

Requirements Development Plan Template

**VERSION 1.0**

This template was created to enable departments to more easily develop their project plans. The Department of Technology, Consulting and Planning Division, created this template based on its experiences. The template relies on industry best practices combined with decades of experience on California state information technology projects. The way it was structured is to enable a department to complete the information related to its project without having to write background information related to the discipline. A department may use as much or as little of the template as it wishes.

**Template Instructions:**

* ***Instructions for completing*** this template – written for the author of the project plan - are encased in **[ ]** and the text is ***italicized*** *and* ***bolded.***
* *Examples* are provided as a guideline to the type of sample information presented in each section and the text is *italicized*.
* Boilerplatestandard language for each section is written in the document font and may be used or modified, as necessary.
* A department’s project specific information goes within the brackets ***<< >>***.
* *Informational text is italicized* within square brackets [ ] for informational purposes to the person who has to create the plan and includes background information, explanation, rationale, etc.

APPROVAL SIGNATURES

| CONTRACTOR | | DATE |
| --- | --- | --- |
| <<Deliverable Owner>>  <<John Doe, Manager>> | <<Signature>> |  |
| <<Vendor Project Manager>> | <<Signature>> |  |
| <<Vendor Managing Director>> | <<Signature>> |  |

| **STATE PROJECT MANAGER** | | | | |
| --- | --- | --- | --- | --- |
| Date: | <<Date>> | To: | **<<PM NAME>>,** Project Manager | |
|  | I approve this deliverable and have no further questions or comments. | | | |
|  | I approve this deliverable conditionally, contingent on the review and approval of the following corrections (see comments). | | | |
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# introduction

## Purpose

The purpose of the Requirements Development Plan is to describe the roles and responsibilities for the <<Project Name>> Project requirements development effort and define the planning, activities, and tasks that will be performed as part of this effort. The planning, activities, and tasks include: planning how the activities will be performed (the processes), defining what approach will be taken with various stakeholders and stakeholder groups or classes (groups/classes[[1]](#footnote-1)) to elicit their requirements, identifying how the elicited requirements will be analyzed, and defining how the requirements will be documented, reviewed, validated/approved, and controlled to form the initial baseline set of Project requirements. The requirements referenced in this Plan are the requirements that <<will/may>> be included within a Request for Proposals (RFP)[[2]](#footnote-2), which are generally referred to as stakeholder and system level requirements. For that reason, this Plan complies with ISO/IEC/IEEE 15288-2008[[3]](#footnote-3) instead of ISO/IEC/IEEE 12207-2008 as the former is a Stakeholder/System-level Standard while the latter is a Software-level Standard.

A requirement is defined as, “A condition or capability that must be met or possessed by a system or system component to satisfy a contract, standard, specification, or other formally imposed documents” (IEEE 610.12-1990 [R2002]). Therefore, requirements identify, in objective terms, the criteria that will be used to measure the success of the Project. The main objective or goal in defining requirements is to **communicate** to the developing organization what the stakeholders need.

## Scope

### In-Scope

The scope of the processes, activities and tasks defined within this Requirements Development Plan are the following items:

[Identify the list of items that will be included within the scope of this Plan. See below for examples.]

* The elicitations of requirements for the system from all stakeholders defined in the <<Project Name>> Project Charter (or include a list of the stakeholders if a Project Plan or the Project Charter, which may define this list, does not currently exist).
* The Project Scope, as defined with the Feasibility Study Report (FSR) and Project Charter, shall be used to limit the scope of the requirements documented in the output of the effort described within this Plan. If a detailed Scope Statement does not exist, the scope must be defined in detail in this section because it is essential to moving forwards with requirements development.

### Out-of-Scope

The following items are not within the scope of this Requirements Development Plan and are therefore excluded:

[Provide a list of items that are related to Requirements Development but are not included in this Plan. This includes those which may be identified in other Project Plans, such as the following:]

* The Requirements Management process, which defines the activities and tasks used to control and manage changes to the baseline requirements, is not included within this Plan but is documented in the Requirements Management Plan.

## Relationship to Other Project Plans

[The objective of this Section is to provide the reader with a clear understanding of how this Plan integrates with the other Project Management disciplines. However, as this Plan will commonly be one of the first plans created and the durations of the activities/tasks under this Plan are relatively short, there may not be any other related documented plans to cite, except for possibly the Project Charter. Therefore, while it may not be possible to cite other plans, the approach the project will use must be documented here in order to clarify and communicate how the activities and tasks identified in this Plan will be executed and communicated to the project stakeholders.

Describe the relationship of the Requirements Development Plan to the other Project Plans that have been or will be created for the Project. This can be done multiple ways, in text by identifying the other plan and how they are related, or graphically. For example:]

Requirements Management Plan:

* The Requirements Management Plan identifies the process and controls that will be enforced on the Project to manage changes to the requirements baseline. Once requirements are created and finalized by this Plan, they will be formally baselined, and as shown in Figure 1, the baseline requirements will be managed and controlled from change by the Requirements Management Plan for the remainder of the Project.



**Figure 1: Relationship between Requirements Development and Management**

Schedule Management Plan

* [Describe how the activities, tasks, and resources necessary to perform this effort will be documented and managed under Schedule Management. If a Schedule Management Plan does not yet exist, describe how the Requirements Development activities and tasks will be captured and documented in the project schedule and how it will be maintained under the umbrella of Schedule Management.]

Communications Management Plan

* [If one exists, describe how the communications with the stakeholders will be managed between the needs of this Plan and the communications described in the Communications Management Plan.]

Governance Plan

* [Describe how conflicts/issues between -requirements will be handled and how the baseline requirements will be validated and approved in accordance with a Governance structure.]

## Document Maintenance

This document will be reviewed <<quarterly*>>* and updated as needed. Since the Requirements Development effort may be a relatively short duration effort, compared to the development life cycle, lessons learned are not as applicable for driving updates to this Plan. However, this Plan does need to be consistent with the activities and tasks actually performed to support overall lessons learned for future Projects. Therefore, if changes to the Requirements Development activities and tasks occur or if Requirements Development Plan changes are driven by other Project Management Plans as they are developed, this Plan will be updated.

This document contains a Revision History Log. When changes occur, the version number will be updated to the next increment and the date, change description, and the author who made the change recorded in the Log.

## References

The following are references used in the creation of this Plan:

* IEEE 610.12-1990 [R2002], IEEE Standard Glossary of Software Engineering Terminology
* ISO/IEC/IEEE 29148:2011(E), Systems and software engineering - Life cycle processes – Requirements engineering
* ISO/IEC 15288:2008(E), IEEE STD 15288-2008, Systems and software engineering - System life cycle processes

[Only list the references that are actually used and cited within this document.]

# Roles and Responsibilities

[Identify the individuals and groups and describe their specific roles and responsibilities for Requirements Development. This is not meant to be a job description of what the individual or group does on the Project but rather a summary of the roles and responsibilities with respect to Requirements Development.

Below is a listing of the most commonly used project individuals/groups that should be considered, though all may not necessarily be needed for a specific Project, and others may need to be added based on the specific Project. Projects must clearly identify the roles and responsibilities associated with each. However, do not be generic, meaning, do not identify responsibilities such as “among the reviewers of …” as this does not convey any ownership responsibility. If there are groups, such as an Executive Steering Committee or reviewer groups, then identify the groups and cite where the members of the groups are defined, (e.g. the Project Charter, Deliverables Management Plan, etc.) Also, do not duplicate roles and responsibilities that are part of and defined within another Project Management Plan, such as the approver of a Change Request should be defined in the Change Management Plan so do not repeat it here; as the role and responsibility changes in the life cycle, it will be difficult to keep multiple plans consistent.]

## Project Executive Steering Committee

### Role

The Executive Steering Committee’s role is to provide the final approval of the Project requirements.

### Responsibility

Their responsibility is to understand the approach used to elicit the requirements from all of the Stakeholders as well as the approach used to develop and finalize the requirements. Then, when presented with the requirements, they will review a representative sample of the requirements to provide the final level of assurance that the requirements will communicate the stakeholders’ needs to any potential vendor. If the requirements are deficient, they will identify issues and problems that need to be corrected. Once acceptable, the Executive Steering Committee will be responsible for approving the Project requirements, which will then become baselined and fall under formal Requirements Management control.

## Project Sponsors

### Executive Sponsor

#### Role

The Executive Sponsor’s role is to ensure this Plan is executed in a timely and efficient manner and that the objectives are achieved.

#### Responsibility

The Executive Sponsor will provide the necessary support to the Project Manager to ensure that resources are available to support the execution of this Plan and to provide the advocacy to all of the internal and external units and organizations that are required to participate in the requirements development effort.

### Project Business Sponsor

#### Role

The Business Sponsor’s role is to provide the overall business leadership to ensure the requirements meet the needs of all users.

#### Responsibility

The Business Sponsor is responsible for ensuring that this Plan identifies an approach that will addresses all of the organizational business users, their needs, and the organization’s business support needs (e.g., Legal, IT Operations, Public Relations, etc.). The Business Sponsor also provides advocacy to the business and support components of the organization to ensure that the documented requirements will meet the overall organization’s needs. Ultimately, the Sponsors (Business and Executive) are responsible for approving this Plan and ensuring that the activities and tasks are executed by the Project Manager.

## Project Director

### Role

The Project Director’s role is to provide support for the Project Manager by aiding in the removal of obstacles and resolving issues or problems during the development of the project requirements that are beyond the control of the Project Manager.

### Responsibility

The Project Director is responsible for tracking the progress of the requirements development effort, identifying significant deviations, and assisting the Project Manager in resolving obstacles, issues, and problems in order to keep the effort on schedule without compromising the quality (completeness, correctness, readability, etc.) of the resulting requirements.

## Project Manager

### Role

The Project Manager’s role is to plan, schedule, resource, monitor, and track the progress of the requirements development effort.

### Responsibility

The Project Manager is responsible to work with the Requirements Development Lead to review the requirements development approach, verify that all stakeholders are accounted for and the planned elicitation approach appears sound for each, and ensure that the tools necessary to develop, document, and maintain the requirements throughout the process are available. The Project Manager will schedule the activities, tasks, and resources necessary to execute the effort and monitor and track the execution. If obstacles, issues, or problems arise, the Project Manager will either resolve them or escalate them to the Project Director or Sponsors for resolution.

## Requirements Development Lead

### Role

The Requirements Development Lead’s role is to lead or perform the activities and tasks defined within this Plan.

### Responsibility

The Requirements Development Lead is responsible for executing all of the activities and tasks within this Plan and complying with the planned process. The Lead will work with the Project Manager to define and identify the resources needed to accomplish each activity and task, verify the tools are available, and assist in the scheduling of the execution of the effort.

# REQUIREMENTS DEVELOPMENT PLANNING

[Key to planning the requirements development effort is to understand the number of stakeholders and stakeholder classes/groups[[4]](#footnote-4) that must be elicited to develop the stakeholder and system requirements. In addition, the elicitation approach may, and likely will, be different for different stakeholders and stakeholder classes/groups. Therefore, it is important to plan how the requirements will be elicited for each stakeholder and stakeholder class/group.

The selection of an approach is determined by understanding of the individual stakeholders and stakeholder class/group composition and how they may be best approached to elicit their requirements. It is also important to plan for iteration and/or the re-execution of tasks when performing requirements elicitation, also called elicitation recursion. Rarely will stakeholders be able to identify all of their requirements in a single iteration or meeting. Therefore, when planning the requirement elicitation, consideration must be made for the number of iterations necessary to achieve the level of requirements’ specificity necessary to define the stakeholders’ needs[[5]](#footnote-5). Further, each iteration cycle may use a different approach with differing objectives, as illustrated in Figure 2, with respect to the level of detail being defined during each iteration cycle. Changes to the approach and the planned level of requirements detail that will be elicited and collected at different iteration levels must be planned.

The State Technology Approval Reform Project, specifically the Stage Gate process, will dictate when specific requirement types must be submitted to proceed past a Stage Gate. The Requirements Development planning must take into account what types of requirements must be submitted for each gate.]

This section identifies the planning that has been performed to prepare for the Requirements Development effort. The planning identifies the stakeholders, the approach that will be used to elicit requirements from each stakeholder or stakeholder group/class, how the elicited requirements will be documented, how the elicitation sessions will be scheduled, and progress tracked and reported to the stakeholders.

Conceptual View of Iteration with Differing Levels of Detail

**Figure 2: Conceptual View of Iteration with Differing Levels of Detail[[6]](#footnote-6)**

## Identify Stakeholders

The individual stakeholders and stakeholder groups/classes that have a legitimate interest in the system throughout its life cycle have been identified, verified, and validated.

[Add a paragraph to identify how these stakeholders and stakeholder classes/groups were identified, verified, and validated to ensure this list is complete and there are no stakeholders missing and no unnecessary stakeholders identified.]

The following table identifies the stakeholders and stakeholder groups/classes for the Project and their interest in the Project execution and/or the artifacts produced.

The following are examples:

| Stakeholder | Interest |
| --- | --- |
| XYZ Unit | As a user of the system, they have an interest in ensuring that the system performs the XYZ functionality necessary for the unit to perform their business function and that reports can be generated. |
| Chief Deputy Director | As an Executive Sponsor, he/she has an interest in ensuring the Project cost, schedule, quality, risks and issues are carefully monitored, managed, and that … |
| Cashiering Unit | … |
| IT Support Unit | The IT Support unit has an interest in ensuring the system can be supportable by the organization and that all artifacts delivered will be usable and accurately reflect the procedures necessary to be supported by the units’ resources. |
| Enterprise Architect (EA) | The EA has an interest in ensuring the new system will meet the performance and other operational needs of the organization. |
| Training Office | The Training Office has an interest in ensuring that the system documentation and training material is developed, with appropriate tools available as necessary to train all of the impacted stakeholders. |
| Project Manager | The PM has an interest in managing the execution of the Project and ensuring that there are sufficient artifacts created and delivered that will allow the necessary tracking, managing, and reporting for the Project. |
| Etc. | … |
| CalTech | CalTech has an interest in the Project by ensuring …. |
| DOF | … |

[Identify all of the stakeholders and their interests in the Project. Ensure you not only look at the development effort but also the maintenance and operations and other post-deployment users. If the Project developed a Product-based work breakdown structure (WBS), this would be an excellent starting point for identifying these stakeholders. Think about the notion that these stakeholders will be elicited for requirements for their area of interest. However, do not identify specific products, such as a System Administration Manual for the IT Unit, but focus on the types of products and services. From a WBS perspective, this would be a level-2 or level-3 view of the products and/or services.]

## Identify and Plan Elicitation Approach

For each stakeholder and stakeholder group/class identified in Section 3.1, the following approach will be used to elicit their requirements. As noted previously, the elicitation process may be iterative and/or recursive and repeated as necessary to ensure all of their requirements have been captured.

The following are examples:

| Stakeholder | Elicitation Approach and Iteration/Recursion |
| --- | --- |
| XYZ Unit | The initial approach that will be used is a top-down business decomposition method. Business process flows will be developed for the “as-is” process. User required changes to this “as-is” process will also be documented. This will be the first level of iteration.  Then, “as-is” Use Cases will be developed that will identify and document the unit’s interactions with the system.  … |
| Chief Deputy Director | Requirements will be elicited by a meeting with the Chief Deputy Director to identify/describe the specific data he or she expects to be generated and reported on by the Project to the Chief Deputy Director, the frequency of reporting, and the criteria for exception reporting. The frequency of reporting …. |
| Cashiering Unit | … |
| IT Support Unit | Requirements will be initially elicited through the requirements teams’ review of the IT Units’ organizational procedures and manuals where initial requirements shall be captured.  Then, additional meetings will be held that will review the existing Units’ processes and procedures, which shall then be validated.  Through the use of recursive requirements brainstorming sessions where each step of the Units’ process is reviewed, additional requirements will be elicited.  …. |
| Enterprise Architect (EA) | … |
| Training Office | … |
| CalTech | … |
| DOF | … |

[There are literally hundreds of techniques and methods that can be used to elicit requirements, though most involve some form of an interviewing technique. Note that not all techniques work well with all stakeholders; the Project must understand the stakeholders and stakeholders classes/groups and identify an approach suitable for the specific stakeholder or class/group. As an example, a top-down business process model to detail user interactions, data, and rules might work well with specific business users but this same approach would not work well for an Executive Sponsor or the IT organization that may be maintaining the solution. For ideas, reference the ISO/IEC/IEEE Standards as well as documents such as the Business Analysis Body of Knowledge (BABOK).

For the specific Project, clearly identify the technique(s) that will be used for each stakeholder or stakeholder group/class and plan for iteration and refinement of the technique as more is known about the needs. While elaborate models are discussed in literature and standards, understand your stakeholders and determine what will work best for them.]

## Identify and Plan Elicitation Documentation

[Define how the requirements and supporting artifacts will be documented and how and where they will be stored.]

As each identified stakeholder and stakeholder group/class is elicited, the requirements and supporting artifacts shall be documented in various forms and formats. In the early iterations, it is anticipated that the documentation created will be primarily graphical in nature, such as flow charts, pictures from white boards, etc. These types of documents will be captured in the form that they were developed (e.g., Visio, PowerPoint, photo (jpeg), etc.). However, as the requirements are refined, they will be documented in a MS Word format to allow for later analysis. When documenting requirements at all levels, the requirement context will always be kept with the set of requirements being collected.

[The Project needs to define the format and structure of the final elicited requirements documents, which are the documents that will be provided to the requirements analysis activity. This is important for a number of reasons: 1) it establishes a common and consistent expectation of the types of data that must be collected for each context area; 2) it supports the analysis activity and tasks by providing a consistent input into the categorization and filtering of requirements defined in section 4.3; 3) it reduces the amount of re-writing that the analysis team will need to do to ensure context and requirements sets are defined; and, 4) it simplifies the identification of missing or incomplete requirement sets during both elicitation and analysis. While the Use Case approach to documenting the final elicited requirements is identified here, any artifact that keeps the requirements context with the set and types of requirements elicited is sufficient.]

The final requirements document for each requirements context area will be documented in Use Cases in accordance with the template provided in <<define where the template is located>>.

All of the requirement artifacts collected shall be stored in a secure repository, <<identify where>>. The artifacts that will be captured will consist of all tools, techniques, diagrams, flow charts, photos, documents, files, etc. that were used in the elicitation process. While some of these artifacts will be used as reference later during the analysis activity, others will be formalized to define or support the requirements and will be incorporated into the final requirements document (e.g., the baseline requirements document).

During the elicitation effort (as further defined in Section 4.1), the collected requirements will not be reviewed or analyzed in any way other than to ensure that the captured requirements are clear, complete, and understandable. Section 4.3 identifies the specific effort to analyze the requirements based on the artifacts captured and stored.

## Scheduling Requirement Elicitation Activities and Tasks

[As with all activities and tasks, they must eventually be scheduled and the resources allocated to ensure the outcome meets the needs of the Project. Based on the above information, identify how the actual activities and tasks will be scheduled and resources committed to accomplish the objectives of the requirements development effort. This becomes very important as the Project has likely not been in the mode of managing to a schedule since this effort is very early in the Project. So, if a Project schedule does not exist or is not being actively managed, define how the Project will schedule the activities, tasks, and resources necessary to execute this Plan.

Also include information on how progress will be managed, tracked, and reported to the Project Manager and stakeholders.]

# REQUIREMENTS DEVELOPMENT PROCESS

Requirements Definition (aka Requirements Development) is defined within ISO/IEC/IEEE 29148-2011 and 15288-2008 as having the following purpose:

“It [the Stakeholder Requirements Definition process] identifies stakeholders, or stakeholder classes, involved with the system throughout its life cycle, and their needs, expectations, and desires. It analyzes and transforms these into a common set of stakeholder requirements that express the intended interaction the system will have with its operational environment and that are the reference against which each resulting operational service is validated.”

To accomplish this purpose, the Requirements Development process defined within this Plan includes the following elements:

* Eliciting stakeholder requirements
  + Including identifying[[7]](#footnote-7) stakeholders and stakeholder classes and working with them to define the requirements.
* Defining stakeholder requirements
  + Defining constraints, activity sequences, interactions between stakeholders, and non-functional needs.
* Analyzing and maintaining stakeholder requirements

## Eliciting Stakeholder Requirements

The referenced ISO/IEC/IEEE Standards define the first task within this activity to be:

“Identify the individual stakeholders or stakeholder classes who have a legitimate interest in the system throughout its lifecycle”.

This task was identified under Requirements Development Planning, Section 3.1, to support the planning for the overall Requirements Development effort, which must consider the number of stakeholders that will be involved.

The other task under this activity is the actual elicitation effort, which can be viewed as the execution of the planned activities and tasks of elicitation with the identified stakeholders and stakeholder classes/groups.

### Eliciting Stakeholder Requirements Task

[This section must identify how the planning will be executed and how supplementary information will be maintained. While this is typically the largest effort for requirements development, the planning was done in the previous section so this section only needs to address the execution and support items, such as agendas, meetings, issues, action items, minutes, preparation material, distribution, etc.

This section defines how the meeting(s) with stakeholder and stakeholder classes/groups will be held. Stakeholder requirements will be identified, documented and controlled as defined in Section 3. During elicitation, the objective is to have the stakeholders identify their needs, wants, desires, expectations, and perceived constraints for the system. The objective is not to perform any pre-screening or analysis during the elicitation activity; the analysis effort is performed later in the Requirements Development process.

For example, to elicit requirements from the stakeholders and stakeholder classes or groups, meeting(s) will be held, in accordance with the schedule for each stakeholder and stakeholder class/group being elicited. During each meeting, the identified and planned requirements elicitation approach, as further described within this Section, will be used and the requirements will be documented. As meetings are held, it is expected that a large number of issues and/or action items will be identified. These issues and action items will be captured and documented in meeting minutes and tracked by the Requirements Development Lead.

A meeting agenda may consist of:

* Introduction, Schedule, Procedures, and Expectations
* Review of Open Issues, Action Items, Suspense Dates, Status
* Overview of Approach to be Used for this Meeting
* Elicit requirements by executing the defined approach
* Review of Captured documentation
* Review of new Issues, Action Items, Suspense Dates
* Set Expectations for Next Meeting and/or Follow-up Efforts

While the meetings with specific stakeholders and stakeholder classes/groups may differ significantly based on the stakeholder and the approach planned, the intent of this general agenda is to prepare the users for what will be going on during the meeting, how the meeting will be conducted, and what the standard processes are for review of any previous open items, elicitation of requirements, and approval of documented changes, as well as any follow-up validation of requirements. It is simply to communicate to the stakeholders what is going on and what is planned for the future.]

[Identify how Issues, Action Items, and Suspense Dates will be documented.]

[Identify how conflicts will be resolved within stakeholder classes/groups. While the requirements should not be analyzed during elicitation, conflicts can also arise between individuals within a stakeholder class/group. Therefore, a general approach should be defined to resolve conflicts within a class/group. Section 4.3.2 addresses conflicts between stakeholders and stakeholder classes/groups.]

[Identify how the meeting minutes and meeting artifacts will be captured, maintained, and verified with the stakeholders.]

All of these artifacts will be used for later analysis to define the formal stakeholder/system requirements and to support requirements traceability under the Requirements Management Plan processes.

## Define Additional Stakeholder Requirements

Within this section, there are tasks and/or statements that define constraints on the requirements and aid in identifying requirements that are commonly missed during the requirements elicitation effort. These tasks/statements support both the requirements elicitation task in Section 4.1 as well as the analysis activity in Section 4.3.

### Define Constraints

The following identifies constraints on the system that must be captured in the form of system requirements. While these constraints in themselves are typically not suitable as requirements, they shall be used to define or derive requirements for the system.

[Identify the constraints on the system/solution. These constraints may come from a variety of sources but are commonly identified within an FSR or other project approval documents or from Departmental internal decisions. The constraints identified here will be used as the “filters” when performing the requirements analysis effort and therefore the more complete they are, the more useful they will be when reviewing the requirements elicited. Typical and common examples include:

* The system/solution must be hosted within the OTech Managed Services environment.
* Existing legacy system data exchange interfaces with external trading partners shall not be modified or changed in any way.
* The system/solution must be consistent with and use the operating systems, databases, and programming languages currently supported by the Department.]

### Define Operation and Support Activity Sequences

The following identifies operational and support scenarios that are out of the normal or routine business processing flows. These scenarios aid in identifying additional system requirements necessary to meet the unusual or non-routine needs of Project stakeholders. The intent of adding these scenarios is to broaden the view of the requirements that need to be defined for the project.

[Define a representative set of operation and support scenarios. These are not business process flows of other business-related scenarios. The objective of these scenarios is to aid in potentially identifying requirements that may not have been identified by any stakeholder or stakeholder group. Examples would include scenarios related to availability of the system, especially around key periods such as the end-of-the-month reporting, legal audits that may be performed, Public Record Act (PRA) requests, public-facing attempts to hack the system, user interactions with the system for training purposes, etc. These are primarily non-functional types of scenarios that are looking at the system as a “black box”.

As an example:

Scenario X: The Department’s Legal Office (Source) has received a Public Records Act request (Stimulus) for business license data. The system is in normal operations mode (Environment Conditions) and the Legal Office accesses the Reporting subsystem (System Artifact Involved) and generates a report (Response) that provides the requested data. The data included within the report only includes data that is publicly releasable and complies with all legal statutes (Response Measure).

From this sample, while the Legal Office may have been identified as a stakeholder, this scenario is used to help ensure that all of the necessary requirements to cover such a situation are identified.

While it may appear difficult to develop such scenarios, the best approach is to draw the system as a box on a whiteboard and ask what could happen to the system, from the operation and support perspectives and then from different stakeholders’ perspectives. Start with brief scenarios (e.g., “external hackers attempt to force a denial-of services”, “regional power outage”, “major technology supplier goes out of business”, “end-of-month and the system goes down”), and further elaborate on those scenarios that appear reasonable or could potentially become real that the system development needs to consider; never delete any identified scenario but simply archive the ones that are not expanded. Document the resulting scenarios within this section.

Again, the objective is to try to find gaps in requirements that may be missed by eliciting requirements from the stakeholders. By documenting the scenarios in this section, additional attention will be focused on ensuring that the requirements necessary are defined or, during analysis, gaps identified. This effort will never be 100% complete and perfect; however, the more gaps found early, the easier they can be closed.]

### Identify Human-System Interactions

The following identifies the high-level requirements for the interfaces between human users and the system to be developed. Information systems have a significant human-to-system interface (visual and well as manual) and the requirements for these interactions must be elicited and documented.

[Included in this section are the usability requirements that must be considered for the system. Typically, this is not a long list of items but for some systems there may be unique human-system interactions that must be specified. An example of a typical requirement for Web-accessible systems is a requirement for Section 508 (29 U.S.C. ‘794 d) and/or W3C Web Content Accessibility Guidelines 1.0 compliance. Other examples may include different levels of training and/or resource skills available to use, maintain, and operate the system. Identify either the human-system interaction requirements or the approach that will be taken to identify these usability requirements. Again, these are typically requirements that are missed when eliciting requirements from the stakeholders.]

### Specify Critical Qualities

[In this section, identify if there are any areas that are deemed “critical”. For example, a system that is externally facing that also holds personally identifiable information (PII) data may have security as a critical requirement. While these requirements should have been identified in Section 4.2.2, there may be a small subset that would be identified as critical, which are mainly security related for State IT systems. If there are, identify and/or reference them here.]

## Analyze and Maintain Stakeholder Requirements

Once the requirements have been defined and elicited, all of the requirements will be analyzed and maintained. Requirements analysis involves a series of steps and the approach that will be used is illustrated in Figure 3.

Figure 3 illustrates that all of the requirements so far elicited and defined, at the top of the Figure, will be reviewed and placed into sets, which are groups of common requirements related to a specific business or other context; if the elicitation process defined above kept the requirements context with the requirements collected, this step is typically a relatively simple effort, especially if Use Cases or a similar requirements documentation approach was used. To perform this filtering and the creation of requirement sets, the controlling inputs are the requirements context artifacts collected during elicitations, such as the business process flows, stakeholder classes/groups, defined scenarios, operations and support approaches, etc. The objective of this initial filtering and setting approach is to allow a more exhaustive and complete analysis to identify missing or incomplete requirements later in the analysis process; it is virtually impossible to analyze and find missing, incomplete, conflicting, or other requirement problems in a large number of individual requirements without partitioning them into subsets around some common context prior to the analysis. The result is a collection of requirements grouped in sets and each set has its own unique context (e.g., a business context for cash management, or patient in-processing). Besides being necessary to perform analysis, it is also critical that the requirements context be captured with the requirements sets in order to facilitate reviews with the stakeholders, and to provide improved communications to potential vendors when defined within an RFP.



**Figure 3: View of Requirements Analysis**

The initial requirement sets will then pass through another filter that reviews each individual requirement to verify that the requirement text is well formed, meaning the requirement does not use ambiguous words, it is complete, readable and correct (within the requirements set context), and generally adheres to the controlling inputs, which are characteristics of individual requirements defined in APPENDIX A.

The results of this final filtering stage are sets of well-formed individual requirements, again with the requirements context retained. Each set is then analyzed to verify that the set as a whole is well formed, as defined in APPENDIX A, and to identify missing requirements, conflicts between requirements within the set, level-setting[[8]](#footnote-8) of requirements within the set, the identification of prioritizations, and other attributes.

For each requirement, the following attributes will be set:

[The Project should define the attributes that will be set at this step. Attributes are simply a method for characterizing requirements, which can be used to support other activities, such as testing for high priority or criticality requirements, or for reporting. APPENDIX A provides a sample list of potential attributes that should be considered.]

After this analysis, problems in the form of requirements gaps in completeness, conflicts or inconsistency, affordability (not just from a cost perspective, but schedule, risk, M&O, etc.), scope, etc. will be identified. These problems will be resolved with the stakeholder and stakeholder class/group that provided the requirement for the requirement context identified with the requirements set. If conflicts exist between stakeholders or stakeholder classes/groups, they will be resolved in accordance with the method defined in Section 4.3.2. Once resolved, each requirement set, including the requirements set context, will be reviewed per Section 4.3.3, and validated per Section 4.3.4, with the stakeholder and stakeholder class/group that has a legitimate interest in the requirements.

Once validated, the requirements sets, with all reference material will be baselined and provided to the Requirements Management process to control per Sections 4.3.5 and 4.3.6.

### Analyze Elicited Requirements

[The Project needs to define how they are actually going to perform each of the steps identified above based on the artifacts that they will collect from the requirements elicitation effort and other requirements either captured within this document or through other defined means. Minimally, define 1) how requirements will be grouped within sets with the same requirements context, 2) how individual requirements will be analyzed to ensure they are well-formed, and 3) how each set will be analyzed to ensure the sets are well-formed.]

### Resolve Requirements Problems

[The Project needs to identify the approach they will use to resolve problems identified in the analysis step. It is extremely important to always keep the requirements context in mind when resolving problems as well as the entire set of requirements; do not attempt to identify missing requirements with the stakeholders without presenting the requirements context and the requirements that already have been identified for the set as this will result in requirements being identified that will likely be inconsistent with the other requirements in the set. The resolution of problems should not result in the need to re-work the analysis effort.

It is important to understand that requirements negotiation can be used as a tool. Negotiation might be needed among stakeholders requiring mutually incompatible features, or when there are conflicts between desired performance requirements, constraints, available budget, and delivery schedule.

This section must also identify how conflicts between stakeholders and stakeholder classes/groups will be resolved.

Regardless of how the problems are resolved, the Project must identify that records will be kept on how they were resolved and by whom or what the agreement was.]

### Provide Feedback

[Sometimes agreements cannot be reached on conflicting requirements, unrealistic requirements will not be changed, or continually requested requirements are beyond the Project scope. The Project needs to define how these will be handled. If the Project has an issue management or an escalation process in place, these might be cited. However, if neither of these exists at this point in the Project, an approach must be defined within this Plan.]

### Validate Requirements

[Describe how the Project plans to validate the requirements. As stated previously, it is important to keep requirement sets and their context together when performing any requirements validation effort; validation should not be simply a review of a long list of individual requirements as context adds significant value for understanding what is specifically being required.

The most common way to validate requirements is by performing a series of requirements reviews that are focused on the requirements context and the individual requirements within that context. For example, a requirements review session context may be for patient in-processing and all of the requirements related to this context will be reviewed and validated. As always, issues or action items are likely to be generated from these meetings so this section must define how these will be captured, tracked, and resolved.

Finally, the sign-off or formal acceptance or approval of the requirements and issues or action items must be described within this section; this sign-off or formal acceptance or approval must be made by the stakeholders that have an interest in the requirement context and the individual requirements documented.]

### Document Requirements

[This section must identify the documentation that will be kept and maintained throughout the requirements analysis effort, which will also end up being passed to the Requirements Management process for tracking and controlling. While a Project may consider keeping little documentation other than the final requirements, it is important that the document necessary to support the attribute assessments, at a minimum, be retained. For example, documentation related to the source of the requirement(s), a requirements priority, issues related to a specific requirement such as the stakeholders’ firmness or uncertainty may relate to a volatility attribute, etc. The Project must consider the attributes that will be kept of the requirements and minimally identify the documentation necessary to support these attributes and identify them within this section.

Also include here how the final document will capture context in addition to just the requirements. For example, specify if Use Cases or other types of documents will be used that capture the requirements context, requirements data, business rules, etc. Again, these are the artifacts that will form the initial baseline set of requirements that will end up being incorporated into an RFP. Therefore, they must communicate the stakeholders’ needs to potential vendors who may not have any understanding of the stakeholder processes or needs, which is why keeping the requirements context with the requirements is so important and stressed throughout this Plan.]

### Maintain Requirements Data

[The Project must identify how the requirements, requirements sets, set context, and all additional supporting information will be delivered to the Requirements Management process. While the resources performing both requirements development and requirements management may be the same, from a process perspective, they are different processes. The main point to this description is for specifying how this “snapshot in time” of the requirements will be captured in order for the transferred artifacts to be complete. In practice, requirements are typically approved incrementally and transferred as each set is approved. Therefore, if this approach is going to be used, it must be described here. However, a word of caution is that once passed to the requirements management process, the requirements are baselined and cannot be changed without change control procedures being followed. So, if an approved requirements set is passed to requirements management and a later review of a different set identifies a problem with the set already approved and baselined, then a change request should be created. By following the process described within this document regarding keeping requirements in sets with each set having a consistent and non-overlapping context, this risk is low.]

1. Requirements Characteristics

The ISO/IEC/IEEE 29148-2011 Standard identifies requirements characteristics for individual requirements and requirement sets as well as requirement language criteria and requirement attribute examples. While the Standard cannot be reproduced here due to copyright restrictions, the following is a high-level list of the areas defined within the Standard.

5.5.2 Characteristics of individual requirements

* Necessary
* Implementation Free
* Unambiguous
* Consistent
* Complete
* Singular
* Feasible
* Traceable
* Verifiable

5.2.6 Characteristics of a set of requirements

* Complete
* Consistent
* Affordable (not cost-wise but within constraints)
* Bounded

5.2.7 Requirement language criteria

* State “what” is needed and not “how”
* Avoid vague and general terms, such as:
  + Superlatives
  + Subjective language
  + Vague pronouns
  + Ambiguous adverbs and adjectives
  + Open-ended, non-verifiable terms
  + Comparative terms
  + Loopholes
  + Incomplete references
  + Negative statements

5.2.8 Requirement attributes

5.2.8.1 Examples of requirements attributes

* Identification
* Stakeholder Priority
* Dependency
* Risk
* Source
* Rationale
* Difficulty

5.2.8.2 Examples of requirements type attributes

* Functional
* Performance
* Usability/Quality-in-Use
* Interface
* Design Constraint
* Process
* Non-Functional
* Quality
* Human Factors

1. COTS, MOTS, Custom Considerations

The following chart identifies requirements development considerations that must be accounted for based on the type of solution being considered or solicited:

| **CONSIDERATIONS FOR COTS, MOTS, and CUSTOM IMPLEMENTATION** | |
| --- | --- |
| COTS | * For COTS products, the requirements are defined in as-is terms with respect to business processes and other organizational processes. One of the most important requirements to put on contracts are the Organizational Change requirements and one of the first deliverables from the vendor should be the mapping of the as-is to the to-be processes, with the to-be processes an approval item. This deliverable must be provided as early as possible but it must be complete, mapping all of the critical steps, data collection elements, and all other critical items from the as-is to the to-be process. This is needed early to support the organizational change work that must be performed to prepare the users for the change. |
| MOTS | * MOTS essentially follows the same process as COTS, developing requirements and processes with respect to the as-is organizational processes. |
| CUSTOM | * This document was written to directly support a custom implementation; there are no additional considerations that need to be taken into account. |

1. The term group/classes, or group/class is used intentionally within this document to be consistent with industry standards and to express the idea that collections may consist of groups of humans and/or classes of non-human objects, such as interfaces consisting of real time and batch interfaces which in themselves have requirements. [↑](#footnote-ref-1)
2. The State may elect to assume responsibility for some of the requirements and not include them as part of an RFP. Regardless, they are still Project Requirements and still need to be treated the same as those that are the responsibility of a vendor. [↑](#footnote-ref-2)
3. While this Plan adheres to the ISO/IEC/IEEE Standard, the planning, activities, and tasks are more focused on common sense, experience, and expertise gained from developing requirements for numerous major systems. [↑](#footnote-ref-3)
4. Stakeholder classes/groups are groups of individuals with a shared or common interest in the system; often they perform the same business function for an organization, such as a Cashiering group or information technology Support group. [↑](#footnote-ref-4)
5. Again, this is for planning purposes; the actual number of iterations and/or recursions will be determined by the ability to elicit the requirements and the completeness obtained. [↑](#footnote-ref-5)
6. While Figure 2 is not meant to imply a “Spiral” software development model, it does result in a similar effect of reducing risk through each progressive spiral. In this case, it helps to reduce the risk that the requirements will be incorrect or incomplete. [↑](#footnote-ref-6)
7. The identification of stakeholders and stakeholder classes/groups was done in Section 3.1. [↑](#footnote-ref-7)
8. Level-setting of requirements simply means that the requirements within a set are specified at roughly the same level of detail, except where necessary to be otherwise. [↑](#footnote-ref-8)