# Including the ITS Architecture into the Planning Process

## Introduction

The work done to develop the NOVA ITS Architecture is valuable only if it contributes to improving the integration of transportation systems in Northern Virginia, particularly VDOT systems. VDOT transportation planning is a process that involves project definition, review, prioritization, approval, funding allocation, and incorporation into the transportation plan. The path a project follows in the planning process is dependent on the funding source being sought for the project. There are several basic funding sources that the planning process supports: ITS Earmark funds, Federal, State, Congestion Mitigation and Air Quality (CMAQ), Surface Transportation Program (STP) funds, and Special Grant funds. The planning process was examined in light of these various funding sources to determine how the NOVA ITS Architecture, and other pertinent documents like the strategic plan and the concept of operations could be used as a reference in the pursuit of integration opportunities.

The general process required to define a project in VDOT's NOVA District is discussed below. The points where the NOVA ITS Architecture, ITS Strategic Plan, Concept of Operations, and the Regional ITS Architecture will be beneficial are highlighted.

The goal of this effort is not to impose more work upon the NOVA Staff managing the ITS project development, but to ensure that the projects are defined with integration in mind. Each project should consider all potential integration possibilities. FHWA policy requires the definition of ITS projects that are consistent with a regional plan or architecture to better support integration. The architecture, strategic plan and the concept of operations provide a guide to integration opportunities among VDOT systems and between VDOT and regional stakeholders. Projects defined without considering integration opportunities will be found to be more costly in the long run due to the cost of redesign in the future. These tools will allow VDOT to better financially plan ITS investments and assist VDOT managers in understanding the priorities of ITS deployment in the NOVA District.

## Process for Defining, Planning and Implementing Projects

Ideally, the NOVA ITS Architecture should be used at the very beginning of this process when projects are first being defined. This may be an evolutionary step to be taken in the future as the use of the architecture in the process becomes more mature.

A benefit of using the NOVA ITS Architecture in this process will be more comprehensively defined projects with attention being paid to integration opportunities. By referencing a larger plan for ITS in the NOVA District, projects may be able to take advantage of other information that exists or will be made available in the future. In addition, a more focused plan will be made available across the District and those VDOT organizations from outside of NOVA that are involved in the project planning process will be able to make more informed decisions based on the information available in the architecture.

The general process for defining, planning, and implementing projects involves several VDOT and non-VDOT organizations. In short, a project is defined at a high level and a cost estimate is associated with it. The various funding sources for different projects present variations on the

general project initiation process. The rest of the document details the general process with relation to three main funding sources: Six Year Improvement Program (SYIP), ITS Earmark Funds, and Special Grant Funds. The processes and the illustrations for these funding sources highlight the areas where the NOVA ITS Architecture should be used and relates this process to the project development documentation. There are three stages in all the processes that the NOVA ITS Architecture should be used:

- Stage 1 – Before Funding is identified
- Stage 2 – When Funding is Available
- Stage 3 – After a Project has been completed

These three stages and "how and what" needs to be done from using the NOVA ITS Architecture is "briefly" described in each of the funding processes below. Additional detail on the specific architecture requirements for the three stages in provided in the "Project Development" documentation.

**SYIP Process**

**Stage 1 - Before Funding is identified**

The first variation is the SYIP process as illustrated in Figure 1. The proposed projects for the NOVA District are initially prioritized by the NOVA ITS PPA team and approved by the NOVA Operations and Administration team. As projects are initially defined, the project initiators and the NOVA ITS Planning, Programming, and Administration (ITS PPA), who is responsible for the NOVA ITS Architecture, can use the architecture (website) to define a project architecture to better illustrate the project definition. The ITS PPA collects projects throughout the year from the NOVA operational functional area managers and maintains a project pool. This project library is used by the ITS PPA to prioritize and generate a list of projects along with sequencing of when these projects will be funded and implemented. This project pool is a "living document" and will be updated as and when new projects are provided to the ITS PPA. The project library is also prioritized using the program plan as a guide to strategize and phase the project deployment using the deployment plan of the ITS strategic plan.

The NOVA Operational and Functional areas can use the architecture website to examine subsystems/stakeholders and their interfaces to define the project scope. This information is sent to the NOVA ITS PPA team before the projects are sent to the VDOT Central Office (and Transportation Board) for assessment. When CMAQ and RSTIP funds are used, the projects are sent to the Northern Virginia Transportation Authority (NVTA) for approval and then forwarded to the VDOT Central Office.

The VDOT Central Office sends the projects to the Smart Travel Oversight Board for approval, and then defines the projects for programming, scheduling and allocation of funds. The projects are then sent to the Commonwealth Transportation Board for another approval before entering the approved projects into the 6 year plan.

**Stage 2 – When Funding is available**

The approved projects that make up the SYIP are sent back to the District offices. Each project manager who is responsible for a project in the 6-year plan develops a project scope and implements the project. The project managers will develop "project architectures" that provide greater detail on the specific components of the architecture. They would download the NOVA Turbo database from the web site and access the database and application software to develop project architectures based on the NOVA ITS Architecture. These project architectures along with information regarding their projects' relationship to NOVA ITS Strategic Plan and Concept of Operations are sent to the NOVA ITS PPA for review and approval. For local government projects receiving funding for ITS projects that will have interface or integration with VDOT, the local government project manager will use the NOVA ITS Architecture Turbo Database. When other agencies are involved with the local government projects, the local governments are encouraged to use the Regional ITS Architecture Turbo Database to define their project interfaces. The Project Manager will then implement the project using the ITS Architecture and the systems engineering process as defined in the "project development" document.

**Stage 3 – After a project has been implemented**

Following project implementation, the final project architecture reflecting the actual state of the project implementation is provided to the NOVA ITS PPA for incorporation into the NOVA ITS Architecture. The project manager will use the NOVA Architecture website to send the project architecture information for inclusion into the into the NOVA ITS Architecture definition to reflect its implementation and make sure its other projects are aware of the interfaces and information that is available from the implemented system. There is also a concurrent process to incorporate the project into the Metropolitan Washington Regional ITS architecture to ensure consistency. In the future, when a Virginia Statewide Architecture is developed, the project architectures will be incorporated into that database to ensure consistency.

The completion of this cycle makes the most accurate architecture data available to the NOVA District, reflecting what exists and what is planned for future project definition and planning.

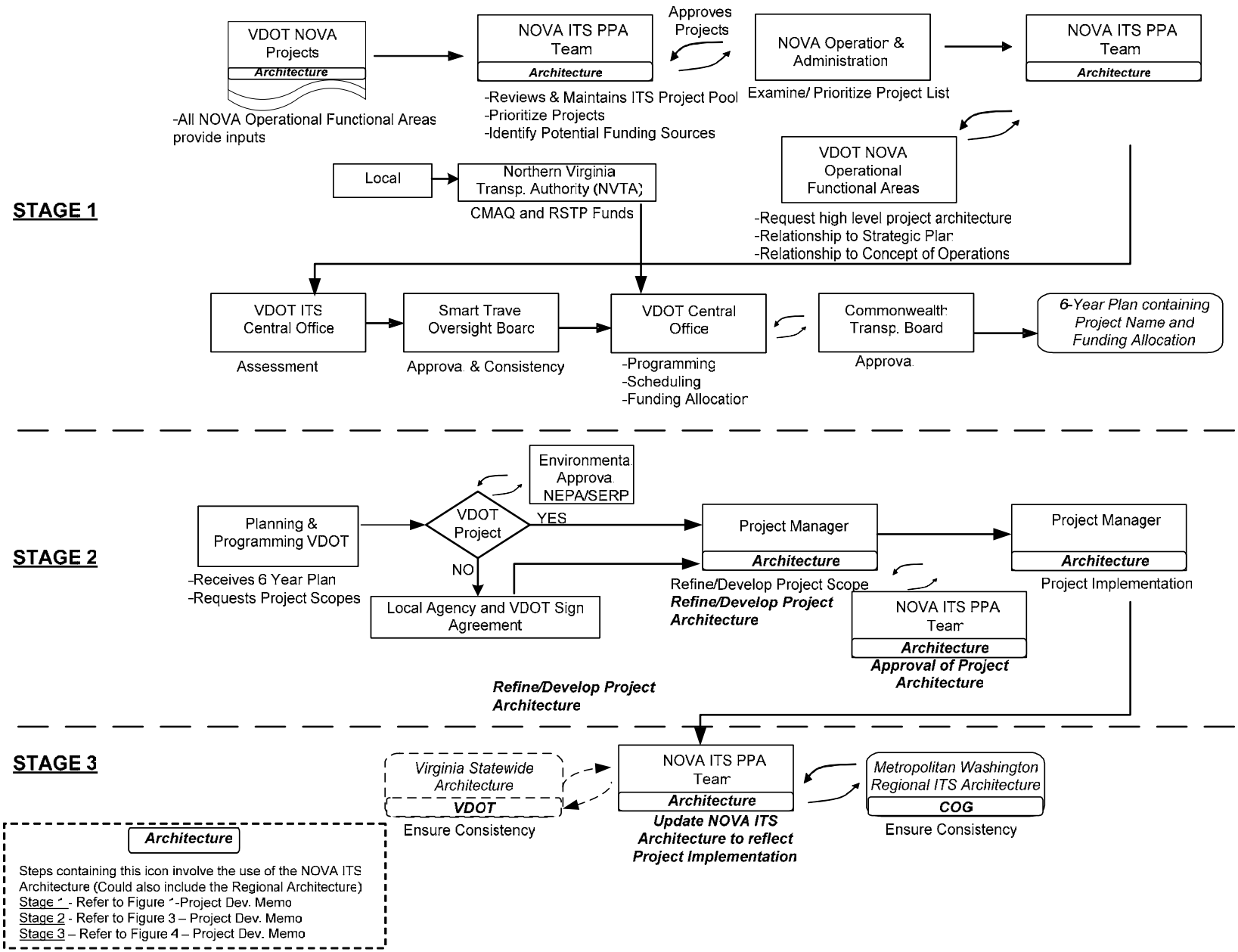


**Figure 1:** VDOT NOVA District ITS Project Initiation Process through the Six Year Improvement Plan

**ITS Earmark**
**Stage 1 – Before Funding is Obtained**

Figure 2 illustrates the Project Initiation Process for ITS Earmark Funds. In this process, once the Congress approves earmark funds, FHWA notifies VDOT Central Office. VDOT then requests the fund-receiving agency to provide high level scope, a financial plan and a draft schedule. The fund receiving agency can use the NOVA Architecture website to define this high level architecture. The central office then adds the earmark funds into the VDOT system and assigns it a project number and sends it to the VDOT Planning and Programming for TIP and STIP requirements.

**Stage 2 – When Funding is Obtained**

Once the TIP and STIP are amended the projects are then evaluated by the FHWA and VDOT ITS PPA team. These projects are further reviewed and follow one of two paths. If the ITS project is being implemented by a VDOT agency, then FHWA and VDOT sign a partnership agreement pending FHWA final approval. If the ITS project is being implemented by a local non-VDOT agency, but being administered by VDOT, the local agency signs an agreement with VDOT for implementing the project. Similar to the SYIP process, the project managers use the NOVA ITS Architecture to scope and define their projects. They have access to the Turbo Architecture database and application software to develop project architectures based on the NOVA ITS Architecture. They provide their project architectures to the NOVA ITS PPA Manager for review and approval for consistency with the NOVA ITS Architecture. For the VDOT projects, project managers are also expected to provide information of their projects in relationship to the NOVA ITS Strategic Plan and the Concept of Operations as they would with the SYIP process.

**Stage 3 – After project is implemented**

Following implementation, the final project architecture reflecting the actual state of the project implementation will be provided to the NOVA ITS PPA for incorporation into the NOVA ITS Architecture. There is also a concurrent process to incorporate the project into the Metropolitan Washington regional ITS architecture to ensure consistency. In the future, when a Virginia Statewide Architecture is developed, the project architectures will be incorporated into that database to ensure consistency.

The use of the NOVA ITS Architecture in the development of an earmark project should highlight the integration opportunities and make them evident to the US DOT that the earmark funds are being targeted to a worthwhile project.

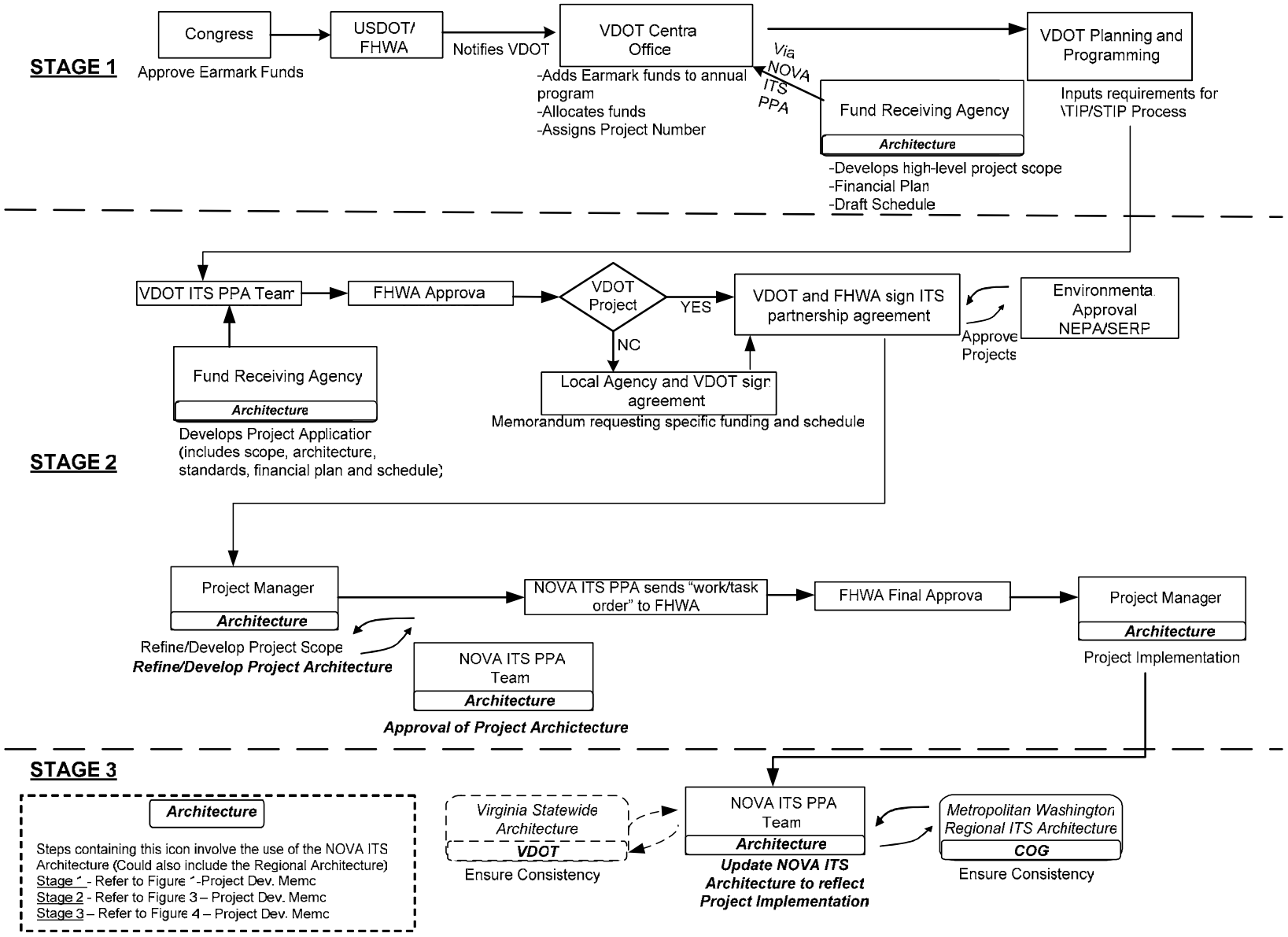


**Figure 2:** VDOT NOVA District ITS Project Initiation Process for ITS Earmark Fund

## Special Grants

### Stage 1 – Before Funding is obtained

Figure 3 illustrates the Project Initiation Process for Special Grant Funds. This process is not as involved as the previously discussed processes. Projects are proposed to the NOVA ITS PPA team from all the NOVA operational functional areas. The ITS PPA team endorses NOVA priority, and the NOVA Grant Development team gets the projects approved by the VDOT Central Office, Regional Stakeholders, and the NOVA Operations and Administration team. This team reviews and approves the projects that receive the grant funding. Every grant may have special requirements and involve more stakeholders in the grant development, this process should be used as a guide only and incorporate each grant's requirements.

**Stage 2 – After Funding is obtained**
The rest of the process is similar to the first two processes.

**Stage 3 – After Project is implemented**
The rest of the process is similar to the first two processes.

As can be seen in each of these process variations, the NOVA ITS Architecture is consistently applied at key steps of the project definition and implementation.

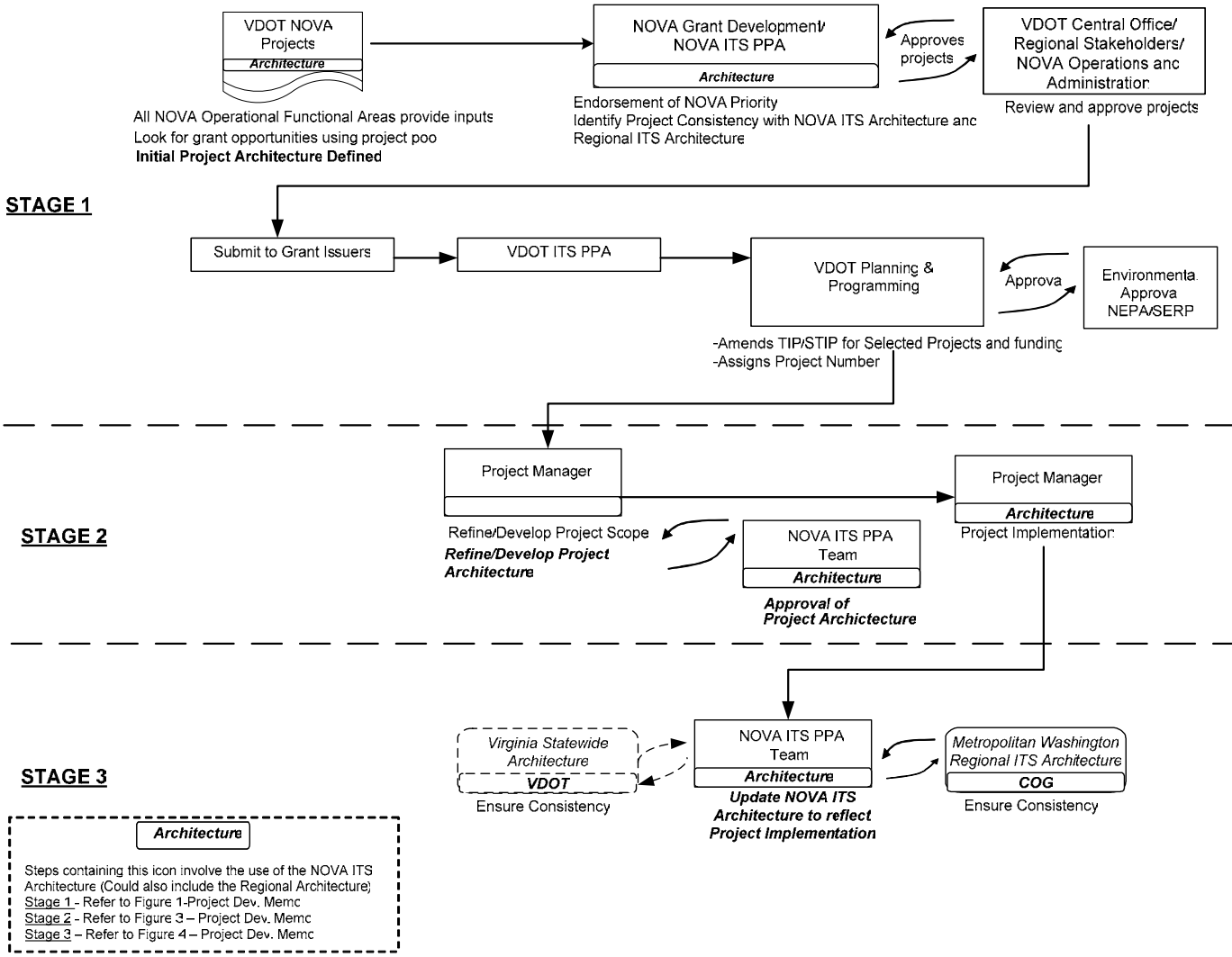


**Figure 3:** VDOT NOVA District ITS Project Initiation Process for Special Grant Fund