects of the project and key risks that are specifically related to construction. Having a good appreciation of construction risks will greatly enhance the process, enabling better project definition and improved outcomes.

Where program objectives are clearly defined, and where there is ample resource and time, institutional screening processes can be very detailed and structured, as in the case of World Bank loans and MCC compacts. These are similar in many respects to USAID stand-alone infrastructure projects in conventional mission settings (project Category 2) where considerable effort is often expended in engineering project development. In other cases, such as post-disaster or emergency response projects (such as in Category 3), there is much less opportunity for extensive pre-project evaluation, so projects must be defined in an accelerated manner.

Exhibit 8 presents a summary of key risks and impacts that may be associated with CSF No. 1, together with an assessment of the potential applicability to the six USAID construction categories.

Exhibit 8

Common Risks: CSF No. 1- Project Screening and Selection Process

	Impact Types					Risk by Const Category						
Key Risks	**Cost**	**Schedule**	**Sustainability**	**Quality**	**Compliance**	**1 Stand-Alone**	**Stand-Alone**	**3 FFP/OFDA/**	**4 Incidental**	**Signif Const**	**Govt to**	**Scalability/Applicability**
Lack of clear, achievable objectives leading to poor alignment of stakeholders and conflicts	X	X	X	X	X	M	H	M	H	H	C	Applicable to all categories, but particularly important where implementation responsibilities are shared by USAID and host country organization
Lack of full ownership and commitment by host country			X	X		M	H	M	H	H	H	Particularly important where implementation responsibility by host country organization is required
Project implementation requirements beyond local capabilities		X	X	X		M	M	M	H	H	H	Larger stand-alone projects may have ability to draw on international resources, while smaller projects are more reliant on local capabilities
Unforeseen adverse environmental or social impacts become apparent at subsequent project stages				X	X	M	H	M	H	H	H	Impacts may be applicable to all categories and project sizes, although exemptions may be applied for conflict and emergency response

Exhibit 9, below, is a summary of industry best practices associated with CSF No. 1, together with an assessment of potential applicability by USAID construction category. Useful resources for implementing best practices, and examples from other international development organizations are suggested where applicable.

Exhibit 9
Industry Best Practices: CSF No. 1 - Project Screening and Selection Process –

Industry Best Practices	Applicability by Const Category						Resources and Examples
	1 Stand-Alone	2 Stand-Alone	FFP/OFDA/	Incidental	5 Signif Const	Govt to	
Structured process using defined criteria to establish feasibility and buy-in	H	C	H	C	C	C	MCC Compact Development Guidance (Chapter 6 – Consultation) is particularly applicable to infrastructure projects with high level of host country involvement
Establishment of project management organizational unit at project definition stage to take implementation responsibility	M	H	L	L	M	H	PMU model followed by MCC and World Bank are particularly applicable for stand-alone infrastructure projects
Threshold criteria establishing appropriate implementation mechanisms, contract amounts & risk levels	H	H	H	C	C	H	World Bank country-specific thresholds provide applicable examples and benchmarks
Initiate environmental and social assessment using locally appropriate standards at project definition stage	M	H	M	H	H	H	Assessments commonly squeezed when implementation schedules are compressed. Exemptions may apply for emergency response.

2. Stakeholder Engagement

Construction projects can typically affect a large number of stakeholders in many different ways. With USAID's increasing emphasis on transparency and inclusion, these stakeholders, including users, neighbors, and government officials can have significant impacts on the project execution resulting in delays, additional costs, and reduced project value. A recent publication by PMI (Ref 38) reports that 55 percent of project managers agree that effective communications to all stakeholders is the most critical success factor in project management. PMI goes on to report that for every US$1 billion spent on projects, US$135 million is at risk, and a startling 56 percent of that amount — US$75 million — is at risk due to ineffective communications.

Stakeholders can include those who should rightfully benefit in some way from the completed project and those who will be affected by it. It is important that this full range of interests be accounted for through a well-planned program of engagement. The IFC Performance Standard 1 (Ref 8) provides an effective framework for this effort that, with many best practices overlapping those that are already common to USAID. The practices highlighted in the table below are fundamental steps for good stakeholder engagement.

Exhibit 10 presents a summary of key risks and impacts that may be associated with CSF No. 2, together with an assessment of the potential applicability to the six USAID construction categories.

Exhibit 10
Common Risks: CSF No. 2- Project Screening and Selection Process

Key Risks	Impact Types					Risk by Const Category						Scalability/Applicability
	Cost	Schedule	Sustainability	Quality	Compliance	1 Stand-Alone	2 Stand-Alone Conventional	3 FFP/OFDA/ OTI	4 Incidental Non-Infra	Signif Const	Govt to	
Progress delayed by withheld approvals or opposition of key stakeholders	X	X			X	M	H	L	M	H	M	Applicable to all categories, but more significant for larger, more visible projects
Communities not engaged in program development and project does not conform to community needs				X	X	H	H	H	H	H	M	Applicable to all categories, including emergency response where quick action is required
Communities and users not supportive of project outcomes			X		X	H	H	H	H	H	M	Applicable to all categories
Project conflicts with other planned projects and programs	X	X		X		H	H	H	H	H	M	Applicable to all categories

Exhibit 11 is a summary of industry best practices associated with CSF No. 2, together with an assessment of potential applicability by USAID construction category. Useful resources for implementing best practices, and examples from other international development organizations are suggested where applicable.

Exhibit 11
Industry Best Practices: CSF No. 2 – Stakeholder Engagement

Industry Best Practices	Applicability by Const Category						Resources and Examples
	Stand-Alone	2 Stand-Alone	FFP/OFDA/	4 Incidental	5 Signif Const	Govt to	
• Stakeholder analysis and planning • Disclosure and dissemination of information • Consultation and participation • Grievance mechanisms • Ongoing reporting	M	H	M	M	H	H	• World Bank IFC Performance Standard 1 provides a useful framework that has been commonly adopted in the international development community. • Opportunity for comprehensive stakeholder engagement is commonly constrained in emergency response.

3. Procurement Procedures, Contract Types & Approaches

One of the bigger challenges for international development construction in the past has been the establishment of effective procurement and contracting approaches that are consistent, well understood by the construction industry, and enforceable under a wide range of conditions. In locations where the construction industry is not well-developed, it is particularly important that the procurement and contracting approach be:

- Specifically tailored to the type and scale of construction required
- Oriented to the target contractors, be they local or international
- Clear, consistent and enforceable
- Supported by appropriate training and professional resources

The process of procurement harmonization, led by the World Bank starting in 1999, has been a major step forward to elevate the capabilities and consistency of construction practice in many parts of the world. The harmonized process, based on the FIDIC Conditions of Contract for Construction, provides an adaptable set of standard documents for different contract types, from conventional design-bid-build construction (Red Book) to design-build (Yellow Book). The short form documents provided in the Green Book may be particularly useful for addressing the needs of smaller construction projects in more remote locations. Although the documents themselves may not be directly usable by USAID in many instances the resources and lessons learned of the harmonized approach may be very useful.

Exhibit 12 presents a summary of key risks and impacts that may be associated with CSF No. 3, together with an assessment of the potential applicability to the six USAID construction categories.

Exhibit 12
Common Risks: CSF No. 3 – Procurement Procedures, Contract Types & Types

	Impact Types					Risk by Const Category						
Key Risks	Cost	Schedule	Sustainability	Quality	Compliance	1 Stand-Alone	Stand-Alone	3 FFP/OFDA/	4 Incidental	Signif Const	Govt to	Scalability/Applicability
Inappropriate or unfamiliar procurement process and contract documents leading to poor procurement response	X			X		H	H	H	H	H	M	Harmonization of FIDIC-based contract documents has resulted in a more common language for procurements in many areas of the world
Unbalanced risk shifting in contract documents leading to higher bid prices and increased potential for claims	X			X		H	H	M	H	H	C	Locally developed contracts with strong orientation to owners' interests are common cause of unethical business practices
Complex requirements beyond local capabilities leading to poor performance		X		X	X	H	H	M	H	H	H	Particularly applicable with smaller procurements and those aimed at local contractors
Poorly developed or incomplete contract documents	X	X		X	X	H	H	H	C	C	H	Common with contracts documents not developed specifically for construction

Exhibit 13 is a summary of industry best practices associated with CSF No. 3, together with an assessment of potential applicability by USAID construction category. Useful resources for implementing best practices, and examples from other international development organizations are suggested where applicable.

Exhibit 13
Industry Best Practices: CSF No. 3 - Procurement Procedures, Contract Types & Types

Industry Best Practices	Applicability by Const Category						Resources and Examples
	Stand-Alone	2 Stand-Alone	FFP/OFDA/	4 Incidental	5 Signif Const	6 Govt to	
Selection of standard, scalable contract mechanisms aimed at target bidder group.	H	H	M	C	C	H	• Harmonized FIDIC-based contract documents range of contract options • Consider FIDIC Green Book to access international standards for smaller contracts
Introduction of internationally developed documents based on balanced treatment of all parties	H	H	M	H	H	C	• As an organization, FIDIC strongly emphasizes and reviews appropriate owner/contractor balance • Construction-oriented contracts based on FAR 36 can provide effective balance
Program management approach with qualified international prime and locally-based subcontracts for construction	C	H	C	H	H	M	Two-tiered approach used effectively by USAID in many situations; examples include Sri Lanka and Balkans
Conduct pre-procurement outreach for training and familiarization.	H	C	H	H	H	M	Approach commonly used by USAID and other organizations for larger programs

4. Institutional Capabilities to Operate and Maintain Investments

Over the years, failures of infrastructure projects due to inadequate operation and maintenance capabilities became an all too common occurrence in the international development community. USAID developed its own effective approach to addressing this challenge through its experiences in the water sector of Egypt. Infrastructure projects of the early 1980s added O&M support components following construction and start-up of initial facilities by the end of that decade. These efforts then evolved to institutional strengthening projects by the early to mid-90s, and then later broad-scale sector reform projects. The end result has been positive, providing a good appreciation for the important linkage between construction and capacity development.

Within the international development community, practices related to confirming, establishing and reinforcing the institutional capabilities of the host country agency have become common requirements for almost all infrastructure projects. These practices can incorporate a number of elements:

- Establishing “good governance” thresholds for project selection
- Tailoring project scope and design to reflect institutional capacity of host organization
- Ensuring long-term sustainability of the project through emphasis on operational and management capabilities

Exhibit 14 presents a summary of key risks and impacts that may be associated with CSF No. 4, together with an assessment of the potential applicability to the six USAID construction categories.

Exhibit 14
Common Risks: CSF No. 4 – Institutional Capabilities to Operate and Maintain Investments

Key Risks	Impact Types					Risk by Const Category						Scalability/Applicability
	Cost	Schedule	Sustainability	Quality	Compliance	1 Stand-Alone	Stand-Alone	3 FFP/OFDA/	4 Incidental	Signif Const	Govt to	
Complex management and operational requirements beyond local capabilities			X	X		H	H	M	L	M	H	Most applicable to larger, more complex projects
Political interference within host country management organization	X	X	X			M	H	M	H	H	C	Most applicable for government to government, and those projects with high degree of host country involvement
Lack of qualified staff at management and operational levels			X			H	H	M	M	M	H	Applicable to all categories of construction
Insufficient funding for long-term operation and maintenance			X			H	C	L	H	H	H	Applicable to all categories of construction
Inadequate ancillary infrastructure required for proper operations						H	H	L	M	M	H	Applicable to all categories of construction

Exhibit 15 is a summary of industry best practices associated with CSF No. 4, together with an assessment of potential applicability by USAID construction category. Useful resources for implementing best practices, and examples from other international development organizations are suggested where applicable.

Exhibit 15
Industry Best Practices: CSF No. 4 – Institutional Capabilities to Operate and Maintain Investments

Industry Best Practices	Applicability by Const Category						Resources and Examples
	1 Stand-Alone	2 Stand-Alone	3 FFP/OFDA/	4 Incidental	5 Signif Const	6 Govt to	
Feasibility assessment to address verification of: • Technology vs. O&M requirements and approach • Governance structure • Infrastructure requirements	M	H	M	M	M	H	Numerous good USAID examples, including Columbia Community Engagement and Pakistan G2G
Assessment and development of staff capabilities: • Identification of staffing requirements and qualifications • Capacity development in conjunction with project	M	H	L	M	M	H	Numerous good USAID examples
Preparation of financial assessment and plan at project feasibility stage Host country commitments as conditions for funding	M	H	L	M	M	H	Numerous good USAID examples

5. Health, Safety, Environmental and Social Requirements (HSES)

Consideration of environmental and social factors and compliance with applicable health and safety standards has become a standard requirement for essentially all international development projects, including those of USAID. However, the gap between required standards and local practice is often so great that local construction contractors are unable or unwilling to comply. This can result in a significant risk to USAID because while noncompliance of local contractors may go unnoticed, the impacts of major HSES incidents are often highly visible and attributed disproportionately to the international entities involved.

To be effective, HSES requirements must be balanced, locally appropriate, and well understood by all of the parties involved. The following are key factors to be considered:

- Minimum or threshold requirements for applicability (both U.S. Federal and local)
- Risks of non-compliance and H&S failures
- Approaches for introduction of new standards and cultural change

It is difficult to introduce and implement new requirements and approaches with individual projects, particularly when those projects are relatively small. This is one area of construction practice where it may be especially useful for USAID to join with other international donors to take advantage of the development work and training that has already been done. The Environmental, Health and Safety (EHS) Guidelines developed by IFC have now been widely adopted and may provide resources and a model for consideration.

Exhibit 16 presents a summary of key risks and impacts that may be associated with CSF No. 5, together with an assessment of the potential applicability to the six USAID construction categories.

Exhibit 16
Common Risks: CSF No. 5 – Health, Safety, Environmental and Social Requirements (HSES)

	Impact Types					Risk by Const Category						
Key Risks	**Cost**	**Schedule**	**Sustainability**	**Quality**	**Compliance**	**1 Stand-Alone**	**2 Stand-Alone Conventional**	**3 FFP/OFDA/ OTI**	**4 Incidental Non-Infra**	**Signif Const**	**Govt to**	**Scalability/Applicability**
Major HSE incident (loss of life, injury, property loss or degradation) due to inability of local contractor to meet US or international standards	X				X	H	H	H	H	H	H	Applicable to all construction categories and project sizes

Exhibit 17 is a summary of industry best practices associated with CSF No. 5, together with an assessment of potential applicability by USAID construction category. Useful resources for implementing best practices, and examples from other international development organizations are suggested where applicable.

Exhibit 17
Industry Best Practices: CSF No. 5 – Health, Safety, Environmental & Social Requirements (HSES)

	Applicability by Const Category						
Industry Best Practices	**Stand-Alone Conflict**	**2 Stand-Alone**	**FFP/OFDA/ OTI**	**4 Incidental**	**5 Signif Const**	**Govt to**	**Resources and Examples**
Adoption of appropriate standards for local conditions	H	H	H	H	H	H	• EHS Guidelines by IFC provide well recognized model with general and industry-specific examples of Good International Industry Practice (GIIP) • Current HSES practice at MCC provides good example for introduction of IFC standards in new countries
Establishment of site-specific targets with an appropriate timetable for achieving them	M	H	M	H	H	H	
Development of local capabilities through training	M	H	M	M	H	H	
Requirements for HSES plan development, monitoring and reporting	H	H	M	H	H	H	

6. Appropriate Design Standards and Technology

Engineering design is an essential step in the construction process that is required to ensure that expected levels of quality and performance can be achieved economically and safely. The challenge in international development is determining the appropriate level of technology and complexity to achieve these requirements with locally available resources and capabilities. Effective designs do not need to be overly detailed or complex; however, construction industry studies by CII (Ref 19) have demonstrated that greater levels of definition at the beginning of the process consistently result in increased levels of project success measured in terms of cost, schedule, and change order percentages.

Common practice in the international development arena has typically required that designs be based upon a combination of local and international standards to ensure effective outcomes, long-term sustainability and safeguarding of health, safety, and the environment. In many cases where local standards are not sufficiently developed, it is necessary to rely to a greater extent on US or international resources to meet project needs and reduce project risks to an acceptable level. On the other hand, an over-reliance on international standards and practices can create new risks if things such as the availability of local labor, materials, and O&M resources are not sufficiently accounted for. For example, standards for a road construction should generally consider locally-appropriate labor-based construction methods, local materials, and concrete standards and inspection/oversight requirements that account for site-mixed concrete and environmental conditions. Similarly, designs should consider operations requirements and long-term asset costs. Examples include water treatment systems that can be easily operated and maintained and electrical systems that account for poor electrical networks. These issues can be addressed through recognized industry practices such as feasibility studies that include total life-cycle cost analysis of alternatives, constructability reviews, and value engineering reviews.

Exhibit 18 presents a summary of key risks and impacts that may be associated with CSF No. 6, together with an assessment of the potential applicability to the six USAID construction categories.

Exhibit 18

Common Risks: CSF No. 6 – Appropriate Design Standards and Technology

Key Risks	Impact Types					Risk by Const Category						Scalability/Applicability
	Cost	Schedule	Sustainability	Quality	Compliance	1 Stand-Alone	Stand-Alone	3 FFP/OFDA/	4 Incidental	Signif Const	Govt to	
Inadequate level of design to support effective procurement or construction	X	X		X		H	H	M	H	H	H	Applicable to all construction categories; level of design requirement is scalable to project size and complexity
Designs prepared by unqualified personnel unable to meet project objectives or requirements				X	X	H	H	M	H	H	H	Applicable to all construction categories; level of qualification required for design is scalable to project size and complexity
Complex requirements and designs beyond local capability to appropriately implement. Designs that include practices or materials not understood or readily available			X	X	X	H	H	M	M	M	M	Applicable to all construction categories; degree of impact is scalable
Lack of design standards, leading to poor quality, ad hoc construction				X	X	H	H	H	H	H	H	Applicable to all construction categories; design standards may be particularly important to smaller projects where specialized design resources are less available
Designs not accounting for operational cost (finance and materials) and/or capacity of workforce			X			H	H	M	M	H	H	Applicable to all construction categories and project sizes

Exhibit 19 is a summary of industry best practices associated with CSF No. 6, together with an assessment of potential applicability by USAID construction category. Useful resources for implementing best practices, and examples from other international development organizations are suggested where applicable.

Exhibit 19
Industry Best Practices: CSF No. 6 – Appropriate Design Standards and Technology

Industry Best Practices	Applicability by Const Category						Resources and Examples
	Stand-Alone	2 Stand-Alone	FFP/OFDA/	4 Incidental	5 Signif Const	6 Govt to	
Establish minimum design requirements based on project size and complexity	H	H	H	C	C	H	USAID primers on engineering and construction provide useful discussion of considerations affecting minimum design requirements (Refs 27 to 37)
Qualifications of design personnel • Establish qualification criteria, including education, legal basis for practice, and project experience • Provide capacity development of design functions • Engage independent engineering review	H	H	H	C	C	H	• USAID publication *Engineering of Infrastructure Projects for Development Professionals: A Primer* (Ref 28) provides useful guidance • MCC Independent Engineer model augments capabilities of locally procured design staff with qualified review and oversight
Design standards • Develop local standards contextualized to budget, norms, and standards • Basis of design and design criteria based upon local practices • Constructability reviews with local expertise • Utilize reach-back resources for specialized technical issues • Standardized designs for small, frequently built project components	H	H	H	H	H	H	• USAID primers on engineering and construction provide useful discussion of considerations affecting design standards • Guidance on "local and appropriate" technology should be oriented to intended function, and should not be interpreted as "simplistic" • USACE technical design guidance and standards are available at USACE Publications • USACE reach-back support is available at UROC
Operations/maintenance considerations: • Ensure operations/maintenance included as set of design criteria • Total life-cycle analysis of alternatives	H	H	L	M	M	H	USAID primers on engineering and construction provide applicable guidance on O&M considerations

7. Quality of Cost Estimating and Scheduling

Effective cost estimating and scheduling is an essential requirement for successful management of engineering and construction, both at the project definition phase and for monitoring of progress during implementation. This is a particularly important function with international development projects because of the greater number of unknowns and uncertainties that are typically encountered.

Given that funding is always limited, effective cost estimating, including cost escalation planning and control, is critical to the procurement process. The starting point for effective cost and schedule management is a realistic government estimate to establish a realistic baseline for budgeting and due diligence assessment of financial proposals. Additionally, government auditors have recognized the need to establish realistic project durations to improve cost performance and limit change requirements (Ref 39). GAO has developed the "GAO Cost Estimating and Assessment Guide" that provides a tool for government agencies to estimate and plan for capital projects (Ref 39). This process is based upon estimating practices created by the Society of Cost Estimating and Analysis (SCEA) and earned value practices.

Effective determination of construction schedules is also critically important to construction management to ensure that the completed meets intended use requirements, while also providing an enforceable benchmark for monitoring of contractor performance. GAO has developed a parallel guidance document, "GAO Schedule Assessment Guide" (Ref 40), which introduces nine recommended best practices for scheduling requirements.

During the implementation phase, effective cost and schedule monitoring is an essential requirement for progress monitoring and risk management, particularly of larger, longer-duration projects. The most widely accepted approach for accomplishing this is the "earned value management" (EVM) technique, which combines scope, schedule, and cost into an integrated set of measurements. The technique relies on valuations of work performed at given points of time relative to budgeted costs of work scheduled. From these measurements, the technique produces a variety of performance indexes that can be used to forecast performance and highlight areas of risk. Fully developed EVM requires qualified analytical staff to validate and interpret the data, and is therefore most applicable to larger, more complex projects. Nevertheless, the basic concepts of EVM are scalable and can be adapted to effectively monitor projects of all sizes. The "GAO Cost Estimating and Assessment Guide" (Ref 39) provides a good introduction to the concept and how it may be applied to USG programs.

Exhibit 20 presents a summary of key risks and impacts that may be associated with CSF No. 7, together with an assessment of the potential applicability to the six USAID construction categories.

Exhibit 20

Common Risks: CSF No. 6 – Quality of Cost Estimating and Scheduling

Key Risks	Impact Types					Risk by Const Category						Scalability/Applicability
	Cost	Schedule	Sustainability	Quality	Compliance	1 Stand-Alone	Stand-Alone	3 FFP/OFDA/	4 Incidental	Signif Const	Govt to	
Unrealistic or unreliable cost estimate resulting in unanticipated costs and inability to meet project objectives	X	X		X		H	H	H	H	H	H	
Costs and project risks impacted by unrealistic schedule	X	X		X		H	H	H	M	H	M	Impact of inadequate budget is applicable to all categories, although estimating approaches are scalable
Construction contractor is unable to perform as required, leading to cost, schedule and quality problems	X	X		X		H	H	H	M	H	M	

Exhibit 21 is a summary of industry best practices associated with CSF No. 7, together with an assessment of potential applicability by USAID construction category. Useful resources for implementing best practices, and examples from other international development organizations are suggested where applicable.

Exhibit 21

Industry Best Practices: CSF No. 7 – Quality of Cost Estimating and Scheduling

Industry Best Practices	Applicability by Const Category						Resources and Examples
	1 Stand-Alone Conflict	2 Stand-Alone Conventional	3 FFP/OFDA/ OTI	4 Incidental Non-Infra	5 Signif Const Non-Infra	6 Govt to Govt	
Prepare detailed Government estimate to verify costs at project design phase	H	H	H	H	H	M	• GAO Cost Estimating and Assessment Guide (Ref 39) provides comprehensive framework for establishment of scalable requirements • USACE programmatic cost practices and estimating database provide methodology and data for country-specific estimates
Provide allowance of construction contingency based on realistic assessment of overall project risk	H	H	H	H	H	H	• Standardized contingencies are common for most implementing organizations. Other Federal agencies, such as EPA, require 10% contingency for construction • GAO Guide provides useful risk-based approach for determination of contingency funding
Review project requirements and establish realistic schedule	H	H	H	M	M	M	• Accurate scheduling is more critical requirement for longer-duration projects, and those with multiple dependencies • GAO Schedule Assessment Guide (Ref 40) provides guidance for 9 recommended best practices
Incorporate Earned Value Management (EVM) in construction oversight	M	M	M	L	L	L	• EVM approach is more applicable for larger, longer-duration projects • Simplified EVM estimation techniques for smaller projects may be applicable for program summaries. USAID Egypt WPRR provides useful example • GAO Guide provides good introduction

8. Appropriate Levels of Contractor Qualifications

Contractor qualification relates to both design and construction. Qualification requirements should be based upon proposed project size and complexity of the program (i.e., careful not to make the requirements so tight as to limit competition).

Exhibit 22 presents a summary of key risks and impacts that may be associated with CSF No. 8, together with an assessment of the potential applicability to the six USAID construction categories.

Exhibit 22
Common Risks: CSF No. 8 – Appropriate Levels of Contractor Qualifications

Key Risks	Impact Types					Risk by Const Category						Scalability/Applicability
	Cost	Schedule	Sustainability	Quality	Compliance	Stand-Alone	2 Stand-Alone	3 FFP/OFDA/	4 Incidental	5 Signif Const	Govt to	
Insufficient procurement criteria, leading to acceptance of technically or financially unqualified contractors	X	X		X		H	H	H	H	H	H	Applicable to all construction categories, although criteria should be scalable to project size
Project requirements exceed capabilities of available local contractors	X	X		X		M	H	M	M	H	H	Most applicable to larger, more complex projects
Limited access to working capital financing and project guaranties leads to contractor inability to manage project cash flow and failure to complete	X	X		X		M	H	M	M	H	H	Most applicable to larger, more complex projects

Exhibit 23 is a summary of industry best practices associated with CSF No. 8, together with an assessment of potential applicability by USAID construction category. Useful resources for implementing best practices, and examples from other international development organizations are suggested where applicable.

Exhibit 23
Industry Best Practices: CSF No. 8 – Appropriate Levels of Contractor Qualifications

Industry Best Practices	Applicability by Const Category						Resources and Examples
	Stand-Alone	2 Stand-Alone	FFP/OFDA/	4 Incidental	5 Signif Const	Govt to	
Establish general qualification thresholds based on size, complexity, and local risk factors	H	H	M	M	H	H	Harmonized FIDIC-based procurement guidelines (including World Bank and MCC) provide useful example of contractor qualification process in international development setting
Conduct pre-market studies. Using a threshold matrix to determine procurement requirements. Provide for international or regional participation, with local capacity development	H	H	M	M	M	H	
Verify contractor financial capacity. Conduct market studies to verify construction financing options and pull bonds	H	H	M	M	M	H	

9. Risk Management Methodology

All of the principal engineering and construction industry organizations noted in this document, including PMI, FIDIC, CII and ECRI, have placed a strong emphasis on risk management as an essential project management technique. Collectively these organizations have demonstrated the benefits of following a methodical process of risk identification, assessment and mitigation to lessen the impacts of events that are a natural part of construction. These processes have been adopted as standard practice and used extensively by many international development organizations, including MCC and the World Bank. The most important requirement is a mindset of the project team that enables it to address potential risks early in the process, when it is more cost-effective to do so.

There are a wide range of processes and tools that may be adapted all sizes and types of projects that may be undertaken by USAID. The CII Risk Tool "What's the Risk?" (Ref 21) provides a useful framework for determining the appropriate level risk management to be adopted in each case.

Exhibit 24 presents a summary of key risks and impacts that may be associated with CSF No. 9, together with an assessment of the potential applicability to the six USAID construction categories.

Exhibit 24
Common Risks: CSF No. 9 – Risk Management Methodology

Key Risks	Impact Types					Risk by Const Category						Scalability/Applicability
	Cost	Schedule	Sustainability	Quality	Compliance	Stand-Alone	2 Stand-Alone	3 FFP/OFDA/	4 Incidental	5 Signif Const	Govt to	
Project risks are not adequately accounted for leading poor execution and unanticipated changes	X	X		X		H	H	H	H	H	H	Applicable to all construction categories and project sizes
Cost impacts • Insufficient funds to cover potential risk contingencies effecting project outcomes. • Adequate contingencies are not provided, leading to budget shortfalls and delays.	X	X		X		H	H	H	H	H	H	Applicable to all construction categories and project sizes
Risks triggers are not identified by field staff leading to failure to enact planned mitigation measures.	X	X	X	X	X	H	H	H	H	H	H	Applicable to all construction categories and project sizes

Exhibit 25 is a summary of industry best practices associated with CSF No. 9, together with an assessment of potential applicability by USAID construction category. Useful resources for implementing best practices, and examples from other international development organizations are suggested where applicable.

Exhibit 25
Industry Best Practices: CSF No. 9 – Risk Management Methodology

	Applicability by Const Category						
Industry Best Practices	**Stand-Alone**	**Stand-Alone 2**	**FFP/OFDA/**	**Incidental 4**	**Signif Const 5**	**Govt to**	**Resources and Examples**
Risk management tools • Conduct detailed project risk register during development phase to account for potential concerns • Formal Risk Review process • Establish scalable requirements based on size and complexity to establish levels of engagement	H	H	H	H	H	H	• Risk management guidelines and tools of CII and ECRI are a primary source • Standard tools and processes have been commonly adopted into practice by other international development organizations, including MCC and World Bank
Management of impacts • Develop budgets that account for potential project issues, conducting financial capacity due diligence prior to award • Manage contingency based on quantitative risk assessment through project life	H	H	H	H	H	H	*GAO Cost Estimating and Assessment Guide* provides useful guidance on risk management and contingencies
Risk management process and communication • Owner required risk workshop during project start-up • Risk management plan review with project staff • Ensure regular updates and risk reviews to implement mitigation measures	H	H	H	H	H	H	• Risk management guidelines and tools of CII and ECRI are a primary source • Standard tools and processes have been commonly adopted into practice by other international development organizations, including MCC and World Bank

10. Construction Oversight and Quality Verification

To promote competitive pricing, construction is typically procured through sealed bidding, which has created a tension between owners and contractors who are in a position of trying to maintain profitability, sometimes at the expense of quality or safe outputs. As a consequence, construction supervision has been part of the construction process since the end of the 19th century and has typically been undertaken by the engineer or architect of record.

Over the past 50 years quality oversight approaches have evolved to include more defined practices and procedures as well as the evolution of professional construction management services (Ref 38). USACE is a good example of an organization with a construction oversight approach oriented around quality planning. USACE has developed a set of quality control procedures that require its contractors to incorporate a three-phase inspection process, recognizing that quality practices start at the preparatory phase of a construction activity. They also provide training certification programs for contractor staff to ensure compliance with their quality methodology, and have developed an on-line tool, the Resident Management System (RMS), to integrate its inspection process into appropriate contract controls.

Determining how construction oversight will be provided, and by whom, is an important aspect of the implementation plan that should be addressed for each individual project. FIDIC contracts are oriented around independent engineering oversight of construction works, and clarify how that function is performed. The European EN 1990 Standard specifies varying levels of controls of inspectors (Inspection Levels or IL) based on consequence classes:

- **IL3 – Third party inspection**. Required for Consequence Class 3, where there is high consequence for loss of life, or high consequences for economic, social or environmental impacts. Examples include public buildings where gatherings take place.
- **IL2 – Normal inspection in accordance with the procedures of the organization**. Required for Consequence Class 2, where there is medium consequence for loss of life or for medium economic, social or environmental impacts. Examples include office buildings.
- **IL1 – Self-inspection**. Permitted for Consequence Class 1, where there is low consequence of for loss of life or for negligible economic, social or environmental impacts. Examples include agricultural or storage buildings where people do not normally enter.

Exhibit 26 presents a summary of key risks and impacts that may be associated with CSF No. 10, together with an assessment of the potential applicability to the six USAID construction categories.

Exhibit 26

Common Risks: CSF No. 10 – Construction Oversight and Quality Verification

	Impact Types					Risk by Const Category						
Key Risks	**Cost**	**Schedule**	**Sustainability**	**Quality**	**Compliance**	**Stand-Alone**	**Stand-Alone**	**3 FFP/OFDA/**	**Incidental**	**5 Signif Const**	**6 Govt to**	**Scalability/Applicability**
Inadequate contract requirements leading to lack of oversight: • Performance requirements not easily verified and inspected by field team • Oversight responsibilities not defined	X	X		X		C	C	H	C	C	H	Applicable to all construction categories. Requirements may be scalable to project size and consequence class (see EN 1990 classifications above)
Unqualified oversight personnel unable to effectively perform role of "Engineer"	X	X		X		H	H	H	C	C	H	Applicable to all construction categories. Qualifications may be scalable to project size and consequence class (see EN 1990 classifications above)
Inadequate quality control by contractor: • Responsibilities not defined • Lack of construction material testing	X	X		X		H	H	H	H	H	H	Applicable to all construction categories and project sizes
Inadequate provisions for field changes leading to delays and quality problems: • Inability to adapt to field conditions as required • Delayed approvals	X	X		X		C	C	H	C	C	H	Applicable to all construction categories and project sizes

Exhibit 27 is a summary of industry best practices associated with CSF No. 10, together with an assessment of potential applicability by USAID construction category. Useful resources for implementing best practices, and examples from other international development organizations are suggested where applicable.

Exhibit 27
Industry Best Practices: CSF No. 10 – Construction Oversight and Quality Verification

Industry Best Practices	Applicability by Const Category						Resources and Examples
	Stand-Alone	2 Stand-Alone	FFP/OFDA/	4 Incidental	5 Signif Const	Govt to	
Contract documents: • Utilize contract documents that are specifically developed for desired form of construction • Ensure that construction documents specifically address oversight roles and responsibilities • Utilize CSI standard specifications • Require contractor quality control plan be developed	C	C	H	C	C	C	• FIDIC provides scalable oversight with full set of contract documents ranging from Green Book for small contracts to Red and Yellow for larger ones • Harmonized FIDIC documents, with emphasis on oversight role by "Engineer," used extensively by international development community, including World Bank and MCC
Oversight qualifications: • Establish qualifications as selection criteria for construction oversight role • Provide construction oversight training • Utilize independent engineer to mentor and oversee construction supervision team	C	C	H	C	C	H	• USACE provides extensive resources for training and certification of construction personnel • MCC model provides for role of "Independent Engineer" to ensure that required standards are applied by local engineering and oversight personnel
Change management: • Establish practical thresholds for field approvals, allowing flexibility to adapt to conditions in the field • Establish procedures for sign-offs and approvals, incorporating technical input for changes	H	H	H	H	H	H	USACE procedures establish thresholds for delegated signature authority to AOR/COR for field changes

11. Monitoring & Evaluation Process

Monitoring and evaluation (M&E) requirements have been an important element of US foreign assistance programs to ensure that programs learn from experience and that responsible agencies are transparent and accountable for results to the US Congress. The purpose of monitoring is to determine the extent to which expected project outcomes are achieved, while the focus of evaluation is to determine the effectiveness of project activities and approaches.

To be most effective, M&E requirements should be objective and meaningful, while at the same time not overly burdensome. Although the reasons for these requirements may be well recognized, the means for accomplishing them have not been consistently applied for construction in the international development arena. The one organization which currently places the greatest amount of emphasis on M&E is MCC, which has a well-established program with requirements for M&E to be conducted for the duration of all compacts. Compared with USAID, MCC has a relatively narrower range of project objectives to monitor; however, their program may provide a useful source of information and examples.

Exhibit 28 presents a summary of key risks and impacts that may be associated with CSF No. 11, together with an assessment of the potential applicability to the six USAID construction categories.

Exhibit 28
Common Risks: CSF No. 11 – Monitoring & Evaluation Process

Key Risks	Impact Types					Risk by Const Category						Scalability/Applicability
	Cost	Schedule	Sustainability	Quality	Compliance	1 Stand-Alone Conflict	2 Stand-Alone Conventional	3 FFP/OFDA/ OTI	4 Incidental Non-Infra	5 Signif Const	Govt to	
Agency is unable to: • Establish lessons learned to avoid mistakes in future projects • Establish cause and effect of construction practices • Demonstrate achievement of project objectives	X	X	X	X	X	H	H	H	H	H	H	Applicable to all construction categories and project sizes
Results of M&E are not accepted as objective assessments					X	H	H	H	H	H	H	Applicable to all construction categories and project sizes

Exhibit 29 is a summary of industry best practices associated with CSF No. 11, together with an assessment of potential applicability by USAID construction category. Useful resources for implementing best practices and examples from other international development organizations are suggested where applicable.

Exhibit 29
Industry Best Practices: CSF No. 11 – Monitoring & Evaluation Process

Industry Best Practices	Applicability by Const Category						Resources and Examples
	1 Stand-Alone	Stand-Alone Conventional	3 FFP/OFDA/	4 Incidental	5 Signif Const	Govt to	
Establish M&E requirements focused specifically on construction to be undertaken on all applicable projects	H	H	H	H	H	H	• Recent comparative study of M&E practices by USG agencies engaged in foreign assistance (Ref 11) provides useful assessment of approaches • MCC M&E program provides useful example for larger, more complex projects
Consider requirement for independent perspective of M&E	M	M	M	M	M	M	

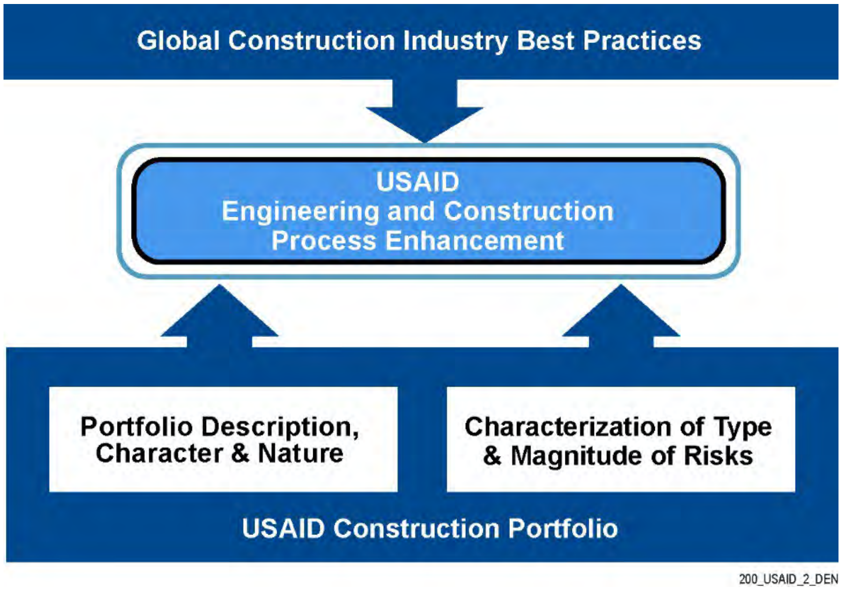
F. WHAT DOES THIS MEAN TO USAID?

Although this paper is not intended to provide specific recommendations to USAID, it does present a number of specific and relevant resources and practices that are proven to be effective in mitigating risk and improving project efficiency and effectiveness within the international construction arena. These analyses provide the Agency with the opportunity to evaluate the unique breadth of its own construction types, environments, and partners it engages globally against organizations with comparable missions use to successfully deliver construction works and manage risks within narrower global portfolios.

The process diagram Exhibit 30 below illustrates how information contained in this paper can be integrated with the other undertakings, and results compiled as part of the Construction Risk Assessment project. It suggests how the information gathered in each part of this effort can be used to provide USAID with a framework and resources to make the best and most informed decisions for itself going forward. A summary of the information and results the project provides include:

1. A description of the USAID construction portfolio inventory, character and nature:
   - Global construction survey results, regression analysis, descriptive statistics
   - A quantitative analysis of construction risk factors
   - Mission and WOU interviews, research of existing procedures and best practices
2. A characterization of the six USAID construction types and magnitude of risks/risk types:
   - Construction industry and insurance research and benchmarks
   - Subject matter expert risk panels addressing gaps in the survey for quantitative and qualitative information specifically related to the USAID construction types
3. Relevant research regarding the critical success factors, best practices and tools of the global construction industry and international development communities:
   - Identification of potentially adoptable and scalable risk mitigating resources, processes and tools
   - A discussion of comparable organization processes and controls in developing key CSFs and best practices.

Exhibit 16
Construction Risk Assessment Project Process



When considering the full scope of information compiled across the USAID construction portfolio, the multi-organizational risk panels and research of industry benchmarks and risk mitigation best practices, a few prominent over-arching areas of focus surface for the Agency to consider:

- Staff Development – ensuring the number of utilization of qualified and experience staff are in place where needed; staff development, training and hiring to fill positions (e.g., engineering, construction oversight, design implementation, etc.).
- Standardized Procurements and Construction Contracts – establishing consistent and appropriate contract mechanisms to align with the full range of USAID construction requirements
- Program Management – Assessing the existing information management systems and databases against options in implementing a more robust enterprise program management information system for active monitoring and reporting; allowing for greater control of global project inventories, budgeting, cost and schedule information.
- Risk Management – establishing a standardized process and tools for assessment and reporting of risk across all project phases.
- Policies and Procedures – Establishing policies regarding construction practices to be considered for specific and applicable development to USAID's existing and future construction portfolio and possible inclusion into the Agency's Automated Directives System (ADS).

REFERENCES

By Citation

1. "Conditions of Contract for Construction", Multilateral Development Bank. Harmonised Ed.

2. *Procurement of Works & User's Guide*. Standard Bidding Documents. 2012. The World Bank Group. Procurement Policy and Services Group. http:// www.worldbank.org/procure.

3. *Prequalification Document for Procurement of Works and User's Guide*. Standard Bidding Documents. 2011. The World Bank Group. Procurement Policy and Services Group. http:// www.worldbank.org/procure.

4. *Procurement of Goods, Works, and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers*. 2011. The World Bank.

5. "Guidance Note for Project Management". *Strengthening Institutional Capacity during Project Implementation*. 2005. The World Bank. Operations Policy and Country Services.

6. *The World Bank Operations Manual*. Updated Sept 2013. The World Bank. Washington, DC.

7. *Investment Lending Reform: Modernizing and Consolidating Operational Policies and Procedures*. 2012. The World Bank

8. *Environmental, Health, and Safety (EHS) Guidelines*. 2007. IFC. www.ifc.org/ifcest/enviro.nsf/content/EnvironmentalGuidelines

9. *UN Procurement Practitioner's Handbook*. 2006. Interagency Procurement Working Group (IAPWG). 2012, the glossary of terms was updated.

10. *Principles into Practice: Country Ownership, Issue Brief*. 2011. 2011-002-0942-01. www.mcc.gov

11. Blue, Richard, Clapp-Wincek, Cynthia, and Benner, Holly. "Beyond Success Stories: Monitoring & Evaluation for Foreign Assistance Results". *Evaluator Views of Current Practice and Recommendations for Change*. 2009. The paper was produced independently by the authors.

12. Engineering Reachback Support (Draft). 2012. U.S. Army Corps of Engineers.

13. "Safety and Health Requirements". 2003. Department of the Army, US Army Corps of Engineers. *Manual No. 385-1-1*. U.S. Government Printing Office. ISBN 0-16-048877-x.

14. "The Purple Book and PROSPECT Training Needs Survey FY2014". *Managers and Supervisors Training Handbook*.____. U.S. Army Corps of Engineers, USACE Learning Center (ULC). The Purple Book is now virtual and located on the ULC website at http://ulc.usace.army.mil.

15. "Construction Quality Management for Contractors". *Student Study Guide*. 2004. US Army Corps of Engineers, Professional Development Support Center and U.S. Naval Facilities Engineering Command (NAVFAC).

16. "Capacity Development", White Paper. 2008. US Army Corps of Engineers.

17. "Programming Cost Estimates for Military Construction". 2011. *Unified Facilities Criteria (UFC)*. UFC 3-730-01.

18. "Willis ref"

19. "Front End Planning Tool: PDRI for Infrastructure Projects". The Construction Industry Institute. 2011. Research Summary268-1. The Construction Industry Institute, The University of Texas.

20. "IPRA Integrated Project Risk Assessment"". The Construction Industry Institute. 2013. Implementation Resource IR181-2. The Construction Industry Institute, The University of Texas at Austin.

21. The Construction Industry Institute. 2013. "Probabilistic Risk Management in Design and Construction Projects, Version 1.1" Research Study RS280-1. Construction Industry Institute, The University of Texas at Austin.

22. The Construction Industry Institute. "Constructability Implementation Guide" SP 34-1. Construction Industry Institute, The University of Texas at Austin.

23. "Level of Maturity of a Firm's Risk Management Process". 2007. ECRI-BP-07. Engineering & Construction Risk Institute. Washington, D.C.

24. "Risk Management Planning". 2008. ECRI-BP-08. Engineering & Construction Risk Institute. Washington, D.C.

25. "ECRI Risk Breakdown Structure". 2008. ECRI-BP-02. Engineering & Construction Risk Institute. Washington, D.C.

26. "A Structured Approach to Project Closeout". 2009. ECRI-BP-09. Engineering & Construction Risk Institute. Washington, D.C.

27. "Basic Engineering and Construction Primer." United States Agency for International Development (USAID)

28. "Engineering of Infrastructure Primer for Development Primer." United States Agency for International Development (USAID)

29. "Construction Tendering." United States Agency for International Development (USAID)

30. "Basic Engineering Construction Oversight Principles for Development Professionals." United States Agency for International Development (USAID)

31. "Basic Host Country Construction Contracting for Development Professionals." United States Agency for International Development (USAID)

32. "FARA Procurement and Implementation Guidelines." United States Agency for International Development (USAID)

33. "Basic Principles for Health Infrastructure." United States Agency for International Development (USAID)

34. "Building Back Housing in Post-Disaster Situations – Basic Engineering Principles for Development Professionals." United States Agency for International Development (USAID)

35. "Introduction to Irrigation Project Design." United States Agency for International Development (USAID)

36. "Seismic Retrofit of Housing in Post-Disaster Situations – Basic Engineering Principles for Development Professionals – A Primer (Draft)." United States Agency for International Development (USAID)\

37. "Site and Retaining Wall Hazard Mitigation in Post-Disaster Situations – A Primer (Draft)." United States Agency for International Development (USAID)

38. "*The High Cost of Low* Performance: The Essential Role of Communications". 2013. Program Management Institute.

39. GAO Cost Estimating and Assessment Guide. 2009. United States Government Accountability Office, Applied Research and Methods. GAO-09-3SP.

By Organization

1. United States Agency for International Development (USAID)

1. Basic Engineering and Construction Primer
2. Engineering of Infrastructure Primer for Development Primer
3. Construction Tendering
4. Basic Engineering Construction Oversight Principles for Development Professionals
5. Basic Host Country Construction Contracting for Development Professionals
6. FARA Procurement and Implementation Guidelines
7. Basic Principles for Health Infrastructure
8. Building Back Housing in Post-Disaster Situations – Basic Engineering Principles for Development Professionals
9. Introduction to Irrigation Project Design
10. Seismic Retrofit of Housing in Post-Disaster Situations – Basic Engineering Principles for Development Professionals – A Primer (Draft)
11. Site and Retaining Wall Hazard Mitigation in Post-Disaster Situations – A Primer (Draft)

2. The Construction Industry Institute (CII) *"Available to non-members by purchase; however, no copies may be made or distributed and no modifications made without written permission from CII. Contact CII at http://construction-institute.org/catalog.htm to purchase copies."*

4. "IPRA Integrated Project Risk Assessment". The Construction Industry Institute. 2013. Implementation Resource IR181-2. The Construction Industry Institute, The University of Texas at Austin.

5. "Front End Planning Tool: PDRI for Infrastructure Projects". The Construction Industry Institute. 2011. Research Summary 268-1. The Construction Industry Institute, The University of Texas.

8. The Construction Industry Institute. 2013. "Probabilistic Risk Management in Design and Construction Projects, Version 1.1" Research Study RS280-1. Construction Industry Institute, The University of Texas at Austin.

9. The Construction Industry Institute. "Constructability Implementation Guide" SP 34-1. Construction Industry Institute, The University of Texas at Austin.

3. Department of Defense (USDOD)

05. "Programming Cost Estimates for Military Construction". 2011. *Unified Facilities Criteria (UFC*). UFC 3-730-01.

4. Engineering & Construction Risk Institute (ECRI)

2. "Level of Maturity of a Firm's Risk Management Process". 2007. ECRI-BP-07. Engineering & Construction Risk Institute. Washington, D.C.

3. "Risk Management Planning". 2008. ECRI-BP-08. Engineering & Construction Risk Institute. Washington, D.C.

4. "ECRI Risk Breakdown Structure". 2008. ECRI-BP-02. Engineering & Construction Risk Institute. Washington, D.C.

5. "A Structured Approach to Project Closeout". 2009. ECRI-BP-09. Engineering & Construction Risk Institute. Washington, D.C.

04. FIDIC (Federation Internationale des In Genieurs-Conseils)

03. "Conditions of Contract for Construction", Multilateral Development Bank. Harmonised Ed. Version 3. 2010.

05 U.S. Government Accountability Office (GAO)

1. GAO Cost Estimating and Assessment Guide. 2009. United States Government Accountability Office, Applied Research and Methods. GAO-09-3SP.

2. "GAO Schedule Assessment Guide, 2012 United States Government Accountability Office, Applied Research and Methods. GAO-12-120G.

09. "A Structured Approach to Project Closeout". 2009. ECRI-BP-09. Engineering & Construction Risk Institute. Washington, D.C.

06. Millennium Challenge Corporation (MCC)

03. *Principles into Practice: Country Ownership, Issue Brief*. 2011. 2011-002-0942-01. www.mcc.gov

8. United States Army Corp of Engineers (USACE)

1. "Safety and Health Requirements". 2003. Department of the Army, US Army Corps of Engineers. *Manual No. 385-1-1*. U.S. Government Printing Office. ISBN 0-16-048877-x.

2. "Capacity Development", White Paper. 2008. US Army Corps of Engineers.

3. "Construction Quality Management for Contractors". *Student Study Guide*. 2004. US Army Corps of Engineers, Professional Development Support Center and U.S. Naval Facilities

Engineering Command (NAVFAC).

4. “The Purple Book and PROSPECT Training Needs Survey FY2014”. *Managers and Supervisors Training Handbook*. . U.S. Army Corps of Engineers, USACE Learning Center (ULC). The Purple Book is now virtual and located on the ULC website at http://ulc.usace.army.mil.

5. Engineering Reachback Support (Draft). 2012. U.S. Army Corps of Engineers.

9. Other

1. Blue, Richard, Clapp-Wincek, Cynthia, and Benner, Holly. “Beyond Success Stories: Monitoring & Evaluation for Foreign Assistance Results”. *Evaluator Views of Current Practice and Recommendations for Change*. 2009. The paper was produced independently by the authors.

4. *“The High Cost of Low* Performance: The Essential Role of Communications”. 2013. Program Management Institute.

5. Hermano, Victor, Lopez-Paredes, Adolfo, Martin-Cruz, Natalia, Pajares, Javier. 2013. “How to manage international development (ID) projects successfully. Is the PMD Pro1 Guide going the right direction?” *International Journal of Project Management* 31 (2013) 22-30. Available online at www.sciencedirect.com.

13. United Nations

02. *UN Procurement Practitioner’s Handbook*. 2006. Interagency Procurement Working Group (IAPWG). 2012, the glossary of terms was updated.

16. The World Bank Group

02. *Environmental, Health, and Safety (EHS) Guidelines*. 2007. IFC. www.ifc.org/ifcest/enviro.nsf/content/EnvironmentalGuidelines

5. *Procurement of Works & User’s Guide*. Standard Bidding Documents. 2012. The World Bank Group. Procurement Policy and Services Group. http:// www.worldbank.org/procure.

6. *Prequalification Document for Procurement of Works and User’s Guide*. Standard Bidding Documents. 2011. The World Bank Group. Procurement Policy and Services Group. http:// www.worldbank.org/procure.

10. “Guidance Note for Project Management”. *Strengthening Institutional Capacity during Project Implementation*. 2005. The World Bank. Operations Policy and Country Services.

12. *Procurement of Goods, Works, and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers*. 2011. The World Bank.

15. *The World Bank Operations Manual*. Updated Sept 2013. The World Bank. Washington, DC.

16. *Investment Lending Reform: Modernizing and Consolidating Operational Policies and Procedures.* 2012. The World Bank

APPENDIX V

METHODS, ASSESSMENT LIMITATIONS, AND CH2M HILL STATEMENT OF WORK

APPENDIX V

METHODS, ASSESSMENT LIMITATIONS, AND CH2M HILL STATEMENT OF WORK

METHODS AND ASSESSMENT LIMITATIONS

USAID's Office of Energy and Infrastructure in the E3 Bureau led a very ambitious survey of the Agency's worldwide construction activities. USAID was aware that their construction activities were multiple and diverse. Wanting a good understanding of their character and nature, they designed a questionnaire to fully capture this portfolio. The survey, using construction awards[1] as the unit of analysis, was designed with a series of questions at the award level and additional questions on subawards when they existed.

Awards included in the survey met three criteria:

1. They met the definition of construction from the Federal Acquisition Regulation:

   Construction, alteration, or repair (including dredging, excavating and [painting]) of buildings, structures or other real property. For purposes of this definition, the terms "buildings, structures, or other real property" include, but are not limited to, improvements of all types, such as bridges, dams, plants, high ways, parkways, streets, subways, tunnels, sewers, mains, power lines, cemeteries, pumping stations, railways, airport facilities, terminals, docks, piers, wharves, ways, lighthouses, buoys, jetties, breakwaters, levees, canals, and channels. (FAR 2.101)

2. Exceptions to the definition applied for the assessment:

   - All vertical construction (buildings) including renovations that altered a building's use or a structure having a value greater than $5,000. The survey did not include renovations that were cosmetic or did not alter the facility, such as the replacement of doors, windows, painting, etc.
   - All horizontal construction (roads, water systems, etc.) that exceed $50,000.

3. The survey gathered data on construction awards that were active between July 1, 2011 and June 30, 2013. This means that the numbers of awards and activities were occurring during that two year period. It neither means that USAID completed that value of construction in that two year period nor that half the value could be allocated to each year.

It is important to note that construction activities performed under projects and awards that were not primarily construction (e.g. a clinic built as part of a health project) were within the scope of this assessment, as long as they met the above criteria.

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[1] "Award" is defined by USAID as an implementing mechanism through which the agency transfers funds to an implementing partner, generally selected through a competitive process resulting in a contract, grant or cooperative agreement (please see ADS 200, 302 and 303 for more information). In addition, a significant portion of construction undertaken with USAID funding is being done through Government to Government (G2G) approaches (please see ADS 220 for more information). Although these bilateral mechanisms are signed by USAID and host governments with no direct involvement by implementing partners, for the construction assessment G2G agreements are included in the definition of "award" thereby ensuring a uniform unit of analysis.

USAID field missions and Washington offices used the above criteria to prepare a list of construction awards using an Excel spreadsheet. This was certified by each mission/office for accuracy. In spite of considerable effort to develop a complete listing, it is likely that some awards and subawards were missed, and the survey was not a complete census. A rigorous methodology was established for the survey instrument design, data collection, and cleaning.

DESIGN OF THE SURVEY INSTRUMENT

The survey instrument was initiated by a Construction Risk Assessment working group at USAID within the E3 Bureau. Development took place over six months in 2012. In the early stages of survey development, the Government Accountability Office (GAO) contacted USAID to initiate an engagement on USAID infrastructure oversight with an emphasis on large infrastructure, citing particularly Iraq, Pakistan, Afghanistan and Haiti. This helped shape the approach of the survey, notably the emphasis on oversight. USAID also reviewed multiple GAO and Inspector General (IG) audits of construction activities to identify potential issues and questions for the survey. GAO's question about oversight and the review of the audits led to a focus on the risks associated with the construction activities. In collaboration with USAID, the CH2M Hill team developed an additional set of survey questions to capture construction portfolio data associated with five risk factors: cost overrun, schedule delays, loss in output due to poor quality, loss in service life due to poor sustainability, and non-compliance.

The data collection instrument (the survey) is divided into two main parts. Part 1 examined the single award level (about 30 minutes in response time), and Part 2 examined the subaward level (response time was dependent upon the number of subawards, but ranged from 45 minutes to 2 hours). The award-level survey captured characteristics of the award and is divided into the sections listed in Table V-1.

In addition to capturing similar information to reflect characteristics of particular subawards under the award, the subaward level survey also includes a series of questions on specific construction components within particular awards. Respondents were requested to provide information on construction location, conflict status, planned and actual outputs in rural/urban areas, planned and actual economic life, rework, and GPS coordinates. Construction activities were divided into the construction types shown in Table V-2.

TABLE V-1. AWARD INFORMATION
General award information – construction phase, country location(s), managing parties (mission or WOU), agreement type
Implementer capacity assessment– who conducted the work, what were the outcome metrics, and what support was provided
Operations and maintenance – whether assessed, outcome of assessment, source of funding
Pre-award preparation – gender analysis, risk register, host country government/non-government stakeholders consulted
Award design – design standards, division into non-construction and construction parts; seismic, hurricane, flood and wind design, requirements and standards
Cost estimate – which parties prepared and reviewed, return rate, award competition
Budget, modifications, and claims – start/end date, original and modified overall and construction budgets, modifications, claims
Experience and management practices of the CO/AO and Contracting Officer's Representative/Agreement Officer's Representative (COR/AOR)
USAID awardee engagement and oversight/control
Project oversight and control measures
Safety and environmental incidents – health and safety and environmental incidents
Engineering oversight – supervising engineer, provider of oversight, construction site inspections
Closeout – closeout and follow-up activities

TABLE V-2. CONSTRUCTION TYPES
Transportation (roads, bridges, rail beds, ports, etc.)
Buildings (new construction, renovation, and/or repair; includes schools, clinics, hospitals, airport terminals, and railway stations)
Water/wastewater facilities (potable water distribution, water treatment plants, wastewater treatment plants, community septic systems, sewers, etc.)
Energy-related facilities (carbon-based, solar and wind, electrical and natural gas transmission, hydroelectric generation excluding hydroelectric dams)
Telecommunication facilities (cell towers, antennae, switching stations)
Solid waste management facilities (landfills, transfer stations, recycling centers, incinerators)
Water resources facilities (dams, hydroelectric dams, irrigation systems)
Water storage/rainwater catchment systems (below or on-ground cisterns/water catchment, aboveground cisterns or water towers, rainwater catchment systems)
Other construction activities (non-building cultural heritage sites, market or outdoor sports facilities, etc.)

DATA COLLECTION PROCESS

The survey was pilot-tested in late June/early July 2013 in the Georgia Mission in Tbilisi and was supported in-country by staff from both CH2M HILL and USAID. To meet the ambitious timeframe, minimal changes were made to the survey and it was officially launched globally on July 14, 2013. Because of the complexity of the survey, which required considerable time to complete, during the summer months when many mission staff are on home leave and many contracting actions are taking place, a subset of missions with large construction portfolios were provided in-country support by USAID and CH2M HILL. There were 35 missions provided with Agency in-country support, including 11 missions that had joint USAID and CH2M HILL support. The remaining missions were supported remotely by a USAID-CH2M HILL virtual on-call team.

For the four offices from the Bureau for Democracy, Conflict and Humanitarian Assistance which had over a thousand subawards, USAID E3 staff and CH2M HILL provided onsite technical support in USAID headquarters in Washington, D.C. This included the Office of Transition Initiatives (OTI), Office of Foreign Disaster Assistance (OFDA), Food for Peace Office (FFP), and American Schools and Hospitals Abroad Office (ASHA).

The survey was accessed by respondents through a web link. The Excel files with the lists of construction related awards generated by USAID missions and Washington offices were uploaded to NORC's Liberty survey platform, which generated unique survey links for each award – respondents generated the links for the subawards as required. Respondents were provided with unique usernames and passwords to access the surveys online.

There were a number of factors that constrained the completeness of survey responses.

- The survey included 140 questions at the award level – but more than 100 questions for subawards had to be completed for each subaward. There were an average of 4 subawards for each award but one award had 306 subawards.
- A management decision was made that only USAID staff would respond to the survey. USAID's policy is that USAID manages the prime award and expects the prime awardee to manage the subawards. Most of the 758 awards included subawards not directly managed by USAID. The normal practice would have been for USAID staff to ask the prime awardees when they did not know the answers to the very detailed questions in the survey, particularly at the subaward level. The USAID General Counsel's office determined that if the survey were extended to the implementing partners (the awardees and subawardees), the Paperwork Reduction Act would apply; thus delaying the data collection while USAID went through the lengthy approval process (generally up to a year).[2] Therefore, it was determined that the survey would be completed with only the knowledge of USAID staff and the files and records within the USAID missions and Washington offices.
- Because respondents often did not have firsthand knowledge of the construction activities for which they were reporting, the data include some degree of measurement error. Responses were true to the best of the respondent's knowledge, but in fact do not accurately portray the true situation.
- Although cooperation in missions was generally good and had direct knowledge of the programs, the USAID staff providing data were often not directly involved in the construction activities and were limited to information drawn from the USAID award files. The USAID and CH2M HILL assessment teams also were limited to award files, and in some cases only portions thereof, and with support from the respective operating unit. Certain data proved difficult for survey respondents to obtain such as detailed information on the quantities/capacity of structures being constructed.
- Modifications to the planned approach were required because of discoveries of data late in the process. OTI had a relatively small number of awards but represented over a thousand subawards. The team sampled 214 for administration of the survey. These 214 were representative of all OTI projects and were correspondingly weighted in the data analysis. Survey responses for 37 subawards were substantially incomplete and unusable for analysis purposes.

The average don't know/no response for all questions was X%. Some questions had over a 60% rate of don't know/no response.

DATA CLEANING AND ANALYSIS

Upon completion of the surveys, data cleaning was performed through the following steps:

- Award and subaward were merged into a single file and verified for variable and value label consistency.
- Variables were mapped to questions.

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[2] The Paperwork Reduction Act of 1980 (Pub. L. No. 96-511, 94 Stat. 2812, codified at 44 U.S.C. § 3501-3521) is a federal law designed to reduce the total amount of paperwork burden the federal government imposes on private businesses and citizens. The Act imposes procedural requirements on agencies that wish to collect information from the public. Extending this law to subawardees implementing U.S. foreign assistance was controversial.

- Values/responses were checked and verified to ensure they were within a valid/reasonable range, and duplicates were flagged.
- Case identifiers were checked, and duplicates were flagged.
- Skip patterns were checked and “reserve” codes were used for system and respondent skips.
- Overall response rates were calculated.
- Sampling weights were created specifically for the OTI cases.

CLEANING THE SURVEY BUDGET DATA

Arriving at an estimated total of USAID construction spending was not entirely straightforward and involved a series of logic steps due to the complexity of the survey questioning. They are detailed here to allow future researchers to understand how we determined the overall reported value for construction during the study period.

The first reference to the construction budget in the survey came when interviewees were asked “Within the original award budget above, please provide an estimate of the amount specified for construction.” After a series of questions related to modifications, interviewees could provide a revised amount for the construction budget. Later on, the survey duplicated these questions at the sub-award level.

In order to get the construction budget data ready for use in the analysis, a number of logic rules were applied to the data. Most importantly, modified totals for the construction budget plan were included into the final construction budget estimates. The cleaning at the award level also eliminated some surveying errors (replacing construction budgets where the value was greater than the total project budget). A related rule then replaced the construction budgets with the total budget if the construction budget exceeded the project total. The USAID team decided to eliminate this rule in the analysis as it affected only one observation under $15,000.

Many of the awards did not either contain sub-awards or sub-awards that involved construction activities. For the subawards that did have a construction budget, the same procedure of adding in any budget modifications was also performed. Since the data for this variable contained many non-numeric characters, the variable had to be “destrung” to eliminate this noise and include only numbers. There were only a few of instances where the sub-award construction budget data had to be dropped entirely from the data set (these observations included a range for the budget instead of a single figure).

The final stage in arriving at the total estimated budget came when both the sub-award and award datasets were combined. At this point, instances where the aggregated sub-award construction value was greater than the award value were replaced with the sub-award construction total.

With this final step completed, the team found the USAID construction total budget worldwide to be $5.62 billion.

STATA CLEANING LOGIC

Variables:

- construct_budget_plan = Within the original award budget above, please provide an estimate of the amount specified for construction.
- total_budget_plan = What was the original award budget for all activities (including non-construction activities)?
- fin_const_amt_oe = What was the revised amount budgeted within the award for construction activities after modifications?

- construct_budget_plan_pk_oe = What was/is the original sub-award budget (in USD) for construction activities?
- sub_ag_budg_mod_oe = What was/is the final sub-award budget amount after modifications?

Stata Logic:

- *replace construction value as missing if construction value is greater than the project total

  replace construct_budget_plan=. if (construct_budget_plan>total_budget_plan & construct_budget_plan!=. & total_budget_plan!=-10141)

- *replace construction value with construction value after modifications

  replace construct_budget_plan=fin_const_amt_oe if (fin_const_amt_oe!=. & fin_const_amt_oe!=-10141)

- *not used – replace construction budget with total budget if construction budget is greater than project total

  replace construct_budget_plan=total_budget_plan if (total_budget_plan<construct_budget_plan & construct_budget_plan!=.)

- *destring sub-award values, e.g. move from non-numeric to numeric values (another 200+ lines added back budget data that was dropped due to including commas or text)

  destring construct_budget_plan_pk_oe, force replace

- *replace construction value with construction value after modifications

  replace construct_budget_plan_pk_oe=sub_ag_budg_mod_oe if (sub_ag_budg_mod_oe!=-8 & sub_ag_budg_mod_oe!=-6)

- *create a new variable that aggregates sub-award construction totals

  bysort award_id: egen new_construct_award=sum(construct_budget_plan_pk_oe)

- *replace award construction budget with aggregated sub-award construction totals if aggregated sub-award construction totals are greater than the award budget

  replace construct_budget_plan=new_construct_award if (new_construct_award>construct_budget_plan | construct_budget_plan==.)

Once the data files were cleaned and quality was checked a set of descriptive statistics was developed to convey the character, scope and nature of USAID's construction portfolio. This information is presented in the main report in the section on Scope and Character of USAID's Construction Portfolio.

ADDITIONAL STUDY LIMITATIONS ADDRESSED IN THE REPORT

Analysis was conducted at the subaward level; this is where the data were weakest due to the factors mentioned above about who completed the survey and with what data. The response rate (and number) of subawards included for the key "outcomes" analyzed were as follows:

- budget overruns: 693 (46% of eligible cases)
- schedule delays: 697 (47%)
- quality: 682 (45%)
- sustainability: 1,124 (51%, mainly because no sustainability data were provided for OTI subawards).

Direct observation of the "outcomes" which was beyond the scope of this assessment. Therefore, two of these key outcomes were based on proxies:

- Quality – based on reported rework and lack of materials testing. When assessing the quality of a contractor, the need for rework is a serious quality issue. In the environment in which USAID works, rework may be equally an indication of the quality of the management and oversight. This makes it somewhat difficult proxy. Materials testing is an international best practice – the non-response rate for sub-awards in the questionnaire was 62%.
- Sustainability was essentially a reflection of planned operations and maintenance. These indicators only provide a partial indication of sustainability which cannot actually be assessed until the construction project has been completed.

Although these processes were quite rigorous in combining the descriptive data, expert knowledge and, a very innovative approach to estimating the level of loss that USAID risks, they should not be taken as an assessment of the losses in USAID's portfolio but more to highlight the very role of a bilateral foreign assistance agency, i.e. to undertake those activities that would not be commercially viable. Findings and conclusions from the additional analytic efforts are included in appendix RISK.

DESCRIPTION OF RISK PANEL PROCESS

Anticipating that historical data would be scarce, or in some cases nonexistent, the risk panels employed Willis's proprietary process Loss PIQ^{SM}, which is specifically designed to quantify risks that do not lend themselves to more routine predictive modeling techniques. The LossPIQ^{SM} is the spreadsheet model "tool" that facilitates and captures the risk panel interactive discussions and panelists' answers regarding individual risk scenarios and cost drivers that most likely affect some measured loss. The model was built using the survey data specific to each of the four risk panel topics, which correspond to the six USAID construction categories as described earlier.

The risk panel process steps are outlined below.

PANELIST SELECTION

Approximately 8 to 12 participants for each panel were selected based on their expert level knowledge of and experience in each construction category, including effectiveness of current and observed risk controls. Panelists participated from a variety of USAID Bureaus, other government agencies, multilateral and bilateral organizations, and nongovernmental organizations (NGOs). Pre-Panel

Each of the four risk panels received an e-survey that contained a comprehensive list of significant and plausible loss scenarios specific to each construction category that could potentially result in a significant unplanned economic cost. The panelists were asked to rank each loss scenario based on perceived significance. The survey results were then collated to identify the top 10 most plausible, significant loss scenarios for each construction category type. These were then imported into the risk models that Willis developed for each construction category.

MODEL DEVELOPMENT

The risk panel models were developed using the cost and schedule data collected from USAID Construction Risk Assessment survey and from public domain construction databases. In addition to the loss scenarios, two other data components were incorporated into the risk models prior to the risk panel sessions:

- The major types of **Financial Impacts** associated with the loss scenarios, which were agreed by USAID to include: schedule delay, capacity reduction, service life reduction, health and safety, third party damage, environmental, and rework/remediation.

- Objective, credible **Cost Drivers** for each Financial Impact type assimilated from subject matter experts, databases within Willis, a rigorous public domain data search, and data obtained from the USAID survey.

PANEL AND MODELING

The models' data points were then completed based on the collective intelligence of the risk panel participants in the course of highly focused and interactive sessions. As a final step following the risk panels, normalization was conducted on the frequencies of financial impacts, limiting the highest frequency to an average of one per project. This type of normalization is customary in the Loss PIQ^{SM} process to account for the tendency of frequencies to be overstated.

Once the model inputs were completed, the model generated a loss distribution curve for each of the top loss scenarios and then aggregated these into a consolidated loss distribution curve to define the inherent economic risk for each construction category.

CH2M HILL STATEMENT OF WORK

SECTION C – BACKGROUND AND STATEMENT OF WORK

C.1 BACKGROUND

The assessment activity results from a review conducted by the E3/Energy and Infrastructure (E&I) Office (then EGAT Infrastructure and Engineering Office) of 20 audits by the Office of the Inspector General (OIG) completed between 2000 and 2010 that cited numerous significant incidents of construction failure and performance deficiencies, such as poor planning, design, quality of materials and workmanship, and failures to apply building codes and engineering standards. These deficiencies may have stemmed, in part, from a lack of sufficient involvement and oversight by experienced engineers working for either the implementing partner or USAID. As a result, the Agency issued a new construction policy on April 3, 2012.

Construction risk assessments typically build off an empirically based consensus that if certain architecture and engineering activities do not sequentially occur e.g., a full and proper design, or there is poor construction techniques, lack of engineering oversight, or lack of strong project management, among others, then the probability of construction failures and lack of functional sustainability increases significantly. Quantifying the magnitude of the losses, e.g., cost to replace, remedy the problem is a data-intensive exercise. Within the scope of this initial survey, only estimates will be attempted.

The survey will first detail the amount and character of the Agency's construction portfolio and continue analysis to (a) describe the incidence of cost overruns, schedule delays, and low quality and/or non-compliant projects, (b) explore whether conformity with USAID's policies and generally accepted engineering and project management practices are correlated with incidence, (c) roughly estimate the portfolio's expected losses, and (d) identify non-financial risks to the Agency, e.g. reputational and fiduciary, associated with the above.

A draft survey has been developed by E&I (see Attachment 1). Part 1 of the survey has a total 34 questions that describe the project, e.g., location, budget, type, scale and complexity and 10 questions on the implementation arrangements. Part 2 of the survey has 58 questions that determine (a) incidence of 5 risks/outcomes of projects (cost, schedule, result (e.g. desired scope and quality achieved, sustainability and compliance issues such as health and safety record, environmental effects, disability inclusive design; and, (b) expected losses and (c) adherence to relevant Agency policies and international standard construction industry processes

C2. USAID EXISTING INFORMATION AND DATABASES

USAID has three required data systems that provide some information on the construction portfolio: GLAAS, for acquisition and assistances record keeping. The accounting system is Phoenix. In addition, FACTS Info is an integrated planning, budgeting, and performance management system that contain a wide range of foreign assistance information, including budget and appropriations allocations and data from Mission Operational Plans, Performance Plans and Reports, and Mission Strategic Resource Plans.

Finally Mission Program Officers and sector leads maintain so-called cuff records with detailed information, particularly suited to the planning, implementation and priorities for that Mission or program.

The GLAAS system provides detailed information contract awards, vendors, and program areas, among other data. It does not, however, require an indication of whether the award includes construction. There is a simple, yes/no to indicate if construction is included but this is not a required field and it is not always used. Some 700 project have indicated "yes" they involve construction. GLAAS migration was completed over the last year and thus will not have information on projects from previous fiscal years.

Phoenix captures the F-Bureau/State Department objectives (Health, Education, etc.), and it captures an "object class code" that generally indicates what USAID is buying. But for program funds that object class code is generally something generic, like "4100200 - Grants (Assistance) International Organizations" no matter what the project is actually doing. There's generally no indication in Phoenix that it is a construction project, or a project with a construction component.

GLAAS is linked at the account line item level to Phoenix. Thus, one could determine what costs are incurred and an indication of project schedule status based on the timing of payments. Thus, some of the cost, schedule, document questions in the draft survey possibly could be answered from the Agency's "routine" administrative data; however, again it is not clear if this would be sufficiently reliable given problems of what projects are included in GLAAS and cost overruns identified in payments may lag behind those identified in the field or are awaiting claims review. This complicates the ability to determine the value of capital construction expenditures. The use of this linkage at the account line level will be important for longer-term monitoring on an ongoing basis along with other management improvements that may result from this assessment.

In summary, the available data systems likely do not contain reliable information about capital expenditures and therefore a census focused on capital expenditures, combined with these existing data sources is the best approach to determining the nature and extent of capital construction. The data systems generated lists would provide an opportunity to ask Missions to reconcile this with mission cuff records prior to issuing the survey, which would allow refinement of the sample size. These systems can have great value with minor adjustments, such as requiring the construction field to be answered, to long term monitoring of the construction portfolio. Finally, as a result of the survey, the survey will be reviewed to see if questions can be refined to better match with the Phoenix and GLAAS data fields.

C3. KEY TASKS

The contractor will provide a team of short-term technical advisors to support E3 E&I on the following tasks:

Task 1 - Review and Refine Approach and the Survey Instrument

This task involves reviewing and providing recommendations for improvement to the overall approach and implementation of the construction assessment as well as detailed review of the survey instrument. The task will confirm the survey design meets the objectives of the assessment, document hypotheses and define 'project failure criteria'. In addition, the task includes a review of the, interalia, survey type, analysis plan, identification of survey respondents, supporting activities (e.g. case studies and key informant interviews) and implementation options, such as degree of support to survey respondents.

This includes assisting USAID in defining the list of survey respondents.

The review will reference best practice in risk assessment and survey questionnaire design as well as consider how survey results can be supplemented by:

- what data are publicly available elsewhere in the industry and
- data on flood plains, earthquakes and other natural disasters etc.
- actuarial data on insurable risks

As part of this review and refinement, the consultant will advise on pilot testing strategies that will be implemented by USAID. Following completion of the pilot testing, the contractor will review results of the pilot testing and make detailed recommendations for survey instrument and implementation method improvement.

Task 2 - Prepare Survey design, including sampling, data analysis plans

Based on results from Task 1, the contractor will make recommendations on the proposed survey design. USAID analysis thus far suggests a census rather than a sample approach to achieve an appropriate level of statistical confidence in the results, e.g. 90-95% confidence interval .The contractor will be required to determine the ultimate approach which should address the following if applicable: sampling frame, size, stratification variables if any, two-stage cluster sampling, preliminary power estimates, and a description of how the data might be analyzed. The approach should also address if applicable: key dependent variables and predictor, independent variables, approaches to testing the strength and direction of relationships, and development of scoring also.

Task 3 - Review and Summary of USG and Industry Standards, Practice, and Experience

To gain an understanding of risks, risk triggers, and appropriate indicator risks to include in the survey the consultant must examine the Federal Acquisition Regulations requirements as well as a representative sample of typical/best industry practice and other USG requirements, policies and practices for construction works and compare them to current policies, procedures and performance and similar factors of USAID construction programs. The examination will also include a review of typical results and risk incidence occurrence for international construction projects based on publically available literature and insurance industry actuarial data. This review will also briefly summarize procedures and practices of other USG and multi-lateral agencies in the infrastructure and construction sector, taking into consideration, the varied objectives of respective organizations. The contractor must provide the results of this review along with the results of the USAID survey to provide USAID the information necessary for it to make an informed decision regarding policies and procedures.

Task 4 - Field Support for Survey Completion by Missions and Other Data Collection

USAID expects that a number of Missions with significant numbers of construction projects will require field support to complete the survey. The contractor shall visit Missions selected by the TOCOR and assist mission personnel to gather information to respond to survey; however, USAID has not yet determined the specific needs. For purposes of the proposals; offerors will used the plug figure of $180,000 for labor for field support provided in section B. This support will involve assisting USAID TDY staff and/or Mission staff in reviewing project reports and files. The Consultant must be in a position to rapidly deploy staff once these needs are determined. These staff shall have basic project management or basic construction, construction management or construction contracting experience. The Consultant will work with USAID to develop and provide training to the field support teams to ensure consistent and reliable support. It is highly preferred that these staff has security clearance. Consultant may be asked to deploy staff to hardship and/or conflict areas; however it is expected that the work activities will be entirely within Agency/Embassy compounds.

Task 5 - Data Quality Assurance; Data Validation and Cleaning

The contractor will be responsible for follow-up validation and data cleaning activities to assure data quality is sufficient for the intended analysis and assessment objectives. This task may include: providing specific recommendations for

- survey design per above task,
- key informant interviews
- data and documents that should be collected to compare with survey responses; and,
- other consultant recommended actions.

The recommendations will indicate activities that should be completed, design of these activities, and implementation arrangements for these activities, e.g. by USAID staff, consultant staff, others or some combination of resources.

Task 6 - Complete Analysis of Survey

Upon the completion of Task 1 thru 5, under the direction of the TOCOR, the consultant will complete qualitative and quantitative analysis of the survey responses. The analysis shall identify correlations between variables and outcomes or risk factors and risk incidence in addition to any other statistical measures the contractor deems necessary based on their technical approach. The analysis will include a discussion of data precision for each of the evaluated risk or risk categories. The analysis will allow the Agency to understand Agency risk and guide risk responses based on Agency risk tolerance and on factors identified by the analysis, including but not limited to:

- Quality and quantity of information about the risk
- Probability and consequences of the risk,
- Time criticality of the risk; and,
- Measures and boundaries of the risk
- Ability of governance measures to mitigate risks (criticality and sensitivity analysis)

Using the information obtained in the survey and other data sources and methods as agreed with USAID, the consultant will estimate the magnitude of embedded losses and risks in the Agency's construction portfolio

C.4 DELIVERABLES

1) The Contractor will draft the overall work plan in conjunction with theTOCOR. The Work plan for the overall analytic work shall be completed by the contractor within two weeks of the award of the contract. The Work Plan will ensure coverage of all elements of the Statement of Work.

2) The overall deliverables under this Statement of Work will be:

- Final survey Instrument
- Survey design, including sampling and analysis plan
- A brief report summarizing USG and industry standards, practice and experience for construction programs.
- A brief memorandum providing recommendations for data validation and cleaning activities.
- An analytical report with narrative discussion of the results of the survey.
- Detailed Results Report with Narrative discussion of analytics, results, and probability and Impact matrix.
- Executive Presentation (PowerPoint) and a 2 page Executive Narrative Brief describing the results of the survey and related research.

3) The contractor will be required to submit a draft of these deliverables for TOCOR review and approval. The final version incorporating USAID revisions is to be delivered within fifteen (15) days of receipt of comment from USAID.

4) USAID reserves the right to classify materials as necessary.

-END OF SECTION C-

APPENDIX VI

USAID CONTRACTING TERMINOLOGY

APPENDIX VI

USAID CONTRACTING TERMINOLOGY

TERMS AS USED IN THIS CONSTRUCTION ASSESSMENT

Construction mean the construction, alteration, or repair (including dredging, excavating and [painting]) of buildings, structures or other real property. For purposes of this definition, the terms “buildings, structures, or other real property” include, but are not limited to, improvements of all types, such as bridges, dams, plants, high ways, parkways, streets, subways, tunnels, sewers, mains, power lines, cemeteries, pumping stations, railways, airport facilities, terminals, docks, piers, wharves, ways, lighthouses, buoys, jetties, breakwaters, levees, canals, and channels. (FAR 2.101) (Exceptions to the definition for purposes of the study were: vertical construction less than $5,000 and horizontal construction less than $50,000. More details are in Appendix V).

Award is defined by USAID as an implementing mechanism through which the agency transfers funds to an implementing partner, generally selected through a competitive process resulting in a contract, grant or cooperative agreement (please see ADS 200, 302 and 303 for more information). In addition, a significant portion of construction undertaken with USAID funding is being done through Government to Government (G2G) approaches (please see ADS 220 for more information). Although these bilateral mechanisms are signed by USAID and host governments with no direct involvement by implementing partners, **for this construction assessment, G2G agreements are included in the definition of “award,” thereby ensuring a uniform unit of analysis.**

Subaward is defined by USAID as the mechanism through which a prime award holder transfers funds to another entity to complete specific parts of the award’s scope of work.

COR/AOR refers to the contracting officer’s representative or agreement officer’s representation – these are the technical staff that manage the awards at the prime level.

DEFINITIONS/EXPLANATIONS OF PROCUREMENT MECHANISMS USED FOR CONSTRUCTION

USAID primarily implements activities via acquisition (procurement contracts) or assistance instruments (grants or cooperative agreements). In order for the Contracting Officer/Agreement Officer (CO/AO) to determine the appropriate instrument, he or she must determine the nature of the relationship between USAID and the awardee, and the intended purpose. It is important to note that the principal intent depends on the Agency’s purpose in establishing the relationship with the awardee.

Award is defined by USAID as an implementing mechanism through which the agency transfers funds to an implementing partner, generally selected through a competitive process resulting in a contract, grant or cooperative agreement (please see ADS 200, 302 and 303 for more information). In addition, a significant portion of construction undertaken with USAID funding is being done through Government to Government (G2G) approaches (please see ADS 220 for more information). Although these bilateral mechanisms are signed by USAID and host governments with no direct involvement by implementing partners, for the construction assessment G2G agreements are included in the definition of “award” thereby ensuring a uniform unit of analysis.

A. ACQUISITION

USAID must use a **contract** or order against a contract when the principal purpose of the instrument is the **acquisition – by purchase, lease, or barter – of property or services for the direct benefit or use of USAID or another U.S. Government (USG) entity.**

In order to determine which type of contract, or procurement instrument, should be used particularly for a construction activity, agency Contracting Officers refer to two sections of the Federal Acquisition Regulation (FAR), Part 16 "Types of Contracts" and Part 36 "Construction and Architect-Engineer Contracts."

FAR Part 16 provides a wide selection of contract types is available to the Government and contractors in order to provide needed flexibility in acquiring the large variety and volume of supplies and services required by agencies. Contract types vary according to—(1) The degree and timing of the responsibility assumed by the contractor for the costs of performance; and (2) The amount and nature of the profit incentive offered to the contractor for achieving or exceeding specified standards or goals. The contract types are grouped into two broad categories: fixed-price contracts and cost-reimbursement contracts. The specific contract types range from firm-fixed-price, in which the contractor has full responsibility for the performance costs and resulting profit (or loss), to cost-plus-fixed-fee, in which the contractor has minimal responsibility for the performance costs and the negotiated fee (profit) is fixed. In between are the various incentive contracts, in which the contractor's responsibility for the performance costs and the profit or fee incentives offered are tailored to the uncertainties involved in contract performance.

FAR Part 36 prescribes policies and procedures peculiar to contracting for construction and architect-engineer services (see definitions below).

Construction means construction, alteration, or repair (including dredging, excavating, and painting) of buildings, structures, or other real property. For purposes of this definition, the terms "buildings, structures, or other real property" include, but are not limited to, improvements of all types, such as bridges, dams, plants, highways, parkways, streets, subways, tunnels, sewers, mains, power lines, cemeteries, pumping stations, railways, airport facilities, terminals, docks, piers, wharves, ways, lighthouses, buoys, jetties, breakwaters, levees, canals, and channels. Construction does not include the manufacture, production, furnishing, construction, alteration, repair, processing, or assembling of vessels, aircraft, or other kinds of personal property.

Architect-engineer services means—(1) Professional services of an architectural or engineering nature, as defined by State law, if applicable, that are required to be performed or approved by a person licensed, registered, or certified to provide those services; (2) Professional services of an architectural or engineering nature performed by contract that are associated with research, planning, development, design, construction, alteration, or repair of real property; and (3) Those other professional services of an architectural or engineering nature, or incidental services, that members of the architectural and engineering professions (and individuals in their employ) may logically or justifiably perform, including studies, investigations, surveying and mapping, tests, evaluations, consultations, comprehensive planning, program management, conceptual designs, plans and specifications, value engineering, construction phase services, soils engineering, drawing reviews, preparation of operating and maintenance manuals, and other related services.

B. ASSISTANCE

USAID uses a grant or cooperative agreement when the principal purpose of the relationship is the transfer of money, property, services, or anything of value to the recipient in order to carry out a public purpose of support or stimulation authorized by Federal statute.

If the Operating Unit and the AO determine that USAID substantial involvement during the administration of an award is necessary for the achievement of the program's objectives, then a cooperative agreement is the appropriate assistance instrument.

If substantial involvement is not anticipated between USAID and the recipient during performance of the proposed program, then a **grant** is the appropriate assistance instrument.

A **Public International Organization (PIO)** is an international organization composed principally of countries, or any other organization that GC or BFS designates as a PIO. USAID provides funding to PIOs under various types of arrangements, including grants, cooperative agreements, contributions, and other types of assistance.

C. GOVERNMENT-TO-GOVERNMENT

G2G assistance is employed by a Mission when, as a result from both strategic planning and project design processes, it is determined that the best means to invest USAID resources and achieve a clearly stated development purpose is to **provide direct funding to partner government** entity of a bilateral foreign assistance recipient country to implement a project or project activity, including non-project assistance, using the partner government's own financial management, procurement or other systems. Use of G2G agreements is encouraged as a necessary element of sustaining development results beyond USAID funding.

Components of projects that include Government to Government (G2G) activities may employ a variety of funding mechanisms to finance approved activities and inputs. One such mechanism is the **Fixed Amount Reimbursement Agreement (FARA).** Under a FARA, USAID pays a fixed amount for the partner government's completion of activity outputs or associated milestones, as opposed to cost reimbursement financing mechanisms, which reimburse the actual costs of activity inputs and expenditures.

D. HOST COUNTRY CONTRACTS

Host Country awards represent a means of program implementation in which **USAID finances, but is not a party to, contractual arrangements** between the host country and the supplier of goods and/or services.

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APPENDIX VII

DESCRIPTIVE STATISTICS

TABLE 1. REGION V CONSTRUCT BUDGET (# AWARDS)

REGION	CONSTRUCTION BUDGET						TOTAL
	$1 TO <$.5M	$.5M-<$1M	$1M-<$10M	$10M-<$50M	$50M-<$100M	$100M AND ABOVE	
Africa	72	15	50	10	4	1	152
Asia	8	1	7	4	2	1	23
EE	11	8	21	6	-	-	46
LAC	31	9	21	12	-	-	73
ME	10	14	52	25	1	-	102
OAPA	3	1	8	17	9	6	44
E3	-	1	4	-	-	-	5
BFS	1	-	1	-	-	-	2
DCHA/ASHA	30	21	7	-	-	-	58
DCHA/FFP	13	15	9	1	-	-	38
DCHA/OFDA	38	15	25	2	-	-	80
DCHA/OTI	2	3	9	-	-	-	14
Global Health	3	-	-	1	-	-	4
Total	**222**	**103**	**214**	**78**	**16**	**8**	**641**

TABLE 2. PERCENT CONSTRUCTION V CONSTUCT BUDGET (# AWARDS)

PERCENT CONSTRUCTION	CONSTRUCTION BUDGET						TOTAL
	$1 TO <$.5M	$.5M-<$1M	$1M-<$10M	$10M-<$50M	$50M-<$100M	$100M AND ABOVE	
Primary (>80%)	38	35	75	38	10	5	201
50-80%	22	9	22	12	3	1	69
20-50%	24	15	36	13	2	1	91
<20%	137	44	71	8	-	1	261
Total	**221**	**103**	**204**	**71**	**15**	**8**	**622**

TABLE 3. REGION V PERCENT CONSTRUCTION (# AWARDS)

REGION	PERCENT CONSTRUCTION OF TOTAL BUDGET (%) – AWARDS				TOTAL
	PRIMARY (>80%)	50-80%	20-50%	<20	
Africa	38	13	14	96	
Asia	5	3	4	11	
EE	14	4	13	16	
LAC	20	4	8	43	
ME	58	6	13	21	
OAPA	19	9	5	16	
E3	-	-	1	3	
BFS	1	-	-	5	
DCHA/ASHA	35	13	6	3	
DCHA/FFP	-	1	4	97	
DCHA/OFDA	11	16	23	45	
DCHA/OTI	-	-	-	14	
Global Health	-	-	-	4	
Total	**201**	**69**	**91**	**4**	**735**

TABLE 4. REGION V PERCENT CONSTRUCTION (VALUE)

REGION	PERCENT CONSTRUCTION OF TOTAL BUDGET (%) – VALUE				TOTAL
	PRIMARY (>80%)	50-80%	20-50%	<20%	
Africa	614,388,416	55,254,602	43,158,489	94,900,196	807,701,703
Asia	192,798,325	98,539,534	4,670,735	13,327,861	309,336,455
EE	151,843,984	9,839,541	59,621,562	15,218,668	236,523,755
LAC	143,548,527	8,016,924	18,810,060	65,084,196	235,459,707
ME	314,495,970	132,807,598	183,429,300	40,983,638	671,716,506
OAPA	1,565,737,299	385,329,474	581,152,564	334,831,332	2,867,050,669
E3			1,000,000	4,841,974	5,841,974
BFS	4,000,000			200,000	4,200,000
DCHA/ASHA	21,099,720	6,001,377	3,106,110	177,000	30,384,207
DCHA/FFP		2,000,000	36,624,762	27,391,660	66,016,422
DCHA/OFDA	35,357,244	24,326,977	33,270,113	4,915,602	97,869,936
DCHA/OTI				30,795,769	30,795,769
Global Health				10,220,000	10,220,000
Total	**3,043,269,486**	**722,116,027**	**964,843,695**	**642,887,896**	**5,373,117,104**

TABLE 5. PCT CONSTRUCT V TYPE (# SUBAWARDS)

PERCENT CONSTRUCTION	TYPE OF CONSTRUCTION											
	ALL BUILDINGS	SCHOOL BUILDINGS	HOSPITALS & CLINICS	OTHER BUILDINGS	ALL TRANSPORTATION	ROADS	OTHER TRANSPORTATION	ALL WATER	WATER & WASTEWATER	WATER RESOURCES	ENERGY	OTHER
Primary (>80%)	103	51	21	37	24	22	15	88	61	23	13	7
50-80%	70	23	21	34	36	21	28	89	62	26	11	66
20-50%	254	73	8	188	24	23	6	98	68	42	5	18
<20%	775	258	135	433	370	358	29	497	223	304	58	613
Total	**1,202**	**405**	**185**	**692**	**454**	**424**	**78**	**772**	**414**	**395**	**87**	**704**

TABLE 6. REGION V CONSTRUCT BUDGET AND CONFLICT (# SUBAWARDS)

REGION	SUBAWARD CONFLICT STATUS	
	NOT	CONFLICT
Africa	238	65
Asia	40	135
EE	423	22
LAC	250	197
ME	459	34
OAPA	52	27
E3	12	-
BFS	7	-
DCHA/ASHA	57	1
DCHA/FFP	83	4
DCHA/OFDA	53	33
DCHA/OTI	497	608
Global Health	7	
Total	**2,178**	**1,126**

TABLE 7. PERCENT CONSTRUCT V CONSTRUCT BUDGET AND CONFLICT (# AWARDS)

PERCENT CONSTRUCTION	CONSTRUCTION BUDGET AND CONFLICT STATUS																	
	$1 TO <$.5M			$.5M-<$1M		$1M-<$10M				$10M-<$50M			$50M-<$100M			$100M AND ABOVE		
	NOT	CONFLICT	UNKNOWN	NOT	CONFLICT	UNKNOWN	NOT	CONFLICT	UNKNOWN	NOT	CONFLICT	UNKNOWN	NOT	CONFLICT	UNKNOWN	NOT	CONFLICT	UNKNOWN
Primary (>80%)	29	2	7	32	2	1	57	11	7	27	10	1	6	2	2	1	4	-
50-80%	13	3	6	7		2	16	5	1	9	3		1	2		1		-
20-50%	19		5	8	2	5	22	10	4	7	6		2				1	-
<20%	75	22	40	29	4	11	52	14	5	3	3	2					1	-
Total	**136**	**27**	**58**	**76**	**8**	**19**	**147**	**40**	**17**	**46**	**22**	**3**	**9**	**4**	**2**	**2**	**6**	**-**

TABLE 8. REGION NEW/UPGRADE/REHAB (# SUBAWARDS)

REGION	DEPTH		
	NEW	UPGRADE	REHAB
Africa	151	31	77
Asia	144	9	18
EE	121	47	235
LAC	173	95	72
ME	76	44	48
OAPA	47	7	17
E3	3	4	-
BFS	1	-	-
DCHA/ASHA	33	8	11
DCHA/FFP	41	2	36
DCHA/OFDA	33	3	33
DCHA/OTI	496	130	373
Global Health	-	-	-
Total	**1,319**	**380**	**920**

TABLE 9. REGION V SUBAWARDEE CONSTRUCTION IMPLEMENTER (# SUBAWARDS)

REGION	SUB-AWARDEE CONSTRUCTION IMPLEMENTER									TOTAL
	INTERNATIONAL CONSTRUCTION/ ENGINEERING	INTERNATIONAL FIRM (NOT PRIMARILY CONSTRUCTION FOCUSED)	INTERNATIONAL NGO/PBO	OTHER INTERNATIONAL ORGANIZATION	LOCAL CONSTRUCTION/ ENGINEERING FIRM	LOCAL FIRM (NOT PRIMARILY CONSTRUCTION FOCUSED)	LOCAL NGO	LOCAL GOVERNMENT	OTHER LOCAL ORGANIZATION	
Africa	8	3	27	8	195	12	13	1	19	286
Asia	3	-	1	-	119	7	3	1	39	173
EE	2	4	-	-	384	46	2	1	1	440
LAC	7	1	3	1	88	68	23	6	187	384
ME	11	2	14	-	278	3	7	6	10	331
OAPA	8	3	-	1	52	3	-	1	2	70
E3	3	1	6	-	2	-	-	-	-	12
BFS	-	-	-	-	3	-	-	-	1	4
DCHA/ASHA	4	-	2	-	38	-	-	-	10	54
DCHA/FFP	-	-	1	-	-	-	-	-	-	1
DCHA/OFDA	-	-	29	4	1	1	4	3	27	69
DCHA/OTI	1	-	1	-	151	10	3	8	23	197
Global Health	-	-	-	-	1	3	-	-	2	6
Total	**47**	**14**	**84**	**14**	**1,312**	**153**	**55**	**27**	**321**	**2,027**

TABLE 10. PCT CONSTRUCT V SUBAWARDEE CONSTRUCTION IMPLEMENTER (# SUBAWARDS)

PERCENT CONSTRUCTION	SUB-AWARDEE CONSTRUCTION IMPLEMENTER									TOTAL
	INTERNATIONAL CONSTRUCTION/ ENGINEERING	INTERNATIONAL FIRM (NOT PRIMARILY CONSTRUCTION FOCUSED)	INTERNATIONAL NGO/PBO	OTHER INTERNATIONAL ORGANIZATION	LOCAL CONSTRUCTION/ ENGINEERING FIRM	LOCAL FIRM (NOT PRIMARILY CONSTRUCTION FOCUSED)	LOCAL NGO	LOCAL GOVERNMENT	OTHER LOCAL ORGANIZATION	
Primary (>80%)	18	4	8	7	155	2	4	2	14	214
50-80%	5	1	12	1	209	3	3	-	8	242
20-50%	-	4	17	1	283	18	7	3	50	383
<20%	14	5	37	5	617	129	40	22	248	1,117
Total	**37**	**14**	**74**	**14**	**1,264**	**152**	**54**	**27**	**320**	**1,956**

TABLE 11. HEALTH RELATED – CONSTRUCT BUDGET V CONSTRUCTION TYPE

CONSTRUCT BUDGET	HEALTH (# SUBAWARDS WITH HEALTH DESIGNATION IN F FRAMEWORK)												TOTAL
	TYPE OF CONSTRUCTION												
	ALL BUILDINGS	SCHOOL BUILDINGS	HOSPITALS & CLINICS	OTHER BUILDINGS	ALL TRANSPORTATION	ROADS	OTHER TRANSPORTATION	ALL WATER	WATER & WASTEWATER	WATER RESOURCES	ENERGY	OTHER	
$1 to <$.5M	42	6	24	12	2	1	1	34	12	15	1	12	91
$.5M-<$1M	33	5	11	17	13	12	1	28	17	10	1	2	77
$1M-<$10M	88	14	62	12	6	5	1	114	57	34	5	23	236
$10M-<$50M	26	1	14	11	5	5	-	24	17	7	-	1	56
$50M-<$100M	16	5	9	2	7	3	4	4	3	1	-	1	28
$100M and above	1	1	-	-	-	-	-	-	-	-	-	-	1
Total	**206**	**32**	**120**	**54**	**33**	**26**	**7**	**204**	**106**	**67**	**7**	**39**	**489**

TABLE 12. HEALTH RELATED – REGION V TYPE OF CONSTRUCTION

REGION	HEALTH (# SUBAWARDS WITH HEALTH DESIGNATION IN F FRAMEWORK)											
	TYPE OF CONSTRUCTION											
	ALL BUILDINGS	SCHOOL BUILDINGS	HOSPITALS & CLINICS	OTHER BUILDINGS	ALL TRANSPORTATION	ROADS	OTHER TRANSPORTATION	ALL WATER	WATER & WASTEWATER	WATER RESOURCES	ENERGY	OTHER
Africa	69	5	47	20	3	1	3	46	26	31	-	18
Asia	2	1	1	-	-	-	-	1	1	-	-	1
EE	5	1	4	1	-	-	-	1	1	-	1	-
LAC	21	16	9	6	1	-	1	8	7	3	1	3
ME	41	1	29	11	8	8	-	48	46	3	-	2
OAPA	4	3	1	1	-	-	-	1	1	-	-	-
E3	-	-	-	-	-	-	-	5	4	-	1	-
DCHA/ASHA	15	2	13	2	-	-	-	1	1	-	-	-
DCHA/FFP	14	8	7	9	18	18	6	32	8	27	-	14
DCHA/OFDA	1	-	1	-	-	-	-	1	1	-	-	1
DCHA/OTI	8	1	-	7	9	9	-	5	2	2	1	1
Global Health	-	-	-	-	-	-	-	-	-	-	-	-
Total	**180**	**38**	**112**	**57**	**39**	**36**	**10**	**149**	**98**	**66**	**4**	**40**

TABLE 13. HEALTH RELATED – CONFLICT V TYPE (# SUBAWARDS)

REGION	TYPE OF CONSTRUCTION											
	ALL BUILDINGS	SCHOOL BUILDINGS	HOSPITALS & CLINICS	OTHER BUILDINGS	ALL TRANSPORTATION	ROADS	OTHER TRANSPORTATION	ALL WATER	WATER & WASTEWATER	WATER RESOURCES	ENERGY	OTHER
Not	156	29	97	53	4	3	1	94	60	36	2	18
Conflict	15	6	7	3	14	13	2	26	15	18	-	9
Total	**171**	**35**	**104**	**56**	**18**	**16**	**3**	**120**	**75**	**54**	**2**	**27**

TABLE 14. EDUCATION RELATED – CONSTRUCT BUDGET V TYPE OF CONSTRUCTION

REGION	EDUCATION (# SUBAWARDS DESIGNATED EDUCATION IN F FRAMEWORK)											
	TYPE OF CONSTRUCTION											
	ALL BUILDINGS	SCHOOL BUILDINGS	HOSPITALS & CLINICS	OTHER BUILDINGS	ALL TRANSPORTATION	ROADS	OTHER TRANSPORTATION	ALL WATER	WATER & WASTEWATER	WATER RESOURCES	ENERGY	OTHER
$1 to <$.5M	29	22	2	9	1	1	1	6	5	2	1	1
$.5M-<$1M	15	12	-	3	-	-	-	4	1	1	2	-
$1M-<$10M	45	39	9	8	1	1	1	2	2	-	1	1
$10M-<$50M	63	46	1	19	1	1	1	4	4	-	-	-
$50M-<$100M	9	4	5	1	4	2	3	1	1	-	-	1
$100M and above	1	1	-	-	-	-	-	-	-	-	-	-
Total	**162**	**124**	**17**	**40**	**7**	**5**	**6**	**17**	**13**	**3**	**4**	**3**

TABLE 15. EDUCATION RELATED – REGION V TYPE OF CONSTRUCTION

REGION	EDUCATION (# SUBAWARDS DESIGNATED EDUCATION IN F FRAMEWORK)											
	TYPE OF CONSTRUCTION											
	ALL BUILDINGS	SCHOOL BUILDINGS	HOSPITALS & CLINICS	OTHER BUILDINGS	ALL TRANSPORTATION	ROADS	OTHER TRANSPORTATION	ALL WATER	WATER & WASTEWATER	WATER RESOURCES	ENERGY	OTHER
Africa	26	16	-	11	3	1	3	4	4	-	-	-
Asia	4	3	-	2	-	-	-	-	-	-	-	-
EE	37	27	-	11	-	-	-	1	1	-	-	-
LAC	25	20	9	7	1	-	1	7	6	3	2	3
ME	35	27	5	4	2	2	1	2	2	-	-	1
OAPA	8	6	2	2	-	-	-	-	-	-	-	-
E3	-	-	-	-	-	-	-	-	-	-	-	-
DCHA/ASHA	36	30	1	7	-	-	-	7	4	2	2	-
DCHA/FFP	1	1	1	-	2	2	2	1	-	1	-	2
DCHA/OFDA	-	-	-	-	-	-	-	-	-	-	-	-
DCHA/OTI	-	-	-	-	-	-	-	-	-	-	-	-
Global Health	-	-	-	-	-	-	-	-	-	-	-	-
Total	**172**	**130**	**18**	**44**	**8**	**5**	**7**	**22**	**17**	**6**	**4**	**6**

TABLE 16. EDUCATION RELATED – CONFLICT V TYPE OF CONSTRUCTION

REGION	EDUCATION (# SUBAWARDS DESIGNATED EDUCATION IN F FRAMEWORK)											
	TYPE OF CONSTRUCTION											
	ALL BUILDINGS	SCHOOL BUILDINGS	HOSPITALS & CLINICS	OTHER BUILDINGS	ALL TRANSPORTATION	ROADS	OTHER TRANSPORTATION	ALL WATER	WATER & WASTEWATER	WATER RESOURCES	ENERGY	OTHER
Not	137	107	10	33	-	-	-	18	14	5	4	3
Conflict	31	20	8	8	3	2	2	2	2	-	-	1
Total	**168**	**127**	**18**	**41**	**3**	**2**	**2**	**20**	**16**	**5**	**4**	**4**

TABLE 17. CONSTRUCTION BUDGET VS CONSTRUCTION TYPE (# AWARDS)

CONSTRUCTION BUDGET	TYPE OF CONSTRUCTION (# AWARDS)												TOTAL
	ALL BUILDINGS	SCHOOL BUILDINGS	HOSPITALS & CLINICS	OTHER BUILDINGS	ALL TRANSPORTATION	ROADS	OTHER TRANSPORTATION	ALL WATER	WATER & WASTEWATER	WATER RESOURCES	ENERGY	OTHER	
$1 to <$.5M	98	30	26	54	8	8	5	67	31	34	5	26	204
$.5M-<$1M	50	16	11	33	9	9	1	39	24	17	5	9	112
$1M-<$10M	109	61	40	61	39	37	14	111	72	52	20	39	318
$10M-<$50M	36	20	6	24	19	19	9	40	21	14	13	10	118
$50M-<$100M	9	6	5	3	6	4	4	7	5	4	0	3	25
$100M and above	2	2	1	1	7	7	5	1	0	1	1	0	11
Total	**304**	**135**	**89**	**176**	**88**	**84**	**38**	**265**	**153**	**122**	**44**	**87**	**788**

TABLE 18. AWARD MECHANISM V DCHA TYPE (# SUBAWARDS)

AWARD MECHANISM	DCHA TYPE (# SUBAWARDS)			TOTAL
	OFDA	OTI	FFP	
Direct Contract	5	711	-	716
Grant (excluding PIO)	65	-	5	70
Public International Organization (PIO)	9	306	10	325
Cooperative Agreement	2	-	38	40
Host Country Award	-	-	-	-
Government to Government Agreement	-	-	-	-
Fixed Amount Reimbursement Agreement	-	-	-	-
USG Interagency Agreement	-	-	-	-
Other (DCA, multidonor, etc)	6	-	-	6
Total	**87**	**1,017**	**53**	**1,157**

TABLE 19. AWARD MECHANISM V SIZE (# AWARDS)

AWARD MECHANISM	CONSTRUCTION BUDGET						TOTAL
	$1 TO <$.5M	$.5M-<$1M	$1M-<$10M	$10M-<$50M	$50M-<$100M	$100M AND ABOVE	
Direct Contract	42	20	51	32	6	5	156
Grant (excluding PIO)	67	23	23	2	-	-	115
Public International Organization (PIO)	6	5	12	2	2	1	28
Cooperative Agreement	95	38	68	19	4	1	225
Host Country Award	1	1	19	10	-	-	31
Government to Government Agreement	1	1	7	6	4	1	20
Fixed Amount Reimbursement Agreement	3	8	20	5	-	-	36
USG Interagency Agreement	-	-	3	1	-	-	4
Other (DCA, multidonor, etc)	1	3	1	1	-	-	6
Total	**216**	**99**	**204**	**78**	**16**	**8**	**621**

TABLE 20. IMPLEMENTER V CONSTRUCTION BUDGET (#SUBAWARDS)

IMPLEMENTER	CONSTRUCTION BUDGET						TOTAL
	$1 TO <$.5M	$.5M-<$1M	$1M-<$10M	$10M-<$50M	$50M-<$100M	$100M AND ABOVE	
International Construction	2	6	18	15	-	4	45
International Firm	3	3	3	3	2	-	14
International NGO/PBO	29	10	28	14	-	-	81
Other international	3	1	5	1	2	1	13
Local Construction/En	146	66	536	278	128	3	1,157
Local firm (not prime)	33	-	96	12	2	-	143
Local NGO	21	18	8	4	-	-	51
Local Government	5	4	15	2	-	-	26
Other Local organization	30	12	75	172	1	-	290
Total	**272**	**120**	**784**	**501**	**135**	**8**	**1,820**

TABLE 21. MECHANISM V PCT CONSTRUCTION (# AWARDS)

AWARD MECHANISM	PERCENT CONSTRUCTION OF TOTAL BUDGET				TOTAL %
	PRIMARY (>80%)	50-80%	20-50%	<20	
Direct Contract	43	12	16	2	153
Grant (excluding PIO)	37	25	21	1	124
Public International	10	7	4	6	37
Cooperative Agreement	27	20	43	9	249
Host Country Award	30	-	-	-	
Government to Government	13	3	-	4	
Fixed Amount Reimburse	36	-	-	1	
USG Interagency Agree	2	1	-	2	
Other (DCA, multidonor, etc)	-	-	5	4	
Total	**198**	**68**	**89**	**9**	**664**

TABLE 22. CONFLICT V TYPE OF CONSTRUCTION (# SUBAWARDS)

CONFLICT STATUS	TYPE OF CONSTRUCTION											
	ALL BUILDINGS	SCHOOL BUILDINGS	HOSPITALS & CLINICS	OTHER BUILDINGS	ALL TRANSPORTATION	ROADS	OTHER TRANSPORTATION	ALL WATER	WATER & WASTEWATER	WATER RESOURCES	ENERGY	OTHER
Not	738	209	126	436	15	14	1	302	167	123	36	192
Conflict	369	159	41	197	292	263	56	324	213	167	31	464
Total	**1,107**	**368**	**167**	**633**	**307**	**277**	**57**	**626**	**380**	**290**	**67**	**656**

TABLE 23. CONSTRUCTION SIZE

CONSTRUCTION BUDGET	# AWARDS (CONSTRUCTION PRIORITY (>80%))	CONSTRUCTION BUDGET (AWARD) VALUE	% OF TOTAL	# OF AWARDS	% OF AWARDS	CONFLICT (AWARDS)	G2G	DCHA
$1 to <$.5M	38	44,959,742	2%	222	29%	27	5	53
$.5M-<$1M	35	70,031,765	5%	103	14%	8	10	33
$1M-<$10M	75	662,000,000	14%	214	28%	42	46	43
$10M-<$50M	38	1,540,000,000	36%	78	10%	24	21	3
$50M-<$100M	10	1,020,000,000	76%	16	2%	4	4	-
$100M and above	5	2,270,000,000	62%	8	1%	6	1	-
Total	**201**	**5,606,991,507**	**31%**	**641**	**85%**	**111**	**87**	**132**

TABLE 24. MANAGEMENT ISSUES

	TOTAL	A. DESIGN OVERSIGHT				B. COR SITE VISITS (AVERAGE/YEAR)				C. COR TRAINED IN CONSTRUCTION/A&E		
		YES (BY USAID DH/FSN/PSC)	YES (NOT BY USAID DH/FSN/PSC)	NO	UNKNOWN	3 OR MORE	1 TO 2	0	UNKNOWN	YES	NO	UNKNOWN
Number of Awards	758	49	282	342	85	314	86	91	267	168	338	252
% of Awards	100%	6%	37%	45%	11%	41%	11%	12%	35%	22%	45%	33%
Construction Value	$5,161 m	$724 m	$2,694 m	$1,190 m	$553 m	$3,187 m	$368 m	$246 m	$1,360 m	$1,477 m	$2,518 m	$1,166 m
% of Const. Value	100%	14%	52%	23%	11%	62%	7%	5%	26%	29%	49%	23%

	TOTAL	D. GENDER ANALYSIS INCLUDED IN PLANNING/DESIGN			E. GOVERNMENT ENGAGED IN DESIGN PROCESS			F. NON-GOV. STAKEHOLDERS ENGAGED IN DESIGN PROCESS			G. AVAILABILITY OF O&M FUNDS ASSESSED		
		YES	NO	UNKNOWN	YES	NO	UNKNOWN	YES	NO	UNKNOWN	YES	NO	UNKNOWN
Number of Awards	758	437	142	179	532	59	167	425	124	209	334	204	220
% of Awards	100%	58%	19%	24%	70%	8%	22%	56%	16%	28%	44%	27%	29%
Construction Value	$5,161 m	$3,208 m	$1,131 m	$821 m	$4,499 m	$480 m	$182 m	$1,970 m	$1,252 m	$1,939 m	$3,275 m	$1,039 m	$846 m
% of Const. Value	100%	62%	22%	16%	87%	9%	4%	38%	24%	38%	63%	20%	16%

H. DISABILITY INCORPORATED INTO DESIGN

SUBAWARD INCORPORATED DESIGN ELEMENTS TO ACCOMMODATE PEOPLE WITH DISABILITIES	ALL BUILDINGS	SCHOOL BUILDINGS	HOSPITALS & CLINICS	OTHER BUILDINGS
No	256	109	9	151
Yes	316	154	84	101
Don't Know	423	81	68	298
Total	**995**	**344**	**161**	**550**

TABLE 25. DISTRIBUTION OF ESTIMATED CONSTRUCTION BUDGET ($)

	CONSTRUCTION BUDGET	% OF TOTAL BUDGET
Afghanistan	1,501,959,801	27%
Pakistan	1,375,020,082	24%
South Sudan	373,702,491	7%
West Bank Gaza	296,786,654	5%
Jordan	273,667,961	5%
Georgia	156,857,493	3%
Indonesia	141,795,411	3%
Haiti	125,759,510	2%
Kenya	103,417,366	2%
DCHA/OFDA	97,869,936	2%
Colombia	73,584,324	1.3%
Philippines	69,766,697	1.2%
Iraq	69,742,029	1.2%
Ethiopia	67,976,523	1.2%
Lebanon	67,577,349	1.2%
DCHA/FFP	66,016,422	1.2%
Egypt	55,457,282	1.0%
Cambodia	55,343,500	1.0%
Bangladesh	49,922,837	0.9%
West Africa Regional	43,423,094	0.8%
Europe and Eurasia	42,055,509	0.7%
Ghana	38,562,996	0.7%
Somalia	38,000,000	0.7%
Vietnam	36,783,235	0.7%
Ecuador	31,604,516	0.6%
DCHA/OTI	30,795,769	0.5%
DCHA/ASHA	30,722,075	0.5%
Sudan	24,260,262	0.4%
Senegal	23,356,591	0.4%
Kosovo	22,155,937	0.4%
Tanzania	21,537,866	0.4%
Liberia	15,767,990	0.3%
Dem Rep of Congo	11,530,281	0.2%
E3	11,424,634	0.2%
Guatemala	10,880,000	0.2%
Madagascar	10,625,366	0.2%
Health	10,220,000	0.2%
Mali	10,024,216	0.2%
Nigeria	9,952,094	0.2%
South Africa	9,849,231	0.2%
Cyprus	9,100,000	0.2%

TABLE 25. DISTRIBUTION OF ESTIMATED CONSTRUCTION BUDGET ($)

	CONSTRUCTION BUDGET	% OF TOTAL BUDGET
Armenia	9,008,895	0.2%
Uganda	8,896,192	0.2%
East Africa Regional	8,255,924	0.1%
Rwanda	7,663,055	0.1%
Mozambique	6,096,000	0.1%
Ukraine	5,891,448	0.1%
Dominican Republic	5,154,726	0.1%
Sri Lanka	5,150,000	0.1%
Honduras	5,000,000	0.1%
Paraguay	4,620,698	0.1%
El Salvador	4,344,071	0.1%
BFS	4,200,000	0.1%
Jamaica	4,050,000	0.1%
Zambia	3,835,000	0.1%
Nepal	3,320,735	0.1%
Peru	2,597,540	0.05%
Nicaragua	1,918,590	0.03%
Macedonia	1,820,000	0.03%
Sarajevo, Bosnia and Herzegovina	1,500,000	0.03%
Morocco	1,472,535	0.03%
Mongolia	1,253,840	0.02%
Burundi	1,045,500	0.02%
Central Asia Republics	1,000,000	0.02%
Serbia	1,000,000	0.02%
Eastern Caribbean	908,000	0.02%
E3/Water	716,974	0.01%
Albania	600,000	0.01%
Malawi	514,714	0.01%
Zimbabwe	415,202	0.01%
Angola	375,000	0.01%
Djibouti	176,000	0.00%
Azerbaijan	150,780	0.00%
Moldova	115,598	0.00%
Brazil	100,000	0.00%
Southern Africa	-	0%
Total	**5,618,022,347**	**100%**

TABLE 26. PERCENT CONSTRUCTION FOR LARGE INFRASTRUCTURE AWARDS (# AWARDS)

REGION	PERCENT CONSTRUCTION OF TOTAL BUDGET (# AWARDS)								TOTAL
	$50-<$100M				$100M AND ABOVE				
	PRIMARY (>80%)	50-80%	20-50%	<20%	PRIMARY (>80%)	50-80%	20-50%	<20%	
Africa	4	-	-	-	1	-	-	-	5
Asia	-	1	-	-	1	-	-	-	2
ME	-	1	-	-	-	-	-	-	1
OAPA	6	1	2	-	3	1	1	1	15
Total	**10**	**3**	**2**	**-**	**5**	**1**	**1**	**1**	**23**

TABLE 27. PERCENT CONSTRUCTION (VALUE $)

REGION	PERCENT CONSTRUCTION OF TOTAL BUDGET ($)								TOTAL
	$50-<$100M				$100M AND ABOVE				
	PRIMARY (>80%)	50-80%	20-50%	<20%	PRIMARY (>80%)	50-80%	20-50%	<20%	
Africa	267,747,443	-	-	-	220,500,000	-	-	-	488,247,443
Asia	-	65,866,697	-	-	114,252,328	-	-	-	180,119,025
ME	-	50,000,000	-	-	-	-	-	-	50,000,000
OAPA	356,820,045	81,000,000	147,269,235	-	1,022,846,947	225,000,000	400,000,000	290,000,000	2,522,936,227
Total	**624,567,488**	**196,866,697**	**147,269,235**	**-**	**1,357,599,275**	**225,000,000**	**400,000,000**	**290,000,000**	**3,241,302,695**

TABLE 28. LARGE INFRASTRUCTURE DESIGNATED CONFLICT

	CONFLICT (# AWARDS)		TOTAL
	$50M-<$100M	$100M AND ABOVE	
Africa	-	1	1
Asia	1	-	1
ME	1	-	1
OAPA	6	5	11
Total	**8**	**6**	**14**

TABLE 29. TYPE OF CONSTRUCTION

REGION	TYPE OF CONSTRUCTION FOR LARGE INFRASTRUCTURE											
	ALL BUILDINGS	SCHOOL BUILDINGS	HOSPITALS & CLINICS	OTHER BUILDINGS	ALL TRANSPORTATION	ROADS	OTHER TRANSPORTATION	ALL WATER	WATER & WASTEWATER	WATER RESOURCES	ENERGY	OTHER
Africa	4	1	2	1	4	2	4	1	-	1	-	-
Asia	11	4	1	6	29	15	24	4	2	2	-	53
ME	5	1	4	-	1	1	-	1	1	-	-	1
OAPA	13	12	4	2	7	6	4	5	2	4	1	1
Total	**33**	**18**	**11**	**9**	**41**	**24**	**32**	**11**	**5**	**7**	**1**	**55**

TABLE 30. AWARD MECHANISMS BY REGION – VALUE AND NUMBER OF AWARDS

	A. AWARD VALUE									
	DIRECT CONTRACT	GRANT (EXCLUDING PIO)	PUBLIC INTERNATIONAL ORGANIZATION (PIO)	COOPERATIVE AGREEMENT	HOST COUNTRY AWARD	GOVERNMENT TO GOVERNMENT AGREEMENT	FIXED AMOUNT REIMBURSEMENT AGREEMENT	USG INTERAGENCY AGREEMENT	OTHER (DCA, MULTIDONOR, ETC)	TOTAL
Africa	385,832,551	19,854,996	132,869,447	261,751,795	990,000	1,846,200	20,758,116	2,875,512	-	826,778,617
Asia	248,709,778	-	1,253,840	68,549,800	-	13,000,000	-	32,322,837	-	363,836,255
EE	40,642,996	-	-	45,423,167	27,878,063	91,078,305	100,000	3,194,620	41,438,509	249,755,660
LAC	147,320,743	526,000	900,000	99,915,304	4,050,000	5,800,000	12,009,928	-	-	270,521,975
ME	249,242,137	6,000	-	243,232,227	203,822,060	8,483,286	51,918,100	-	-	756,703,810
OAPA	1,014,934,527	331,974	430,754,732	396,824,293	-	949,134,357	85,000,000	-	-	2,876,979,883
E3	4,125,000	-	-	8,016,608	-	-	-	-	-	12,141,608
BFS	-	-	-	-	-	-	-	4,000,000	-	4,000,000
DCHA/ASHA	-	21,904,108	1,070,000	7,747,967	-	-	-	-	-	30,722,075
DCHA/FFP	-	1,104,808	3,600,000	41,722,926	-	-	-	-	-	46,427,734
DCHA/OFDA	1,252,252	59,342,194	24,430,189	5,866,387	-	-	-	-	3,426,413	94,317,435
DCHA/OTI	22,727,645	-	6,507,489	-	-	-	-	-	-	29,235,134
Global Health	10,170,000	-	-	50,000	-	-	-	-	-	10,220,000
Total	**2,124,957,629**	**103,070,080**	**601,385,697**	**1,179,100,474**	**236,740,123**	**1,069,342,148**	**169,786,144**	**42,392,969**	**44,864,922**	**5,571,640,186**

	B. NUMBER OF AWARDS									
	DIRECT CONTRACT	GRANT (EXCLUDING PIO)	PUBLIC INTERNATIONAL ORGANIZATION (PIO)	COOPERATIVE AGREEMENT	HOST COUNTRY AWARD	GOVERNMENT TO GOVERNMENT AGREEMENT	FIXED AMOUNT REIMBURSEMENT AGREEMENT	USG INTERAGENCY AGREEMENT	OTHER (DCA, MULTIDONOR, ETC)	TOTAL
Africa	43	7	8	96	1	2	2	1	-	160
Asia	11	-	1	11	-	1	-	1	-	25
EE	18	-	-	18	3	3	1	1	3	47
LAC	27	3	2	40	2	3	3	-	-	80
ME	19	1	-	27	25	3	28	-	-	103
OAPA	25	1	2	8	-	8	3	1	-	48
E3	2	-	-	3	-	-	-	-	-	5
BFS	-	-	3	1	-	-	-	1	-	5
DCHA/ASHA	-	44	1	13	-	-	-	-	-	58
DCHA/FFP	-	5	10	38	-	-	-	-	-	53
DCHA/OFDA	5	64	9	2	-	-	-	-	6	86
DCHA/OTI	12	-	1	-	-	-	-	-	-	13
Global Health	3	-	-	1	-	-	-	-	-	4
Total	**165**	**125**	**37**	**258**	**31**	**20**	**37**	**5**	**9**	**687**

APPENDIX VIII

SYNOPSES OF MISSION ORDERS, BEST PRACTICES, AND E3 CONSTRUCTION PRIMERS

APPENDIX VIII

MISSION ORDERS, BEST PRACTICES, AND E3 CONSTRUCTION PRIMERS

CH2M HILL staff visited 11 missions as part of the Construction Risk Assessment in summer 2013. During these visits, the team collected mission orders and identified best practices in Georgia, West Bank, and Pakistan. Additionally, CH2M HILL received a set of nine primers from the E3 Bureau Infrastructure team.

These orders are not the complete set of mission orders because CH2M HILL staff did not visit many of the infrastructure-intensive missions such as Afghanistan, Jordan, Egypt, or Haiti. Orders in these missions should be catalogued. However, these mission orders and primers do provide a starting point from which the Agency can capture some of its organizational best practices and develop an effective set of construction policies and procedures.

The orders and primers align to many of the proposed critical success factors. The orders and primers generally incorporate a program management structure, either through a program manager / engineer or through host-country government agencies and recognizing the need for ensuring effective planning and design. Furthermore, these best practices provide recommendations for community and host-government engagement at all levels. Finally, the orders provide recommendations for staffing requirements to ensure there is effective oversight and control by qualified USAID staff.

MISSION ORDERS

GEORGIA	**Mission Order for Implementation Projects with Construction Activities.** This order incorporates the USAID General Notice 0424 – USAID Construction Policy. It provides basic requirements for how construction programs are procured and executed by size and contract mechanism. It also provides educational and experience requirements for the COR for projects over specific cost thresholds. The order specifies a number of minimum requirements for inclusion in construction contracts, such as a quality control process and health and safety plans. Additionally, it provides an additional level of specific approvals for cooperative agreements to ensure stronger oversight for these instruments.
WEST BANK / GAZA	**Mission Order 202 – Review and Oversight of Construction Activities under USAID Awards.** This order incorporates the USAID General Notice 0424 – USAID Construction Policy. It provides requirements for pre-award and post-award activities of both contracts and cooperative agreements. Pre-award activities require inclusion of engineering staff to clear the Project Appraisal Document and to serve on the evaluation committee. In post award, the orders describe preconstruction design reviews and site visit requirements. The mission order includes two attachments, one prescribes details on implementing construction as part of Cooperative Agreements and the other prescribes details for construction as part of contracts.
PAKISTAN (DRAFT)	**Construction Oversight Procedures.** This order incorporate the USAID General Notice 0424 – USAID Construction Policy. The second part of the order provides more detail on oversight requirements and COR capacity and experience requirements. For example, contracts with an estimated construction cost greater than $5M require an engineer as the COR or an engineer having substantial involvement with the award. Projects greater than $10M require that the COR is an engineer. The order also requires USAID to perform an assessment of the host country implementing unit for government-to-government (G2G) agreements and specifies oversight of the host country implementing unit.

MISSION BEST PRACTICES

COLOMBIA	Oversight Trigger	Although not a specific mission order, the Colombia mission had a construction oversight trigger prior to Agency requirement captured in USAID General Notice 0424 – USAID Construction Policy. This practice has been used whenever an infrastructure project exceeds a certain threshold: Typically, projects of more than $100,000 USD required engineering review (either a USAID or consultant engineer) and COR approval.
COLOMBIA	Social Auditing	For the Areas for Municipal-Level Alternative Development (ADAM) project and some earlier programs, the stakeholder engagement process included a "social auditing" component from the beneficiary communities themselves through a social audit committee for each project.
COLOMBIA	Community engagement model to engage local experts and officials	The Social Infrastructure Fund (SIF) used a participatory model that involves local, municipal, and departmental government; project implementers (such as NGOs and funding partners); community representatives; and technical experts, such as civil engineers or accountants, to help manage the projects. SIF was developed in response to an environment of very low trust and cooperation with and within the government. The SIF project has been proven to increase beneficiaries' trust in government, which helps relieve acute problems in Colombia, such as recruitment into paramilitary and terrorist groups. The SIF project benefits from a reasonably robust engineering and construction capacity within the country, as well as an abundance of regulation, which may not make it applicable in all countries. This local capacity exists not only for implementers, but also for inspection and enforcement of local codes. This model has many benefits that tie back to critical success factors: 1) increased accountability, 2) improved project screening and development, 3) inclusion of local engineering best practices, 4) improved construction oversight, 5) increased civil capacity, 6) improved trust in Colombian governmental systems, and 7) increased sustainability.
GEORGIA	Checklist for conducting universal accessibility inspections	This reference tool provides a simplified method for determining the American Disability Act (ADA) accessibility requirements and instructions for implementing and inspecting these requirements for facilities constructed or renovated with USAID funds.
PAKISTAN	Online tracking system	The USAID Pakistan Office of Infrastructure and Engineering (OIE) maintains a matrix of all projects with critical cost, contract, project dates, status, and administrative data for all OIE projects. This information is used to maintain status and track progress. The staff also uses the PakInfo system, a local Sharepoint site, to maintain critical contract and agreement documents.
PAKISTAN	Community engagement in project development and design	OIE engages significant and early community involvement in project screening and design development. OIE works to start community engagement 3-5 months in advance of project award to get local ownership/involvement in the activities. The engagement resulted in infrastructure activities are better able to meet local needs and reduced schedule delays and security issues. One example cited was the formation of a "school committee" in the village that was receiving a new school. The unpaid committee helped shape the design and worked with local stakeholders to ensure the project proceeded. The committee also was trained on maintenance of the school, resulting in positive feedback during post construction follow-up inspections. (See Thomas, Jane. No date. Get off my land, please: A primer for community participation and construction. Produced for the USAID Pakistan Earthquake Reconstruction and Recovery Program.)
PAKISTAN	Risk mitigation guidelines for G2G construction	The (OIE) has developed a set of risk mitigation guidelines for G2G infrastructure construction. These documents highlight a number of key risks and recommended mitigation measures for G2G construction agreements.

PAKISTAN	Integration of contractor capacity building in international construction standards and methods into all construction programs	The Pakistan mission includes capacity-building considerations within its entire portfolio of construction awards. Although not specifically a best practice, this is an area that the Pakistan OIE team feels should be acknowledged with all USAID construction awards. The OIE approach is that all awards serve a dual purpose. First, they are designed to produce a finished construction project – a school, a clinic, a bridge, etc. The second purpose of many of these projects is to build construction capacity for the country of Pakistan-- to train the local contractors to use internationally accepted construction techniques that then can improve the overall quality of construction within Pakistan. The concept is that the second purpose likely provides greater benefit than the project itself. OIE recognizes that this second "purpose" likely causes additional cost and/or schedule delays because it requires training of the local contractor, but these delays and costs are justified given the benefit that capacity-building has on the entire industry.

E3 CONSTRUCTION PRIMERS

Basic Engineering and Construction Primer Prepared for USAID by Tetra Tech, December 2010, ES, Inc.	This primer covers the basic steps in the process of planning and contracting for engineering and infrastructure projects funded by USAID. It is intended for training and as a reference for USAID engineers and other development staff on engineering, construction implementation, and management.
Engineering of Infrastructure Primer for Development Professionals: A Primer Prepared for USAID by Michael Gould of CH2M HILL through the International Resources Group, January 2012	This primer provides guidance on hiring and managing an Architect-Engineering (A/E) firm. It explains the roles and responsibilities of the A/E firm as it assists USAID in the planning and engineering design of infrastructure projects. Although it focuses on USAID direct contracting, the principles are applicable to host country contracting where the host country or cooperating country implementing agency hires an A-E firm using USAID financing. Tendering support, construction supervision, and operations and maintenance (O&M) support are also discussed but are covered in more detail in other primers.
Construction Tendering Principles for Development Professionals: A Primer Prepared for USAID by Michael Gould of CH2M HILL through the International Resource Group, January, 2012	The purpose of this primer is to provide general information regarding the tendering process for USAID infrastructure projects. The tendering process is used to secure a qualified constructor to construct the planned facilities based on engineering designs developed by an A-E firm or Engineer. This primer is intended for USAID staff members involved with direct contracting of infrastructure projects under USAID country programs. Host country contracting is covered under another primer. Specific staff functions in the USAID mission must be involved and work as a team to successfully plan and implement an infrastructure project.
Basic Engineering Construction Oversight Principles for Development Professionals: A Primer Prepared for USAID by Moenes E. Youannis through the International Resource Group, January 2012	This primer provides a brief overview of some factors that have significantly affected USAID construction programs over the last three decades. The primer focuses on construction oversight as an important element of these projects. The document includes definitions, guidelines, and a brief discussion of USAID experience in construction projects. The primer provides an overview of a typical construction project; identifies important stakeholders and parties to construction projects; and provides a discussion of the contractual and work relationships between the identified stakeholders and parties, with special focus on USAID's role.
Basic Host Country Construction Contracting for Development Professionals Prepared for USAID by Moenes E. Youannis, through the International Resource Group, January 2012	The primary objective of this primer is to provide engineering and non-engineering development professionals with a one-stop reference for the use of USAID-financed Host Country Construction (HCC) approaches and to describe USAID's role and responsibilities in the implementation of USAID-financed HCC contracts. This primer provides a brief description and discussion of the different types of acquisition contracting approaches that USAID has used throughout the years in designing and implementing its construction programs. The primer then provides more details on providing contracting and implementation guidelines for using HCC mechanisms in carrying out a variety of construction activities. The document includes definitions, contracting and implementation guidelines, a discussion of USAID experience in construction projects, discussions of the challenges and constraints faced and those to be expected, and finally, a discussion of the important lessons learned. The USAID Automated Directive Systems (ADS) and its Supplementary References in effect at the time of drafting this document represent the primary source of guidance discussed in this document regarding the use of HCC in construction. ADS clauses are quoted throughout the document.

FARA Procurement and Implementation Guidelines Prepared for USAID by Moenes E. Youannis, through Tetra Tech, December 2010	This document provides a brief discussion of the different types of contracting mechanisms the Agency currently uses in designing and implementing construction projects. It also provides contracting and implementation guidelines for using FARA in carrying out infrastructure activities. The USAID ADS and its Supplementary References provided an excellent source of information regarding the use of FARAs. The purpose of this document is to provide to development professionals (engineering and non-engineering) with a one-stop reference for designing and implementing FARAs. It includes definitions, guidelines, case studies, and lessons learned from previous USAID experience. It also outlines the necessary steps for implementing construction activities with the overall objective of enabling USAID to meet its long-term development goals. Throughout the document, emphasis is placed on USAID/Egypt's experience with using FARAs during the last 30 years. The examples provided are also based on USAID/Egypt's experience with several of its completed and ongoing FARAs. It is important to note that direct contracting and host country contracting are not the subject of this document, and as such, only a brief overview is provided. Also, this document is based on the applicable regulations in effect when these guidelines were developed; the applicable ADS clauses are incorporated in the document.[1]
Basic Principles for Health Infrastructure: A Primer Prepared for USAID by MASS Design Group for the International Resource Group, January 2012	This primer provides USAID officers and Host Country officials with the steps, principles, and best practices to properly carry out health infrastructure design, construction, and renovation. It provides a road map on how to use broadened partnerships to develop a holistic health infrastructure project through planning, design, and implementation, and builds upon an earlier report, "Basic Engineering and Construction Management: A Primer." A holistic approach acknowledges the impact that infrastructure interventions have on multiple sectors of the region. Regardless of scale, from new construction to a small retrofit, projects will ultimately impact not only the delivery of healthcare, but also the community, economy, and environment. Ignoring these impacts can result in negative or debilitating consequences that will limit the effectiveness of the initial investment. This primer is intended to guide USAID officials through the process of cultivating the right partnerships to integrate economic, community, and environmental considerations while designing patient-centric spaces and ultimately facilitating better health outcomes.
Building Back Housing in Post-Disaster Situations – Basic Engineering Principles for Development Professionals: A Primer Prepared for USAID by Build Change for the International Resource Group, October 2013	This primer introduces engineering and development professionals to the basic steps in the process of selecting a model for planning and executing post-disaster homeowner-driven housing reconstruction projects funded by USAID. It is intended to provide USAID officers and Host Country officials with the steps, principles, and best practices that need to be taken to properly carry out homeowner-driven housing construction and reconstruction in a post-disaster situation. It provides a road map on how to develop a project through planning, design and implementation and builds on two earlier USAID Primers, "Basic Host Country Construction Contracting for Development Professionals: a Primer," and "Basic Engineering and Construction Management: A Primer."
Introduction to Irrigation Project Design Prepared for USAID by Mark Svendsen for the International Resource Group, January 2012	This primer is to introduce the basic features of an irrigation system to a non-engineering audience and to highlight important issues to be considered in designing a development assistance project involving irrigation. The approach taken is to divide the irrigation system into a set of six sub-systems and to describe each of these, along with the important design options within each that are available to system planners. Although the principles introduced apply generally to any irrigation system, it is assumed that the focus of the intended audience will be small- and medium-sized systems. Large multi-purpose reservoir-based systems, though having the same basic components, will be significantly more complex and their development process requires significantly more rigorous study, environmental planning, and engineering design.

1 Please note that the terms Engineer and architecture and engineering contractor (A&E) have the same meaning. They refer to the engineering consultant responsible for providing engineering services, construction management, and tendering assistance.

Site and Retaining Wall Hazard Mitigation in Post-Disaster Situations: A Primer Prepared for USAID by Build Change for Parsons Engineering, January 2014	This primer introduces engineering and development professionals to the basic steps in the process of selecting a model for planning and executing post-disaster mitigation of site hazards for homeowner-driven housing reconstruction projects funded by USAID. It is intended to provide USAID officers and host country officials with the steps, principles, and best practices that need to be taken to carry out homeowner-driven site hazard mitigation properly in a post-disaster situation. It provides a road map for developing a project through planning, design, and implementation and is considered a parallel document to two other primers, “Building Back Housing in Post-Disaster Situations – Basic Engineering Principles for Development Professionals: A Primer,” and “Seismic Retrofit of Housing in Post-Disaster Situations – Basic Engineering Principles for Development Professionals: A Primer.”
Seismic Retrofit of Housing in Post-Disaster Situations Basic Engineering Principles for Development Professionals: A Primer Prepared for USAID by Build Change for Parsons Engineering, January 2014	The focus of this primer is on the seismic retrofit of existing housing using the homeowner-driven reconstruction model. Homeowner-driven reconstruction is a post-disaster housing reconstruction model that is gaining in usage and popularity worldwide. It has been successfully implemented after recent earthquakes in India, Indonesia, China, and Haiti.

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