The following checklist summarizes QAPP requirements for projects involving software and application development of software tools (models, web-based applications, etc.) that have not been previously verified or validated. More comprehensive guidance on developing QAPPs for modeling projects is provided in the EPA/240/R-02/007 report titled “Guidance for Quality Assurance Project Plans for Modeling ([EPA QA/G-5M](https://www.epa.gov/quality/agency-wide-quality-system-documents#guidance)).” The completed checklist will be entered into QA Track with the approved QAPP by the QA Manager when final.

## B.1 FUNCTIONAL REQUIREMENTS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Yes** | **No** | **N/A** | **Requirement** | **Notes** |
|  |  |  | Provide a list of the most important functions that the software system must address. |  |
|  |  |  | Identify requirements for functionality, external interfaces (includes graphical user interfaces and interfaces which are needed for other programs to call subroutines from the software, as applicable), performance, and design constraints. Each requirement should be uniquely identified and defined such that its achievement is capable of being objectively verified and validated. |  |
|  |  |  | Specify computer hardware and operating system requirements as required in the ORD APP inventory. |  |

## B.2 SYSTEM DESIGN

| **Yes** | **No** | **N/A** | **Requirement** | **Notes** |
| --- | --- | --- | --- | --- |
|  |  |  | Provide an overview of the system design, e.g., block diagrams showing relationships between major program modules, hardware devices, and data input/output. |  |
|  |  |  | Describe the components and subcomponents of the software design, including databases and internal interfaces. The description should link the software structure to the functional requirements. |  |
|  |  |  | Provide the rationale for selecting the proposed hardware and software tools as addressed in the application governance process. |  |

## B.3 IMPLEMENTATION

| **Yes** | **No** | **N/A** | **Requirement** | **Notes** |
| --- | --- | --- | --- | --- |
|  |  |  | Describe how a working software system is developed from the design specifications. Agile software development is recommended. |  |
|  |  |  | Describe how the requirements for functionality, external interfaces, performance, and design constraints will be verified and validated. |  |
|  |  |  | Describe how release and delivery of the product is managed, including versions for alpha and beta testing, user acceptance testing (UAT), and training materials for users. |  |
|  |  |  | Describe the procedures for controlling, documenting, and archiving all significant changes to software and hardware. Recommend the use of bitbucket or GitHub depending on scenario. |  |
|  |  |  | Identify the archiving software used for controlling, documenting, saving, and recovering changes made to the source code. |  |

## B.4 VALIDATION, VERIFICATION, AND TESTING

| **Yes** | **No** | **N/A** | **Requirement** | **Notes** |
| --- | --- | --- | --- | --- |
|  |  |  | Describe the testing strategy that will be used along with the procedures for each planned test. These tests can include routines that assess validation and verification of the software functions. Testing may include individual module tests, integration tests, system testing, acceptance testing, and alpha and beta testing. |  |
|  |  |  | Describe the review process for the software’s graphical user interface and output reports. Ensure that summary or synthesis statements accurately represent the underlying data and limitations. Check for correct interpretation of results, clarity of discussion, proper citations and references, and spelling and grammar. |  |
|  |  |  | Describe the procedure for checking the correctness of outputs and validity of model inputs, e.g., checks that input parameters are realistic and/or do not violate the applicability domain of the model. |  |
|  |  |  | Describe how it will be determined if the developed software product conforms to customer and Agency requirements, and whether the software product fulfills the intended use and user expectations. This includes analysis, evaluation, review, inspection, assessment, and testing of the software product and the processes that produced the product. |  |

## B.5 DOCUMENTATION, MAINTENANCE, AND USER SUPPORT

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Yes** | **No** | **N/A** | **Requirement** | **Notes** |
|  |  |  | Specify the requirements for documentation, methods and facilities used to maintain, store, secure, and document-controlled versions and related artifacts of the identified software during all phases of the software life cycle (e.g., requirements and design documents, configuration maintenance plan, operations manual, source code, user’s guide, and application programming interface). |  |
|  |  |  | Describe the procedures for maintenance and user support when software or data generated by the project will be distributed or deployed outside of the ORD laboratory that initiated the development of the software product. |  |

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