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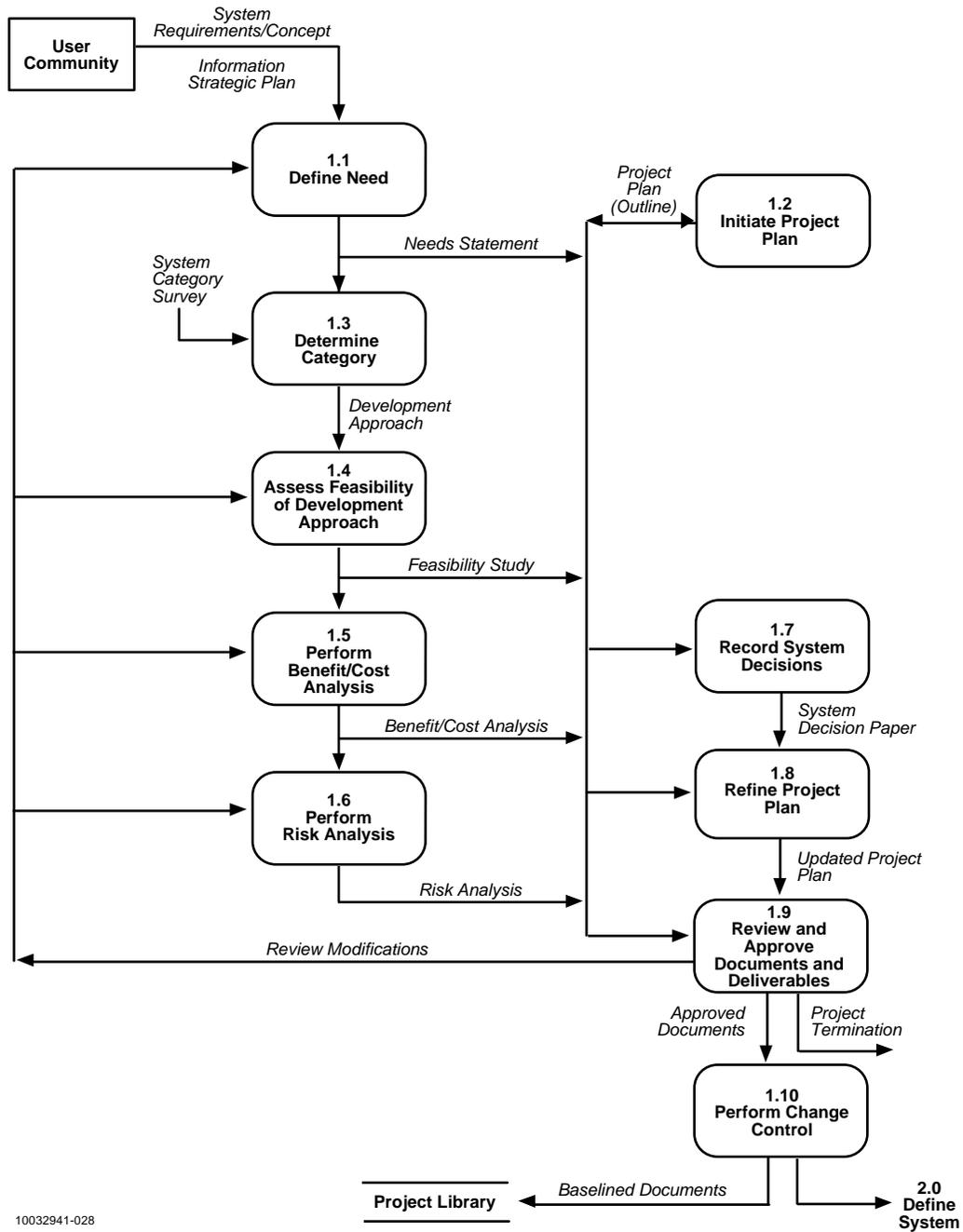
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Section 1. Initiate Project

1.0 Initiate Project Phase



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Figure 1-1. Process Flow for Initiate Project Phase

1.0 INITIATE PROJECT

Purpose

The Initiate Project phase of system development is the period in which an information management need is identified and the decision is made whether to commit the necessary resources to solve the deficiency. Figure 1-1 highlights the process flow for the Initiate Project phase.

Overview

The activities of the Initiate Project phase begin with identification of an information management need. A user or system sponsor may identify the need or it may be the result of the strategic information architecture analysis described in the HUD Information Strategy Plan (ISP). The need is documented in the form of a Needs Statement. This document describes the deficiency, justifies the exploration of alternative solutions, and is approved by the Technology Investment Board (TIB).

After a need has been fully documented and approved, the project manager plans the Initiate Project phase activities. The project manager evaluates the scope of the project, including the security categorization of the proposed system, and documents high-level phase activities in a preliminary Project Plan. Decisions regarding size, complexity, risk, and level of effort are to be made on a project-by-project basis in accordance with current HUD standards. The project manager classifies the proposed development effort as a new development or as an enhancement to an existing system. The applicable selection criteria have been designed to provide assistance when determining that classification. The project manager further categorizes the project as either a major or a minor effort according to its size and complexity. In addition, the project manager makes decisions concerning the analysis, design, and development techniques for the project, including computer-aided software engineering (CASE) tools.

After an information management need has been described, documented, and approved, alternatives for solving the need must be identified. Criteria for evaluating these alternatives are developed based on the objectives and security categorization of the proposed project. Each alternative is evaluated for its technical, cost, and schedule feasibility, and a determination made as to the best development option. The steps of this analysis are documented in a feasibility study that describes the criteria used to evaluate each alternative and identifies the preferred development approach.

For each alternative considered, a benefit/cost analysis is performed. All economic benefits and costs, including development and operation, one-time, and recurring costs, are calculated in current dollar values. Benefits that cannot be quantified in dollar amounts are identified. Each alternative is then evaluated based on the net economic benefits of developing and operating the system, as calculated during the analysis. This evaluation is documented in the benefit/cost analysis, including the analysis methodology, the alternatives with their associated benefits and costs, and a recommendation as to the best development alternative.

A risk analysis on system security is then performed, identifying the threats and vulnerabilities associated with the proposed project, system and data criticality and sensitivity, as well as potential control alternatives. The purpose of the risk analysis is to identify and assess risk, and to subsequently select cost-effective safeguards that will reduce

security-related risks to an acceptable level. The following components are included in a risk analysis document:

- System characterization, considering both system and data criticality and sensitivity, as well as system boundaries
- Identification of threats and vulnerabilities, and likelihood determinations for each threat
- Impact analysis and risk determination
- Security requirements and control recommendations based on the sensitivity and criticality of the proposed project to the project sponsor and user organizations
- Baseline security requirements that must be satisfied to ensure that applicable HUD guidelines are met

All decisions made during the Initiate Project phase are recorded in a System Decision Paper (SDP), as is the schedule of activities already accomplished. In addition, a projected schedule of activities for the full lifecycle of the system, by phase, is provided in the SDP. Included in this schedule are the actual or projected beginning and ending dates for each phase, as well as a running total of the actual or projected development and operation costs, broken out by phase and totaled by fiscal year. Major, complex development efforts, generally those addressing departmental priority needs, should follow the activities and tasks as outlined in the System Development Methodology (SDM). Minor efforts may need to tailor the SDM to fit the project's specific needs.

Based on the findings summarized in the SDP, the appropriate review board decides whether to continue with the proposed development effort. If the review board decides to continue, the project manager documents the decision and which development alternative is selected in the SDP. The project manager then updates the Project Plan accordingly.

Reviews of the project are performed by one or more of the following groups:

- **Technology Investment Board (TIB).** Responsible for ensuring that Departmental resources are directed to the highest Information Resource Management (IRM) priorities of the Department and that these limited resources are efficiently utilized. The TIB tracks and reviews progress toward achieving key events and target dates for critical project activities.
- **Change Control Board (CCB).** Serves as the decision-making body for each program area project. The CCB is the control mechanism for the program office that has requested the need for which the project has been initiated. For each project, the project sponsor establishes and heads the CCB. The project sponsor appoints CCB members from the following organizations: program officials, system users, external stakeholders, and IT representatives.

The project CCB evaluates the scope, applicability, and effect of each requested requirement change (RC). The CCB focuses on items that could affect cost, schedules, or compliance with technical or security requirements. It acts on any requested RC to the system and provides change approval or disapproval based on defined strategic initiatives, program business objectives, and budgetary parameters. In addition, the project CCB meets regarding impacts of changes proposed by other program areas or organizations, especially schedule and cost impacts. The project CCB has the authority to establish project baselines, initiate

or change software, accept testing results, and approve the release of software into production.

- **Quality Assurance (QA).** Responsible for coordinating and implementing software quality assurance for IT projects. QA verifies that plans, standards, and procedures are in place and can be used to review and audit the project. In addition, QA reviews software development and maintenance activities to verify compliance. Results of QA activities are reviewed with IT management and project personnel.

After approval, all documentation is placed under the configuration management change control process. This change control process is observed whenever any products of the project's baseline are revised. Change control activities include verifying changes made to the products, assigning a new version number to the revision, updating a logbook with the change information, updating the central library with the new version, distributing copies of the new version, and archiving the old version. This process of change control over the lifecycle products continues throughout each project phase.

After all deliverables have been completed (see Table 1-1), the level of review and approval required for the project is determined based on management guidelines. The Initiate Project phase culminates in a decision as to whether to continue the project and proceed to the next phase of the lifecycle, the Define System phase.

Table 1-1. Initiate Project Phase Functions and Products

Initiate Project Phase Function	Product
1.1 Define Need	Needs Statement
1.2 Develop Project Plan	Project Plan
1.3 Determine Category	--
1.4 Assess Feasibility of Development Approach	Feasibility Study
1.5 Perform Benefit/Cost Analysis	Benefit/Cost Analysis
1.6 Perform Risk Analysis for System Security	Risk Analysis
1.7 Record System Decisions	System Decision Paper
1.8 Refine Project Plan	Project Plan (updated)
1.9 Review and Approve Documents and Deliverables	New products Management summary ¹
1.10 Establish and Perform Change Control Activities	Change control records

¹ A management summary is prepared for each product produced or revised during the Initiate Project phase. This one-page summary includes a summary of the essential data collected in a document product, conclusions that may be drawn from the document, and potential impacts on the project, if applicable.

Standards and Guidelines

HUD SDM documentation standards and Project Management Guidelines (Appendix A) should be followed during development of Initiate Project phase products. For the benefit/cost analysis, use the HUD Benefit/Cost Analysis Methodology: Volume I - Methodology, and Volume II - Workbook, September 1995.

In accordance with the Federal Information Security Management Act (FISMA), HUD is required to comply with the guidance in the following NIST publications:

- (SP) 800-12, *Introduction to Computer Security: the NIST Handbook*
- (SP) 800-14, *Generally Accepted Principles and Practices for Securing Information Technology Systems*
- (SP) 800-18, *Guide for Developing Security Plans for Information Technology Systems*
- (SP) 800-30, *Risk Management Guide for Information Technology Systems*
- (SP) 800-37, *Guide for the Certification and Accreditation of Federal Information Systems*
- (SP) 800-53, *Recommended Security Controls for Federal Information Systems*
- (SP) 800-60, *Guide for Mapping Types of Information and Information Systems to Security Categories*
- (SP) 800-64, *Security Considerations in the Information System Development Life Cycle*
- FIPS 199, *Standards for Security Categorization of Federal Information and Information Systems*

These publications are located at <http://csrc.nist.gov/publications/nistpubs/index.html>

The HUD *Enterprise Data Management Policy* (Handbook 3260.1) and *Total Information Quality Management Handbook* (3300.1) are applicable to all system development efforts.

Roles and Responsibilities

Throughout the Initiate Project phase of development, key personnel are required to perform the various tasks and activities outlined in the SDM. Table 1-2 presents the types of personnel required and the activities for which they are responsible.

Table 1-2. Roles and Responsibilities for Initiate Project Phase (1 of 2)

Role	Responsibility
Project Sponsor	Establishes and heads project CCB for program office. Coordinates, review and approves Needs Statement. Reviews and approves deliverables. Reviews and approves system development decisions. Ensures compliance with the Department Financial Management Systems Strategic Integration Plan (DFMSSIP).
Project Manager	Records need and system category. Coordinates security categorization Makes decision on system development approach. Develops Project Plan. Selects project development team. Manages development of deliverables. Coordinates system development decisions with project sponsor. Updates Project Plan to include actual costs incurred and specific activities accomplished for the Initiate Project phase; and revises project schedule, plans, strategies, resources, and requirements for the Define System phase, as required.

	<p>Reviews, for approval, the quality process planned by users and developers for the project phases.</p> <p>Reviews and approves deliverables prior to submittal.</p> <p>Obtains appropriate approval for deliverables.</p> <p>Provides quarterly status reports to TIB.</p>
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Table 1-2. Roles and Responsibilities for Initiate Project Phase (2 of 2)

Role	Responsibility
Project Development Team (User and Developer)	<p>Identifies need and prepares Needs Statement.</p> <p>Determines system category.</p> <p>Determines development options.</p> <p>Prepares system category survey.</p> <p>Performs risk analysis.</p> <p>Conducts feasibility study.</p> <p>Performs benefit/cost analysis.</p> <p>Provides input to project manager on required Define Project phase tasks and activities.</p> <p>Participates in review of Project Plan.</p> <p>Develops SDP.</p> <p>Identifies and plans the quality process for the project phases.</p>
Computer Services	<p>Provides input to risk analysis, feasibility study, and benefit/cost analysis.</p> <p>Initiates capacity planning estimates.</p> <p>Provides input for system category options.</p>
ADP Security	<p>Reviews phase products to ensure that security requirements have been incorporated.</p> <p>Reviews and approves risk analysis.</p>
Project Data Administrator	<p>Reviews new projects for adherence to HUD information architecture.</p>
Configuration Management	<p>Establishes Configuration Control Board (CCB).</p> <p>Develops Configuration Status Accounting (CSA) function.</p> <p>Establishes a central Project Library.</p> <p>Establishes change control for new products.</p> <p>Performs change control for new products.</p> <p>Provides status reports to project management as requested or required.</p>
Quality Assurance	<p>Assists in all facets of review activities.</p> <p>Reviews deliverables for adherence to applicable HUD documentation standards and project guidelines.</p> <p>Coaches users and developers in the planning for quality in the project phases.</p>

1.1 DEFINE NEED

The information management need represents any of multiple requirements: a functional capability that is not met by existing systems, increased or streamlined workflow, manual-to-automated system conversion, or productivity improvement. The need may be identified by clients or system sponsors, or it may be a result of the analysis documented in the HUD

Department ISP. The deficiency to be satisfied is identified as narrowly as possible to increase the probability of developing or modifying a system that will accurately meet the user's requirements. During the process of identifying the need, the organization(s) affected by the need is identified. The conditions that restrict resolution of the need and the estimated cost of fulfilling the need are determined. Activities include the following:

- 1.1.1 Identify the need.
- 1.1.2 Document the need.
- 1.1.3 Obtain approval of a Needs Statement.

All data regarding the information management need are documented in the form of a Needs Statement, which is prepared by the user and approved by the project sponsor. The project sponsor also certifies the intention to provide project funding.

The Needs Statement is subject to the project's quality assurance process to ensure that it includes the necessary level of detail and completeness and has been developed to meet HUD standards. The final step in this process is to obtain approval from the appropriate HUD authority.

Table 1-3 defines roles and responsibilities of key personnel for defining the project need.

Table 1-3. Roles and Responsibilities for Defining Need

Role	Responsibility
Project Sponsor	Coordinates review of the Needs Statement. Approves the Needs Statement.
User	Identifies need and prepares Needs Statement.

1.1.1 Identify Need

The initial activity undertaken to develop a Needs Statement is the identification and description of the need. The description should be as specific as possible to ensure the development of a system that will satisfy the requirements. The following activities are performed when identifying the need to be solved:

- Identify the functional area.
- Identify, by title and function, the organization(s) with the need. If more than one organization is cited, indicate which is the primary user.
- Cite specific directives.
- Describe the current organizational and functional environment.
- Determine the scope of the deficiency.
- Describe the functions that are needed but not currently provided. Identify benefits to be expected if the needed functions are developed and implemented.
- Describe the security issues associated with the need. Consider requirements to maintain the integrity, availability, and confidentiality of the system and data.
- Describe the level of information quality associated with the need, particularly if mission-critical information is involved.

- Summarize needs in terms of outcome to be achieved.
- Determine benefits.
- Identify constraints.
- Identify conditions that restrict or hinder resolving the need, such as relative priority within the functional area; limits on available funding; interfaces with other systems; and staffing, security, or logistical considerations.
- Estimate costs.
- Estimate the costs in terms of resources required to fulfill the need. This is accomplished by estimating the costs to develop and implement the project and the costs to complete the study of the need and consider alternative solutions.
- Estimate the range of costs to develop and implement the system. Include the costs associated with security controls throughout the lifecycle.
- Identify the events, tasks, and estimated resources needed to complete concept development.
- Indicate consistency with the Department's Financial Management Systems Strategic Integration Plan (DFMSSIP).
- If the solution to the information management need requires development of a financial management system or impacts current or proposed financial management systems, indicate consistency or inconsistency with the DFMSSIP objectives as follows:
 - If solutions are *consistent* with the DFMSSIP:
 - Reference the DFMSSIP.
 - Explain how the development effort fits into the plan's schedule.
 - Demonstrate consistency with the plan's objectives.
 - If solutions are *inconsistent* with the DFMSSIP:
 - Reference the DFMSSIP.
 - Explain the inconsistency from a timing or solution standpoint, e.g., correction of a material weakness that cannot wait until implementation of the integrated system.
 - Apply for a temporary waiver.

1.1.2 Document Need

After analysis of the need has been completed, the results are documented in the Needs Statement. Document the Needs Statement in accordance with HUD SDM documentation standards.

The Needs Statement describes the need and the benefits to be expected and identifies the estimated costs and resources to be expended to fully develop and implement the project. Perform the following activities when documenting the need:

- *Describe the scope of the need.* Document the user organization and its functional requirements.
- *Describe the benefits to be expected.* Document the benefits to be expected if the project is approved for development.
- *Describe the security categorization of the proposed system.* Document the potential impact on the organization or individuals should there be a breach of system security (i.e., a loss of confidentiality, integrity, or availability).
- *State the estimated costs and resources.* Document the costs, in dollars and number of resources, to develop the project and to complete the study of the need.
- *Reference the DFMSIP.* Document the proposed development effort's consistency or inconsistency with the DFMSIP schedule and objectives.

1.1.3 Review and Approve a Needs Statement

The review and approval of the Needs Statement is a process that allows all project organizations to reach concurrence on the definition of the information management need. In addition, the approval process offers senior management insight into the need. Activities include the following:

- Perform review of Needs Statement.
- Obtain approval of Needs Statement.

Perform Review of Needs Statement

Conduct a project review with project personnel and system stakeholders to ensure that the Needs Statement includes the level of detail and completeness necessary to evaluate a proposed solution to the user's information management need and that it meets the appropriate HUD standards as well as other applicable Federal guidelines. Use the appropriate document review checklist in Appendix E to aid the review process.

Allow a minimum of 10 working days before the scheduled review, notify the personnel required to attend this review, and provide each with a copy of the Needs Statement for their pre-review. A thorough review of the Needs Statement should be held with a facilitator, noting all comments or objections that are raised during the review procedure. A consensus should be reached on one of the following decisions before the termination of the review session:

- The Needs Statement is correct and complete, as is, without further changes.
- Additional changes that need to be made are minor and do not require further review. In this case, the updates should be made and change pages distributed by an agreed-upon date.

- Required changes will have a major impact on the document. A second review must be scheduled. The changes must be incorporated and the resulting change pages distributed at least 10 working days before the second review.

Prepare a one-page management summary describing the information management need and summarizing any significant points that are addressed. Also include a brief description of any conclusions that may be drawn and their potential impact on the DFMSSIP.

Obtain Approval of Needs Statement

Present the Needs Statement for approval to the Technology Investment Board (TIB) or appropriate group or division review board at least 10 days before the scheduled decision date. Include management summary information and an approval (sign-off) record. Project approval records are maintained by the project's configuration management (CM) function. A copy is inserted into the central project library.

1.2 DEVELOP A PROJECT PLAN

After the Needs Statement is defined, the project manager establishes a high-level project plan outline for all development phases so that adequate resources are defined. Because project planning is an iterative activity, detailed planning of the subsequent phases can occur after the Initiate Project phase is completed and the project is approved for continuation. Included in the high-level plan is the preliminary strategy for handling programmatic and security risks that would have a direct impact on schedule, cost, and technical performance. (Appendix A provides guidelines for project planning.)

1.3 DETERMINE CATEGORY

Apply selection criteria to determine the category of the project. Overall, the selection criteria assist in determining the level of applicability for SDM activities and tasks and will provide a basis for system platform selection. The determination will be made based on several categories of factors, including size of the effort, overall scope and complexity of the proposed system, and estimated resources required to develop and maintain the proposed system. Activities include the following:

- 1.3.1 Apply the selection criteria.
- 1.3.2 Make the selection.
- 1.3.3 Document the selection.

The investigation leading to the category determination will create a foundation for decisions to be made in the following areas:

- Alternative analysis, design, and system development techniques
- Selection of tools to be used to develop the system
- Target platform for the proposed system
- Determination of development effort as an enhancement to an existing system or an entirely new development effort

The results of the category determination activity are documented in the System Category Survey form. The information contained in the survey records the initial system category

decisions and provides a basis for describing the proposed system alternatives in the feasibility study document. Table 1-4 defines the roles and responsibilities of key personnel for determining the project's category.

Table 1-4. Roles and Responsibilities for Determining Category

Role	Responsibility
Project Manager	Reviews needs and system category and coordinates with project sponsor.
User	Analyzes needs and determines system category. Determines development options and prepares system category survey.
Developer	Assists in determining system category.
Computer Services	Provides input to determine system category.

1.3.1 Apply Selection Criteria

Specific selection criteria are applied to project requirements to classify the type of system development effort. The selection criteria are evaluated, scored, and weighed to assist in determining the following project-related factors:

- Target platform of the proposed system
- Use of analysis, design, or system development or interactive development techniques (e.g., traditional prototyping, rapid application development [RAD], joint application development [JAD])
- System classification (i.e., new development, system enhancement, system maintenance)
- Use of commercial off-the-shelf (COTS) software, with or without modifications
- Tool usage, including CASE or automated tools
- Size and complexity of effort
- Whether the system is a major or minor effort
- A decision on the level of applicability and general guidance on the portions of the SDM that must be followed

The System Category Survey (see Table 1-5) assists the evaluator in classifying the type of development effort. The survey is organized into three major areas, each with its own questions and scoring section. Each has a minimum possible score of zero (0) and a maximum score as follows:

- System Platform: 80
- Development Techniques: 64
- Type of Effort: 24

The scores for each section are designed to form a continuum for possible courses of action, rather than a yes or no answer. Very low or high scores in any section would make the strongest arguments for a particular decision. Scores midway between zero and the maximum

score for a given section would indicate that either course of action has equal merit according to the criteria in the survey. The courses of action, based on the minimum zero or maximum score for each section, are as follows:

- System Platform
 - 0: Strongest case for a PC or LAN solution
 - Maximum score: Strongest case for a mainframe-based solution
- Development Techniques
 - 0: Strongest case for not using alternate development techniques such as JAD, RAD, prototyping, and CASE tools
 - Maximum score: Strongest case for alternative development techniques, including JAD, RAD, prototyping, and CASE tool use
- Type of Effort
 - 0: Strongest indication that the development effort is a maintenance effort
 - Maximum score: Strongest indication that the development effort is a new development effort

Responding to the Survey

Each question or statement and its responses are in the first cell of a row. Each statement has up to five responses. Each response is sequentially numbered. Select the statement or response that most closely answers the question as it relates to the particular development effort being studied. If a question indicates to select all responses that apply, do so. If none of the responses apply, skip the question.

At the beginning of each of the responses will be a number from 1 to 5, and in the last five columns of the survey will be corresponding numbers. Respond to the question or statement by circling or marking the number(s) in the last five columns that correspond to the most correct response(s).

Note: Survey factors may not exist for one or more columns for a given question. This distribution of factors to columns is designed to facilitate the weighted scoring process.

Scoring the Survey

After all questions have been answered for a particular area, count the number of responses for each column and enter the total number of responses in the Response Count row. Use the number in the Multipliers row, located directly below, and multiply the number of responses by that number. Enter the result in the Total Score cell (zero has already been filled in where appropriate). Repeat the process for each column. When all the columns are complete, add the numbers appearing horizontally in the Total Score row and enter the result in the last cell of the table.

Table 1-5. System Category Survey (1 of 8)

I. System Platform	Factors				
a. Number of client/user organizations that will use the operational system 1 = One organization 2 = Two to three organizations 3 = Four or more organizations	1		2		3
b. Estimated number of concurrent end users of the system 1 = 1 2 = 2 to 10 3 = 11 to 20 4 = More than 21	1	2	3		4
c. Relative physical location of organizations that will use the system in production 1 = All at same location 2 = Within the same region 3 = In one or more regions 4 = All offices nationwide	1	2	3		4
d. Support software target platform 1 = Targeted for personal computers (PCs) 2 = Targeted for local area networks (LANs) 3 = Targeted for all platforms 4 = Targeted for mainframes	1	2	3		4
e. If the data is presently stored in an automated environment, what is the present location of the data? (Circle all that apply) 1 = One or more standalone PCs 2 = One or more LANs 3 = One or more mainframes	1	2			3
f. Estimated online data storage requirements 1 = Less than 100 MB 2 = 101 to 255 MB 3 = 256 MB to 1 gigabyte (GB) 4 = More than 1 GB	1	2		3	4
g. Estimated size of core random access memory (RAM) required by system 1 = 450 kilobytes (kB) or less 2 = 451 kB to 1 megabyte (MB) 3 = More than 1 MB	1			2	3
h. Estimated number of batch processing jobs per 24-hour period 1 = 0 2 = 1 to 2 3 = 3 to 5 4 = More than 5	1	2	3	4	

Table 1-5. System Category Survey (2 of 8)

I. System Platform	Factors				
i. Estimated average number of steps in each of the system's batch jobs 1 = N/A (no batch jobs) 2 = 1 to 15 3 = 16 to 30 4 = 31 to 50 5 = More than 50	1	2	3	4	5
j. Interfaces with office automation software 1 = System will need to interface with e-mail, spreadsheets, and word processing software 2 = Proposed system will not need to interface with office automation software	1				2
k. Text handling requirements 1 = System will be required to provide desktop publishing capabilities 2 = System will be required to provide full-screen text input and editing 3 = System will be required to provide only short or single-word text entry	1		2		3
l. Document search and retrieval functions 1 = Document search and retrieval functions will be requirements of the system 2 = Document search and retrieval functions will not be requirements of the system	1		2		
m. Estimated amount of offline historical or archived data generated per year 1 = 350 MB or less 2 = 351 to 700 MB 3 = 701 MB to 3.5 GB 4 = More than 3.5 GB	1	2		3	4
n. Estimated number of data elements in database 1 = Less than 200 2 = 201 to 400 3 = 401 to 600 4 = More than 600	1	2		3	4

Table 1-5. System Category Survey (3 of 8)

I. System Platform	Factors				
<p>o. Complexity of algorithms and processing (Circle all that apply)</p> <p>1 = Fewer than 50 simple mathematical calculations (add, subtract, multiply, and divide) will be performed by the system</p> <p>2 = More than 50 simple mathematical calculations (add, subtract, multiply, and divide) will be performed by the system.</p> <p>3 = 1 to 5 large, complex algorithms, central to the system, will be developed</p> <p>4 = System will contain from 6 to 20 large, complex algorithms that will be used frequently</p> <p>5 = Proposed system will contain more than 20 large, complex algorithms used frequently</p>	1	2	3	4	5
<p>p. Hardcopy reports</p> <p>1 = System will produce no hardcopy reports</p> <p>2 = System will produce fewer than 10 different hardcopy reports, generated only when requested by the user</p> <p>3 = System will produce fewer than 10 reports automatically on a monthly or quarterly basis</p> <p>4 = System will produce summary reports daily</p> <p>5 = System will produce extensive, detailed reports daily</p>	1	2	3	4	5
<p>q. CASE tool usage</p> <p>1 = Decision has already been made to use a CASE tool that targets PC environments</p> <p>2 = Decision has been made not to use a CASE tool</p> <p>3 = Decision has already been made to use a CASE tool that targets mainframe hardware</p>	1		2		3
<p>r. Interfaces to other systems</p> <p>1 = System will interface only with PC- or LAN-based systems</p> <p>2 = System will interface with LAN- and mainframe-based systems</p> <p>3 = System will interface only with mainframe systems</p>	1		2		3
<p>s. Graphics</p> <p>1 = System will be required to provide extensive graphic capabilities, including user-generated graphics and both ad hoc and predefined reporting shown graphically</p> <p>2 = System will be required to generate simple predefined graphic reports</p> <p>3 = System will not be required to provide graphic capabilities</p>	1		2		3

Table 1-5. System Category Survey (4 of 8)

I. System Platform	Factors				
t. Data update and retrieval 1 = System will be required to provide real-time update and retrieval capabilities to online users 2 = System will provide online user interface to data repository that is updated every 1 to 4 hours 3 = System will provide online user interface to data repository that is updated daily 4 = System will provide online user interface to data repository that is updated every 2 or more days 5 = System will not provide an online interface for users	1	2	3	4	5
Response count Count the number of responses in each column and enter that count for each column in the appropriate cell to the right.					
Multipliers Use these multipliers to factor the weight for each column.	0	1	2	3	4
Total score For each column, multiply the response count by the multiplier and enter the product in the appropriate cell to the right.	0				
Add numbers in the row above and enter the total (between 0 and 80) in the cell to the right.					
II. Development Techniques	Factors				
u. Number of organizations (other than IT) that will provide input for requirements for the development effort 1 = One organization 2 = Two or three organizations 3 = More than three organizations	1		2		3
v. System will be developed by 1 = IT personnel only 2 = IT personnel and contractors 3 = IT and sponsor personnel 4 = IT and sponsor personnel, each with own contractors 5 = IT, sponsor, and end-user personnel, each with own contractors					
w. Estimated elapsed time needed to develop system 1 = Less than 1 year 2 = 1 to 2 years 3 = 2 to 3 years 4 = 3 to 4 years 5 = More than 4 years					

Table 1-5. System Category Survey (5 of 8)

II. Development Techniques	Factors				
<p>x. System will support</p> <p>1 = Known function that has been performed by HUD for years</p> <p>2 = Known function or program that has recently changed slightly</p> <p>3 = Known function or program that has recently undergone major changes</p> <p>4 = Totally new program or function never before performed by HUD</p>	1	2		3	4
<p>y. System will cause</p> <p>1 = No organizational changes</p> <p>2 = Staff movements or additions</p> <p>3 = Entire organizations to be disbanded or formed</p>	1		2		3
<p>z. System's functions</p> <p>1 = Very similar to other systems previously developed and presently used at HUD</p> <p>2 = Somewhat similar to other systems developed and used at HUD</p> <p>3 = Similar to other systems used at HUD, but those systems were purchased or developed outside of HUD</p> <p>4 = Do not resemble any existing systems at HUD</p>	1	2		3	4
<p>aa. Proposed system's programming language</p> <p>1 = Is being used by HUD personnel to develop systems</p> <p>2 = Has, for the most part, been used to develop systems. (A new version of the compiler will be used, but for the most part the language is unchanged.)</p> <p>3 = Has never been used successfully to develop a system at HUD; however, staff or contractors have received training or have prior experience</p> <p>4 = Is totally unknown to HUD staff and existing contractors, although there is a large base of knowledge in the software development community</p> <p>5 = Is a leading-edge technology, with very few information systems professionals experienced in its use</p>	1	2	3	4	5
<p>bb. Proposed system's hardware and peripherals</p> <p>1 = Are being used by HUD personnel</p> <p>2 = Similar equipment has been or is being used at HUD</p> <p>3 = Have never successfully been used to develop system at HUD; however, staff or contractors have received training or have prior experience</p> <p>4 = Are totally unknown to HUD staff and existing contractors, although there is a large base of knowledge in the software development community</p> <p>5 = Represent leading-edge technologies, with very few information systems professionals experienced in their use</p>	1	2	3	4	5

Table 1-5. System Category Survey (6 of 8)

II. Development Techniques		Factors				
cc.	Proposed system's support software	1	2	3	4	5
1 =	Is being used by HUD personnel					
2 =	Similar software has been used in the past or is presently being used at HUD					
3 =	Has never successfully been used to develop a system at HUD; however, staff or contractors have received training or have prior experience					
4 =	Is totally unknown to HUD staff and existing contractors, although there is a large base of knowledge in the software development community					
5 =	Is a leading-edge technology, with very few information systems professionals experienced in its use					
dd.	Client and sponsoring organizations have expressed	1		2		3
1 =	Very rigid systems requirements					
2 =	Flexibility with some requirements, but maintain a core of requirements that cannot be changed					
3 =	Desire to assemble team to determine requirements based on predetermined high-level specifications					
ee.	What is highest level of management with a direct interest in the system?		1	2	3	4
1 =	Office Director(s) or Division Director(s)					
2 =	Assistant Secretary or Deputy Assistant Secretary					
3 =	Under Secretary or Deputy Under Secretary					
4 =	HUD Secretary					
ff.	Program area staff	1	2		3	4
1 =	Most program area staff members are thoroughly knowledgeable about all phases of the program and functions that will be processed by the proposed system					
2 =	Most program area staff members are knowledgeable about a portion of the program and functions that affect their organization but have little knowledge of interaction of other organizations					
3 =	Most program area staff members have a thorough knowledge of their immediate function or portion of the program but do not know interaction with other members in their own organization					
4 =	Very few program area staff members understand how their actions impact the program or function; actions are based on instructions without an understanding of how those actions affect the overall program					
gg.	System can best be described as	1		2		3
1 =	Transaction processing system					
2 =	Control and reporting system					
3 =	Decision support system					

Table 1-5. System Category Survey (7 of 8)

II. Development Techniques	Factors				
hh. Overall system concept and requirements 1 = Generally well known and have much supporting documentation in the form of regulations, legislation, and existing procedures 2 = Generally well known, but no documentation exists or existing documentation is not up to date 3 = Generally well known, but some portions of requirements are vague, or conflicting understanding of requirements exists 4 = For the most part, not known or are vague	1		2	3	4
ii. Outcomes of implementing the system and the impacts to the agency 1 = Well understood and documented 2 = Generally understood, but all aspects not thoroughly known 3 = Not understood or known	1		2		3
jj. Tools (e.g., fourth-generation languages, CASE tools, simulation languages, data query languages, and screen formatters) to support alternate development techniques 1 = Not available for use by project development team 2 = Available for use, but members of development team have not used the particular tools available 3 = Available for use and project development team has been trained in their use 4 = Available for use and project team members have extensive experience in their use	1	2		3	4
Response Count Count the number of responses in each column and enter that count in the appropriate cell to the right.					
Multipliers Use these multipliers to factor the weight for each column.	0	1	2	3	4
For each column, multiply the response count by the multiplier and enter the product in the appropriate cell to the right.	0				
Add numbers in the row above and enter the total (between 0 and 60) in the cell to the right.					
III. Type of Effort	Factors				
kk. Development effort to be undertaken will cause 1 = No application design changes to existing system(s) 2 = Minor application design changes to reports or queries, input screens, and other input sources of existing system(s) 3 = Moderate application design changes to one subsystem and its associated input and output of existing system(s) 4 = Moderate application design changes to more than one subsystem and its associated input and output of existing system(s) 5 = Major application design changes throughout one or more systems	1	2	3	4	5

Table 1-5. System Category Survey (8 of 8)

III. Type of Effort	Factors				
ll. Development effort will cause 1 = Minor design changes to existing database(s); less than 10 percent of the database entities in any one database will be affected 2 = Moderate design changes to existing database(s); 10 to 40 percent of the data entities in any one database will be affected 3 = Major changes to existing database(s); affecting more than 40 percent of the data entities in any one database 4 = No design changes to existing database(s)	1		2	3	4
mm. Development effort is being performed to 1 = Correct errors detected during operation of an existing system or improve processing efficiency 2 = Respond to evolving or expanding user needs 3 = Respond to changes in the organization's environment	1			2	3
nn. The system 1 = Will replace an existing automated system 2 = Will replace an existing manual system 3 = Is totally new	1		2		3
oo. How old is the existing system? 1 = Less than 5 years old 2 = Between 5 and 10 years old 3 = Between 10 and 15 years old 4 = Between 15 and 20 years old 5 = More than 20 years old	1	2	3	4	5
pp. Estimated number of staff hours to complete the effort 1 = Less than 5,000 2 = 5001 to 12,500 3 = 12,501 to 25,000 4 = 25,001 to 50,000 5 = More than 50,000	1	2	3	4	5
Response Count					
Count the number of responses in each column and enter that count in the appropriate cell to the right.					
Multipliers					
Use these multipliers to factor the weight for each column.					
For each column, multiply the response count by the multiplier and enter the product in the appropriate cell to the right.					
Add numbers in the row above and enter the total (between 0 and 24) in the cell to the right.					

1.3.2 Make Selection

The scoring from the system category survey factors, security categorization, and other decision criteria deemed critical by project management are used to assist in making the following determinations:

- Target platform of the proposed system
- Use of analysis, design, or system development or interactive development techniques (e.g., traditional prototyping, RAD, JAD)
- System classification (i.e., new development or an enhancement to an existing system)
- Use of COTS software, with or without modifications
- Tool usage, including CASE or automated tools
- Size and complexity of effort
- Whether the system is a major or minor effort
- A decision on the level of applicability and general guidance on the portions of the SDM that must be followed

Determinations made during this activity will be revisited at each SDM milestone. Information gathered as part of the project development effort may cause modifications to decisions made at this point in the effort. The modifications will be recorded when updates to the project documents are made.

1.3.3 Document Selection

The decisions made during these activities are recorded as part of the Feasibility Study that is prepared in accordance with HUD SDM documentation standards. Along with the recorded decisions, the completed system criteria survey provides a basis for describing the proposed system alternatives, method used to determine the category of the system, and the information supporting the category selection.

1.4 ASSESS FEASIBILITY OF DEVELOPMENT APPROACH

After the user's needs have been identified and documented in a Needs Statement and the system category has been determined and documented, it is necessary to evaluate the various options available for meeting that need. Activities include the following:

- 1.4.1 Examine system objectives.
- 1.4.2 Evaluate alternatives.
- 1.4.3 Identify preferred approach.
- 1.4.4 Develop detailed feasibility study.

During this analysis, the objectives of the system are defined based on the needed functions described in the Needs Statement. Included in these system objectives are the high-level functional and performance objectives, security considerations including criticality and sensitivity, and any assumptions and constraints.

When the system objectives have been identified, the various alternatives for satisfying those objectives are determined. For each alternative, the costs in time and resources are estimated. A determination is then made as to the most feasible development alternative. Table 1-6 defines roles and responsibilities of key personnel for assessing feasibility of the project's development approach.

Table 1-6. Roles and Responsibilities for Assessing Feasibility of Development Approach

Role	Responsibility
Project Manager	Manages feasibility study and coordinates results of feasibility study with project sponsor.
User	Conducts feasibility study.
Developer	Provides input to feasibility study.
Computer Services	Provides input to feasibility study.
Quality Assurance	Reviews feasibility study for adherence to standards.

1.4.1 Examine System Objectives

The initial activity involved in determining feasible alternatives is to generate and examine system objectives by considering the functions defined in the Needs Statement. These objectives will form the basis for generating alternatives to meet the user's need.

Determine Proposed Functional Objectives

Analyze the anticipated functions of the system, considering such areas as new services, increased capacity, legislative and policy requirements, privacy and security requirements, and audit controls.

Identify Major Performance Objectives

Identify major performance objectives, considering such areas as reduced staff and equipment costs, increased processing speed, increased productivity, improved management information services, improved controls over automated decision-making system(s), and compliance with regulations.

Identify Assumptions and Constraints

Determine the assumptions and constraints, such as operational life of the proposed system; period of time for comparison of system alternatives; information criticality and sensitivity; input, output, processing, and data quality requirements; financial constraints; changing hardware, software, and operating environment; and availability of information and resources.

1.4.2 Evaluate Alternatives

Evaluate the development alternatives based on the system objectives. Document the alternatives, along with their associated costs and the criteria for evaluating the alternatives.

Determine Criteria for Evaluating Alternatives

Identify the criteria applicable to the development process that will be used to determine the most attractive system option. Such criteria must include security issues, but can also encompass cost, priority, development time, ease of system use, or any combination.

Identify Alternatives To Be Considered

Identify and summarize each system alternative considered during the feasibility study, including use of one or more existing system(s), development of one or more new system(s), and the potential of purchasing an off-the-shelf system.

Outline Time and Resource Costs

For each system alternative identified, outline the time and resource costs, including the time and funding required for all activities of the lifecycle from definition through operation. It is imperative to use realistic estimates and include security-related costs. When making time estimates, remember to include such factors as the current workload of personnel, staff absences due to vacation and illness, lead time for procurement of equipment and software, and staff training.

1.4.3 Identify Preferred Approach

Weigh each alternative identified during the evaluate alternatives process against the evaluation criteria and determine the most feasible development alternative.

1.4.4 Develop Detailed Feasibility Study

Describe and document the detailed feasibility study, describing the methodology and criteria used to determine the feasibility and the preferred approaches selected for fulfilling the system need.

Describe System Objectives

Document the functional and performance objectives of the system. Include such information as system output; system input; file descriptions; information quality class; validation criteria; security, privacy, and control requirements; data storage and retrieval; and any interfacing system(s).

Describe Current Functional Procedures

Describe current functional procedures of any existing system, whether automated or manual. Specifically, document the major processing and data flow(s) of the current system(s), volume of work currently processed, costs incurred in operating the current system, skill categories and number of staff required to operate and maintain the current system, equipment used by the existing system, and any other factors that are unique to the current system(s).

Describe Proposed System

Describe the proposed system, including such information as the overall system concept and boundaries; improvements anticipated after successful implementation of the proposed

system; anticipated impacts in the areas of equipment, software, personnel, operations, privacy, and security; building or office modifications; and projected costs of development and operations.

Document Results

Document the results of the analyses and studies related to the feasibility of the various system options in accordance with HUD SDM documentation standards.

1.5 PERFORM BENEFIT/COST ANALYSIS

Each alternative generated during the feasibility study is examined and a comparison is done on the benefits and costs of each. The current system, proposed system, and each alternative system identified in the feasibility study are described and their associated benefits and costs determined. These benefits and costs include developmental as well as operational (both one-time and recurring) costs, and must account for security risks and the impact of control measures. Activities for performing benefit/cost analysis include the following:

- 1.5.1 Identify the alternatives for development and operation.
- 1.5.2 Determine the costs per alternative.
- 1.5.3 Determine the benefits per alternative.
- 1.5.4 Develop a detailed benefit/cost analysis.

Table 1-7 defines roles and responsibilities of key personnel for performing the project's benefit/cost analysis.

Table 1-7. Roles and Responsibilities for Performing Benefit/Cost Analysis

Role	Responsibility
Project Manager	Manages benefit/cost analysis and coordinates results of benefit/cost analysis with the project sponsor.
User	Conducts benefit/cost analysis.
Developer	Provides input to benefit/cost analysis.
Computer Services	Provides input to benefit/cost analysis.
Quality Assurance	Reviews benefit/cost analysis for adherence to standards.

1.5.1 Identify Alternatives for Development and Operation

Identify the alternative approaches for the development and operation of the system, as determined in the feasibility study, and provide a brief description of each. In addition, provide a description of the current system (if one exists).

Describe Technical and Operational Characteristics of Current System

Briefly describe the current system, if one exists, by summarizing the functions of the system, identifying the hardware used, and identifying the input to and output from the system.

Describe Proposed System

Briefly describe the proposed system. Summarize the functional objectives of the system, including requirements for confidentiality, integrity, availability, and data quality, and briefly describe the expected input to and output from the system.

Describe Alternative System

Briefly describe each alternative system discussed in the feasibility study. Include an outline for the basic design and identify any technical, operational, or security characteristics that are specific to the system. In each description, address how the alternative did or did not meet the feasibility criteria.

1.5.2 Determine Costs per Alternative

Calculate all costs to develop and operate each alternative described in the feasibility study, including both one-time and recurring costs. Multiply costs to be incurred in the future by a present value factor, an inflation index that defines future costs in present dollars. This index takes into account items such as vendor and potential salary increases. This calculation brings the cost into present dollars.

Determine Development Costs

For each alternative system described in the feasibility study, estimate the cost of the Define, Design, and Build System phases. When determining the overall cost of development, include costs for personnel, equipment, developer training, security controls, and development tools.

Determine Operational Costs

For each alternative system described in the feasibility study, estimate the installation, operation, and maintenance costs of the system. Include such costs as personnel, equipment, security, operational site upgrades or changes, and staff training.

Determine Nonrecurring Costs

Determine the one-time costs that may be incurred with each alternative system described in the feasibility study. Include the costs of running a parallel system during system release, the potential disruption to existing business operations, etc.

Determine Recurring Costs

Determine the ongoing costs that will continue throughout the development and operation of each system alternative discussed. Include the costs required for operating and maintaining each alternative over the system's life (e.g., equipment and software [lease, rental, and maintenance], data communications [lease and rental], travel and training, supplies and utilities, contractual support services, overhead).

1.5.3 Determine Benefits per Alternative

Evaluate each alternative for both the one-time and recurring economic benefits of developing and operating the system. Calculate in present dollars all benefits that will

generate future economic returns. Also identify other benefits that cannot be quantified in dollar amounts.

Determine Nonrecurring Benefits

Determine nonrecurring benefits for each system alternative considered. Describe benefits that can be assigned dollar values. Include cost reductions resulting from improved system operations, such as reduction of resource requirements; improved operating efficiency; and improved data entry, storage, and retrieval. Also include benefits that enhance the value of the application system, such as improved resources utilization and reduced error rates.

Determine Recurring Benefits

Determine the recurring benefits of operating and maintaining each system alternative. Include equipment lease, rental, and maintenance; software lease, rental, and maintenance; data communications lease, rental, and maintenance; supplies and utilities; security and privacy; and travel and training.

Determine Nonquantitative Benefits

Describe the benefits that cannot be quantified in terms of direct dollar values, such as improved service, reduced risk of incorrect processing, improved information handling, and enhanced organizational image.

1.5.4 Develop Detailed Benefit/Cost Analysis

Describe and document the analysis, including the costing methodology used for performing the analysis. Document each alternative and its associated costs and benefits. Include a recommendation as to the most cost-beneficial alternative system, and provide the necessary information to support that recommendation.

Summarize Procedures for Conducting Analysis

Document the steps followed when performing the benefit/cost analysis. Include any reference material used, as well as charts and graphs if applicable.

Describe Techniques Used in Estimating and Computing Costs

Document how estimates and costs were derived. Include any reference material used, as well as charts and graphs if applicable.

Describe Benefits and Costs per Alternative

For each of the system alternatives analyzed, describe the associated costs and anticipated benefits that may be derived from developing and operating the system. Describe the costs and benefits in terms of recurring, nonrecurring, and nonquantitative.

Describe Most Advantageous Alternative

Based on comparative analysis of the benefits and costs, describe the alternative determined to be the most advantageous of the system alternatives described during the benefit/cost analysis.

Document Results

Document the results of the analyses and studies related to the costs and benefits of the various system options. Document the Benefit/Cost Analysis study in accordance with the HUD Benefit/Cost Analysis Methodology: Volume I - Methodology and Volume II - Workbook, September 1995.

1.6 PERFORM RISK ANALYSIS FOR SYSTEM SECURITY

The purpose of risk analysis is to identify and assess security risk, and to subsequently help select cost-effective controls and safeguards that will reduce risks to an acceptable level. This can be accomplished by following the methodology detailed in Section 3 of NIST (SP) 800-30, *Risk Management Guide for Information Technology Systems*.

Risk is a function of the likelihood of a given threat-source's exercising a particular vulnerability, and the resulting impact of that adverse event on HUD. Therefore, a clear picture of the system and its processing environment is key to assessing and managing risk.

After reviewing characteristics of the proposed system including the operating environment, interfaces, and system/data criticality and sensitivity, potential system threats and vulnerabilities are identified, a control analysis is performed, and determinations made concerning the likelihood of each threat. An impact analysis is then performed to estimate the potential damage and losses that may result from successful exploitation of vulnerabilities. After the impact analysis, a risk determination can be made and appropriate planned security controls recommended and documented.

Activities for performing risk analysis include the following:

- 1.6.1 Security Characterization.
- 1.6.2 Threat Identification.
- 1.6.3 Vulnerability Identification.
- 1.6.4 Control Analysis.
- 1.6.5 Likelihood Determination.
- 1.6.6 Impact Analysis.
- 1.6.7 Risk Determination.
- 1.6.8 Control Recommendation.
- 1.6.9 Prepare Risk Analysis document

Table 1-8 defines roles and responsibilities of key personnel for performing the project's risk analysis.

Table 1-8. Roles and Responsibilities for Performing Risk Analysis

Role	Responsibility
Project Manager	Coordinates results of risk analysis with the project sponsor.
User	Conducts risk analysis.
Developer	Provides input to risk analysis.
Computer Services	Provides input to risk analysis.
ADP Security	Reviews and approves risk analysis.
Quality Assurance	Reviews risk analysis document for adherence to standards.

1.6.1 System Characterization

The first step in risk analysis is to define the scope of the system development effort. The boundaries of the system must be identified, along with the resources and information that will constitute the system. Characterizing the proposed system establishes the scope of the risk assessment, delineates the operational authorization (or accreditation) boundaries, and provides information essential to defining risks and appropriate safeguards. Information must be compiled on the proposed operating environment, including hardware, software, interfaces and system mission, as well as system and data criticality and sensitivity. This will help develop a profile of the system, including a basic security strategy or concept of operations.

1.6.2 Threat Identification

A threat is the potential for a particular threat-source to successfully exercise a particular weakness that can be accidentally or intentionally triggered. A threat-source does not present a risk when there is no vulnerability to be exploited. Identify the potential threat-sources and compile a threat statement listing potential threat-sources applicable to the system being developed. In determining the likelihood of a threat, consider threat-sources and their motivation, potential system vulnerabilities, and planned or existing controls. It is important to consider all potential threat-sources that could cause harm to the system and its processing environment.

1.6.3 Vulnerability Identification

The analysis of threats to an IT system must include an evaluation of the vulnerabilities associated with the system and its processing environment. Develop a list of system vulnerabilities that could be exploited by potential threat-sources. Analyze the processes and procedures required of the new system or the system to be replaced, as well as the criticality and sensitivity of the data the system will be processing, to determine inherent security risks. This will subsequently help determine the security controls that may be required to adequately counteract these security risks.

1.6.4 Control Analysis

Review the system characterization as well as the identified threats and vulnerabilities, and consider the potential controls needed to safeguard the system and data. Control analysis should encompass three key control areas:

- **Management Controls:** management control criteria include assignment of responsibility, certification and accreditation, periodic review of security

controls, personnel background checks, separation of duties, and the system or application security plan.

- Operational Controls: operational control criteria include facility protection and environmental controls, back-up electrical power, external data distribution, and data media access and disposal.
- Technical Controls: technical control security criteria include identification and authentication, intrusion detection, cryptography, and communications (e.g., dial-in routers, system interconnections, &c).

Document the management, operational, and technical controls planned for the system to mitigate the likelihood of vulnerabilities being exercised, and reduce the impact of such an adverse event on the system.

1.6.5 Likelihood Determination

Derive a likelihood rating that indicates the probability for each potential vulnerability to be exercised within the construct of the associated threat environment. To make this determination, the following factors must be considered:

- The motivation and capability of each threat-source.
- The nature of the vulnerability
- The existence and effectiveness of current and/or planned controls

The likelihood that a potential vulnerability could be exercised by a given threat-source can be described as *high* (the threat source is highly motivated, sufficiently capable, and current or planned controls to prevent the vulnerability from being exercised are or may be ineffective); *medium* (the threat source is motivated and capable, and controls are in place or planned that may impede successful exercise of the vulnerability); or *low* (the threat source lacks motivation or capability, or controls are either in place or planned to prevent or significantly impede the vulnerability from being exercised).

1.6.6 Impact Analysis

Determine the potential adverse impact resulting from successful exploitation of each vulnerability. To make this determination, the system mission, as well as system and data criticality and sensitivity, must be considered. The adverse impact can be described in terms of loss or degradation of the three primary security goals: integrity, availability, and confidentiality.

Some impacts can be measure quantitatively in terms of lost revenue, repair/recovery expenses, or level of effort required to correct issues arising from successful threat exploitation. Other impacts, such as loss of public confidence or credibility, may not be measured tangibly but can be described in terms of high, medium, and low impacts.

1.6.7 Risk Determination

Based on the system characterization, threat/vulnerability information and impact analysis, determine the level of risk associated with the system. The determination of risk can be expressed as a function of-

- The likelihood of a given threat-source's attempting to exercise a particular vulnerability
- The magnitude of impact should a threat-source exercise the vulnerability
- The adequacy of planned or existing security controls for reducing or eliminating risk

Describe the level of risk to which the system may be exposed if a given vulnerability were exercised. The risk description(s) help determine necessary actions and control measures.

1.6.8 Control Recommendations

Identify the appropriate management, operational, and technical security controls that will reduce risk to an acceptable level for the proposed system. The following factors should be considered when recommending control alternatives to minimize or eliminate risks:

- Effectiveness of recommended options
- Legislation and regulation
- Organizational policy
- Operational impact
- Safety and reliability

Due to budget or other constraints, it may not be possible to implement all controls needed to reduce risk. Use data from the Feasibility Study and Benefit-Cost Analysis to help determine and justify which controls are most appropriate. Include security requirements imposed on the system by HUD Automated Data Processing (ADP) security guidelines and indicate the ability of the proposed controls to meet these requirements.

1.6.9 Prepare Risk Analysis Document

Develop the Risk Analysis document in accordance with HUD SDM documentation standards and project guidelines, as well applicable NIST standards. Describe the risk analysis that was performed and the risks, threats, and vulnerabilities that were uncovered. Include a recommendation of management, operational and technical controls proposed to mitigate these security risks, and describe how the control measures will safeguard the system.

1.7 RECORD SYSTEM DECISIONS

The decisions made during development of the Initiate Project phase documents (e.g., Needs Statement, risk analysis, feasibility study, benefit/cost analysis) are recorded in an SDP. The SDP is submitted to the appropriate review board for approval or disapproval. Based on the SDP and supporting analysis, the appropriate review board makes the decision to continue development of the project. This decision is also recorded in the SDP, as is the selected alternative if the decision is made to continue with the development effort. Activities for recording system decisions include the following:

- 1.7.1 Summarize issues.
- 1.7.2 Outline accomplished and projected schedules.

1.7.3 Develop a System Decision Paper.

Table 1-9 defines roles and responsibilities of key personnel for recording the project's system decision.

Table 1-9. Roles and Responsibilities for Recording System Decisions

Role	Responsibility
Project Manager	Manages development of SDP.
User	Develops SDP.
Quality Assurance	Reviews SDP for adherence to standards.

1.7.1 Summarize Issues

Summarize for management the information gathered from the previously produced documents. If management, through the approval process, decides to proceed with the development of the system, determine the criticality of the proposed system. The criticality is determined through comparisons with other potential systems identified in the HUD Department ISP. Include the following in the SDP:

- Identify the information management need as detailed in the Needs Statement.
- Summarize the current system procedures as detailed in the feasibility study.
- Indicate the anticipated benefits of the new system as detailed in the feasibility study.
- Determine the importance, risk and potential impact of the proposed project to HUD as documented in the risk analysis.
- Summarize, by fiscal year, the cost to develop and operate the system as computed in the benefit/cost analysis.
- Identify the funding source (the organization responsible for most, if not all, of the cost to develop and operate the system; typically, the project sponsor or primary user).

1.7.2 Outline Accomplished and Projected Schedules

Document the schedule of activities that transpired during the system development decision processes and include them in the SDP. Provide a projected schedule of activities and milestones by phase for the full lifecycle of the system. Include the actual or projected beginning and ending dates for each phase, as well as a running total of the actual or projected development and operation costs broken out by phase and totaled by fiscal year.

1.7.3 Develop System Decision Paper

Using the summary information and projected schedules, develop the SDP to document and support management's decision on resolving the need.

Describe Summarized Issues

Provide a summary of the progress of the proposed project to date and incorporate it into the SDP. Include any milestones met or impediments to progress that were encountered.

Describe Accomplished and Projected Schedules

Prepare a schedule detailing completed and anticipated project activities, including the milestones.

Prepare Document

Prepare the SDP in accordance with HUD SDM documentation standards and project guidelines. Include a summary of the issues encountered, the decisions reached, and the accomplished and anticipated project schedules, with accompanying actual and projected resource expenditures.

1.8 REFINE PROJECT PLAN

The Project Manager controls the project by monitoring phase activities; taking corrective action where necessary; refining the project plan to account for changes due to actions taken in the current phase and new information for upcoming phases; and reviewing the planned quality process developed by users, developers, testers, and QA for the next phase. Activities include the following:

- 1.8.1 Update Project Plan.
- 1.8.2 Review planned quality process.

Table 1-10 defines roles and responsibilities of key personnel for updating the Project Plan.

1.8.1 Update Project Plan

Update the Project Plan with cost, schedule, and budget data for the current phase (Initiate Project) to the level of detail necessary to reflect the status of the project.

Review the plan and determine whether any activities for subsequent phases are affected by the completion status of the current phase activities.

Adjust schedules and resource requirements for activities in the following phases, if necessary, and assign starting and ending dates for activities that have been affected. Take into account that the starting date for some activities may be dependent on the completion of other activities.

Update milestones, schedules, resource requirements, and programmatic risk management strategy for the remainder of the project.

Table 1-10. Roles and Responsibilities for Refining Project Plan

Role	Responsibility
Project Sponsor	Approves changes to the project schedule. Approves changes to the Project Plan.
Project Manager	Updates the Project Plan to include actual costs incurred and specific activities accomplished for the Initiate Project phase; and revises project schedule, plans, strategies, resources, and requirements for the

	<p>subsequent phases, as required.</p> <p>Reviews, for approval, the quality process planned by users and developers for the project phases.</p>
User	<p>Provides input to project manager on required Define System phase tasks and activities.</p> <p>Participates in the Project Plan review.</p> <p>Works with developer to identify and plan the quality process for the project phases.</p>
Developer	<p>Provides input to project manager on required Define System phase tasks and activities.</p> <p>Participates in the Project Plan review.</p> <p>Works with user to identify and plan the quality process for the project phases.</p>

1.8.2 Review Planned Quality Process

Users, developers, and QA work closely together to determine the process that will be used to build the product with the desired quality. During the Initiate Project phase, activities include identifying and planning the quality process for the project phases and identifying the standards and procedures to be used to develop the product. Near the end of each project phase, the planned quality process is reviewed and updated for the next phase. The project manager reviews the quality process for approval and execution.

1.9 REVIEW AND APPROVE DOCUMENTS AND DELIVERABLES

The review and approval of documents and deliverables is an iterative process as each phase provides more definition and products are revised. Additionally, the approval process offers senior management insight into the project. Activities include the following:

- 1.9.1 Conduct review for Initiate Project phase documents and deliverables.
- 1.9.2 Obtain approval of project documents and deliverables.

Table 1-11 defines the roles and responsibilities of key personnel for review and approval of deliverables and documents.

1.9.1 Conduct Review for Initiate Project Phase Documents and Deliverables

Conduct a project review with project personnel and system stakeholders to ensure that the project documents and deliverables for the Initiate Project phase include the necessary level of detail to evaluate a proposed solution to the user’s information management need and meet the appropriate HUD and project standards and guidelines. Be sure to include the management official(s) responsible for certification and accreditation of the proposed system. Use the appropriate document review checklist in Appendix E for Initiate Project phase deliverables to aid the document reviews.

Table 1-11. Roles and Responsibilities for Review and Approval of Deliverables and Documents

Role	Responsibility
Project Manager	Determines required review level and schedules reviews.

	Attends reviews and presents deliverables. Follows up on reviewer recommendations. Obtains concurrence and approvals for deliverables and associated management summaries.
User	Assists in preparation of deliverable reviews. Attends deliverable reviews.
Developer	Assists in preparation of deliverable documents. Provides technical expertise during review process.
ADP Security	Reviews phase products to ensure security requirements have been incorporated.
Project Sponsor	Participates in deliverable reviews.
Configuration Management	Assists project manager with review preparation.
Computer Services	Participates in review of documents and deliverables.
Quality Assurance	Ensures all review procedures are followed, as required. Reviews products to ensure they meet all applicable HUD standards and guidelines.

A minimum of 10 working days before the scheduled review, notify the personnel required to attend and provide each with a copy of the product for their pre-review. Discuss all comments or objections that are raised during the review, and reach consensus on one of the following before the review session terminates:

- The document is correct and complete, as is, without any further changes
- Additional changes that need to be made are minor and do not require further review. In this case, the updates should be made and change pages should be distributed by an agreed-upon date.
- Required changes will have a major impact on the plan. A second review must be scheduled. The changes must be incorporated and the resulting change pages distributed a minimum of 10 working days before the second review.

Prepare a management summary for each document that includes the essential data collected in the document, lists conclusions that may be drawn from the document, and describes potential impacts on the project. Submit documents to the appropriate review board for approval. Documents for approval include the following:

- Needs Statement
- System Decision Paper
- Feasibility Study
- Benefit/Cost Analysis
- Risk Analysis
- Project Plan (updated)

1.9.2 Obtain Approval of Project Documents and Deliverables

Present the project documents and deliverables to the chairperson of the appropriate review board for approval at least 10 days before the scheduled decision date. Include the

management summary information, approval (sign-off) record, the System Decision Paper, and any other required or requested information. The review board chairperson coordinates review board comments, recommendations, and approval signature(s) and returns the approval record to the project manager. Recommendations on the approval record are addressed by the project and the document should be resubmitted to the board if requested. Approval will be assumed if there is no response, or the response is “no comment.” Project approval records are maintained by the project’s configuration management (CM) function. A copy is inserted into the central project library.

The project proceeds to the next phase after all project documents and deliverables are approved.

1.10 PERFORM CHANGE CONTROL ACTIVITIES

A CM function is created to include a project Change Control Board (CCB), a configuration status accounting (CSA) function, and a central project library. All products developed during the project’s development phases are baselined and subjected to change and version control. Baselined items are assigned new version control numbers as they undergo changes (e.g., an update or rewrite).

Configuration management reports are provided to the project manager as requested or required.

Table 1-12 defines the roles and responsibilities of key personnel for performing configuration change control activities for approved baselined products.

Table 1-12. Roles and Responsibilities for Performing Change Control Activities

Role	Responsibility
Project Manager	Approves controlled products for distribution. Approves Configuration Management Plan and supporting activities.
Configuration Management	Establishes Configuration Control Board (CCB). Develops configuration status accounting (CSA) function. Establishes a central project library. Establishes change control for new products. Performs change control for new products. Provides status reports to project management as requested or required.
Quality Assurance	Audits products to ensure only approved products are baselined. Validates establishment of project library.

The configuration management function prepares the baseline for configuration control. The baseline includes any new technical and document deliverables that will compose the project configuration baseline. For the baseline items, configuration management performs the following activities:

- **Develop Configuration Management Plan (CMP).** If desired, create the CMP as a subsection of the Project Plan or as a standalone document. The CMP provides

the plan for recording change processing and implementation status and identification and documentation of inconsistencies among successive baselines.

- ***Establish project CCB.*** The project sponsor establishes and heads the Change Control Board (CCB) for the project. The project CCB establishes the control mechanism for the program office that has identified the need for which the project has been initiated. The goal of the project CCB is to baseline system products and review for approval (and implementation) any changes to the baseline. Criteria for approval will include cost and schedule impacts of proposed changes. The project sponsor will appoint board members from the following organizational areas:
 - Program officials
 - System users
 - External stakeholders, such as Federal oversight agencies
 - IT representative(s), such as project leader, project QA, and technical support

As head of the CCB, the project sponsor does initial reviews of requirement changes to determine if they are changes in scope or clarifications or derivatives of existing baselined requirements. The project sponsor holds CCB meetings to review and approve changes of scope and authorizes the project team to implement clarifications and derivatives.

- ***Establish central project library.*** Establish a library for baselined documents and deliverables. The library, controlled by the project CM function, provides a single, up-to-date repository for the project's documentation and software products.
- ***Establish configuration status accounting reporting.*** Record and monitor changes to controlled documentation and software. Provide CSA reports to appropriate personnel to furnish up-to-date status of approved, baselined products.
- ***Establish change control and version number procedures.*** Identify procedures needed to ensure that changes are accomplished in an organized manner with absolute traceability and accountability and to ensure proper implementation of project CM requirements. For the version number, follow procedures established by HUD. The version numbering enables the project's CM to monitor updates to the product and assist in its distribution. For revised baselined products, review changes made to products to ensure that the changes have been made as described in the supporting documentation.
- ***Assign version number.*** The version number format must follow conventions established by HUD. The version numbering enables the project's configuration management to monitor updates to the product and assist in its distribution. For revised baselined products, review changes made to products to ensure that the changes have been made as described in the supporting documentation.
- ***Store approved version in central library.*** After each baseline product has been completed and approved according to HUD procedures, store the approved version in the project's central library. The project's CM function controls access to the library.

- ***Record product information in inventory log.*** Maintain an inventory log that includes the title of the product, release date, version number, name and version or model numbers of the software and hardware used in the development of the product, name of the organization responsible for development of the product (usually the sponsoring organization), and the product distribution list.
- ***Distribute copies of products as required.*** The project's configuration management function distributes copies of the product according to a distribution list maintained as part of the inventory log information, with distribution based on need and the security level of the product.
- ***Archive old version of products.*** Archive and retain outdated versions of all products for the required period of time, in accordance with HUD guidelines.

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