

Appendix G – Architecture Maintenance Plan

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EXECUTIVE SUMMARY

This document presents the maintenance plan for the Illinois Department of Transportation's (IDOT) Illinois Statewide ITS Architecture.

The IDOT Statewide Intelligent Transportation System (ITS) Architecture is unique in that it covers statewide ITS functions and covers regions that have not yet developed their own regional ITS architecture. Regions that have deployed significant intelligent transportation systems have their own unique regional ITS architectures that are consistent with the Statewide ITS architecture, and will address the maintenance of those regional ITS architectures at the regional level.

The Illinois Statewide ITS Architecture should be continuously maintained to assure that

- The architecture is consistent with state plans and priorities,
- New projects properly integrate with existing systems,
- New projects do not duplicate current systems,
- The State is spending resources efficiently, and
- New projects are eligible for Federal funding.

In addition to on-going maintenance, the architecture should undergo a comprehensive update every three years to confirm that all ITS initiatives in the state are consistent with the Statewide ITS Architecture. This comprehensive update can follow a similar process to the one used to develop the initial IDOT Statewide ITS Architecture.

Two components of the Statewide ITS Architecture are to be maintained: the Turbo Architecture Database and the associated Architecture Document (Volume IV of this report). Of the two components, maintaining the Turbo Architecture Database is the most important. The database is the foundation of the architecture. The Architecture Document derives tables of functions from the Turbo Architecture Database and describes how to use the architecture to develop new projects.

1. INTRODUCTION

The Illinois Statewide ITS Architecture provides a common framework for planning, defining, and integrating intelligent transportation systems. The architecture defines:

- The functions that are required to support an Intelligent Transportation System service (e.g. 511, traveler information),
- The physical entities or subsystems where these functions reside, and
- The information flows and data flows that connect these functions and subsystems together into an integrated system.

As ITS projects are implemented, the Statewide ITS Architecture will need to be updated to reflect new ITS priorities and strategies that emerge through the transportation planning process, to account for expansion in ITS scope, and to allow for the evolution and incorporation of new ideas. The Statewide ITS Architecture has a ten-year time horizon as are the majority of regional ITS architectures that support the higher level statewide architecture. As the architecture is updated to address new priorities, they will be extended further into the future.

A maintenance process has been defined for the Illinois Statewide ITS Architecture. This process includes an update to the Statewide ITS Architecture every three years, defined Configuration Management techniques to maintain the architecture, a specific group – the IDOT ITS Program Office (ITSPPO) - responsible for maintaining the Statewide ITS Architecture, and an institutional framework for stakeholders to continue to provide guidance to the evolution of the architecture.

The purpose of maintaining an ITS architecture is to keep it current and relevant, so that stakeholders will use it as a technical and institutional reference when developing specific ITS project plans.

The goal of the maintenance plan is to guide controlled updates to the Statewide ITS Architecture baseline so that it continues to accurately reflect the state's existing ITS capabilities and future plans.

2. INSTITUTIONAL FRAMEWORK SURROUNDING THE ILLINOIS STATEWIDE ITS ARCHITECTURE MAINTENANCE PROCESS

In order to continue to gain the benefits derived from the Statewide ITS Architecture, IDOT needs an institutional framework and technical process to maintain the architecture. This institutional framework enhances the original institutional framework for developing the Statewide ITS Architecture to keep all interested stakeholders involved in architecture maintenance.

At an institutional level, the current Technical Committee becomes the Architecture Change Management Board. The current Steering Committee becomes the Policy Oversight Board. IDOT’s ITS Program Office (ITSP0) is the agent responsible for updating the architecture. Each group has particular functions and duties in maintaining the architecture. Table 1 lists the functions and responsibilities of each group within the institutional framework for maintaining the Statewide ITS Architecture.

Table 1: Functions and Responsibilities of Groups in Maintaining the IDOT Statewide ITS Architecture

IDOT ITS Program Office	Change Management Board	Policy Oversight Board
Maintain the Architecture files	Approve Change Requests that affect two or more participating stakeholders	Provide Policy Guidance
Service Change Requests	Provide direction to IDOT ITS Program Office for changes that have stakeholder consensus	Establish priorities based on policy
Approve IDOT Specific Changes	Forward to Policy & Oversight Board any Change Requests that do not have consensus	Resolve Change Requests that do not have consensus

Change requests to the Statewide ITS Architecture go from a stakeholder to the IDOT ITS Program Office. If the change is IDOT specific and affects no other stakeholders, the Program Office can implement the change. If the change affects multiple stakeholders, the Change Management Board should approve the change to the architecture. The Change Management board shall meet twice a year to review and approve Change Requests.

Individual agencies control the systems that they own. The Change Management Board is the forum for confirming that the stakeholders have a consensus for implementing a change.

If an individual agency must change a technical system without consensus, then the Change Request and its associated issue is sent to the Policy Oversight Board. The Policy Oversight Board sets the direction and policy.

If a conflict arises between the policies of different stakeholders, the Policy Oversight Board is the forum for resolving those issues. The policy Oversight Board meets once per year.

If an issue requires immediate action, an individual stakeholder can request an unscheduled meeting of the Change Management Board. Two or more stakeholders can request an unscheduled meeting of the Policy Oversight Board.

3. ILLINOIS STATEWIDE ITS ARCHITECTURE MAINTENANCE ROLES AND RESPONSIBILITIES

There are two types of maintenance that can be made to the Statewide ITS Architecture: administrative and technical. The major difference between the two is that administrative maintenance does not require the approval of the Change Management Board or the Policy Oversight Board and technical changes require some level of approval depending on the proposed change.

3.1 Administrative Maintenance

As stated previously, administrative maintenance does not require Committee action and is implemented by the IDOT ITSPO staff. Maintenance tasks involve amending the interfaces and information flows, correcting/modifying inventory descriptions, and adding/modifying/deleting stakeholders, for example.

The IDOT ITSPO staff, as appropriate, will evaluate each proposed ITS project to determine if the project is consistent with the Statewide ITS Architecture and appropriate for inclusion at the statewide level.

A project is considered “consistent” with the Statewide ITS Architecture if the elements of the project and their associated functionality are contained in the current architecture baseline. The proposing agency will work with the IDOT ITSPO staff to document the communications and data exchanges between agencies introduced or modified through the proposed project. If the project under consideration is consistent, and the communications flows are determined to be “existing,” then no action is required on anyone’s part to update the current architecture baseline. If the project under consideration is consistent, and the communication and data flows are documented as “planned,” then IDOT ITSPO staff shall prepare the top portion of the Change Request Form shown in Figure 2 to prepare for the change in status of those existing communication and data flows.

3.2 Technical Maintenance

3.2.1 ROLE OF AGENCY AND IDOT ITSPO

If an ITS project is determined to be inconsistent with the Statewide ITS Architecture, the proposing agency will coordinate with the IDOT ITSPO staff to propose an amendment to the Statewide ITS Architecture. The agency proposing the amendment will identify, in writing, any other stakeholders and/or agencies are consulted in creating the architecture modifications. Note that the agencies involved will be dependent on the proposed type of project.

The proposing agency will work with the IDOT ITSPO staff to determine how to amend the Statewide ITS Architecture. Once a decision is in place, the proposing agency will provide a detailed recommendation for the Change Management Board and Policy Oversight Board that details the amendment. Documentation of the recommended change(s) is done through the use of the Change Request Form shown in Figure 2.

3.2.2 ROLE OF THE CHANGE MANAGEMENT BOARD AND POLICY OVERSIGHT BOARD

The Change Management Board will be asked to recommend that the Policy Oversight Board endorse the proposed amendment to the Statewide ITS Architecture. If the Change Management Board does not make such a recommendation, the project will be forwarded to the Policy Oversight Board with the Change Management Board's reasons for not recommending the proposed amendment noted. The proposing agency, at that time, can decide how it would like to proceed (e.g., leave proposal as is; amend proposal; fund project with local money; etc.)

If the Change Management Board does recommend that the Policy Oversight Board endorse the amendment, it may make suggestions for the agency to modify the proposal to better align with the overall Statewide ITS Architecture. The proposing agency will work with the IDOT ITSPO to incorporate these modifications before making a presentation to the Policy Oversight Board.

3.2.3 ROLE OF PROPOSING AGENCY

The proposing agency will work with the IDOT ITSPO to document the functionality and information flows between elements. Documentation of these exchanges by the proposing agency is in two forms:

1. Change Request Form (Figure 2) that details each of the added or changed functionality and/or data exchanges;
2. Updated Turbo Architecture file.

Figure 1: Illinois Statewide ITS Architecture Change Request Hierarchy

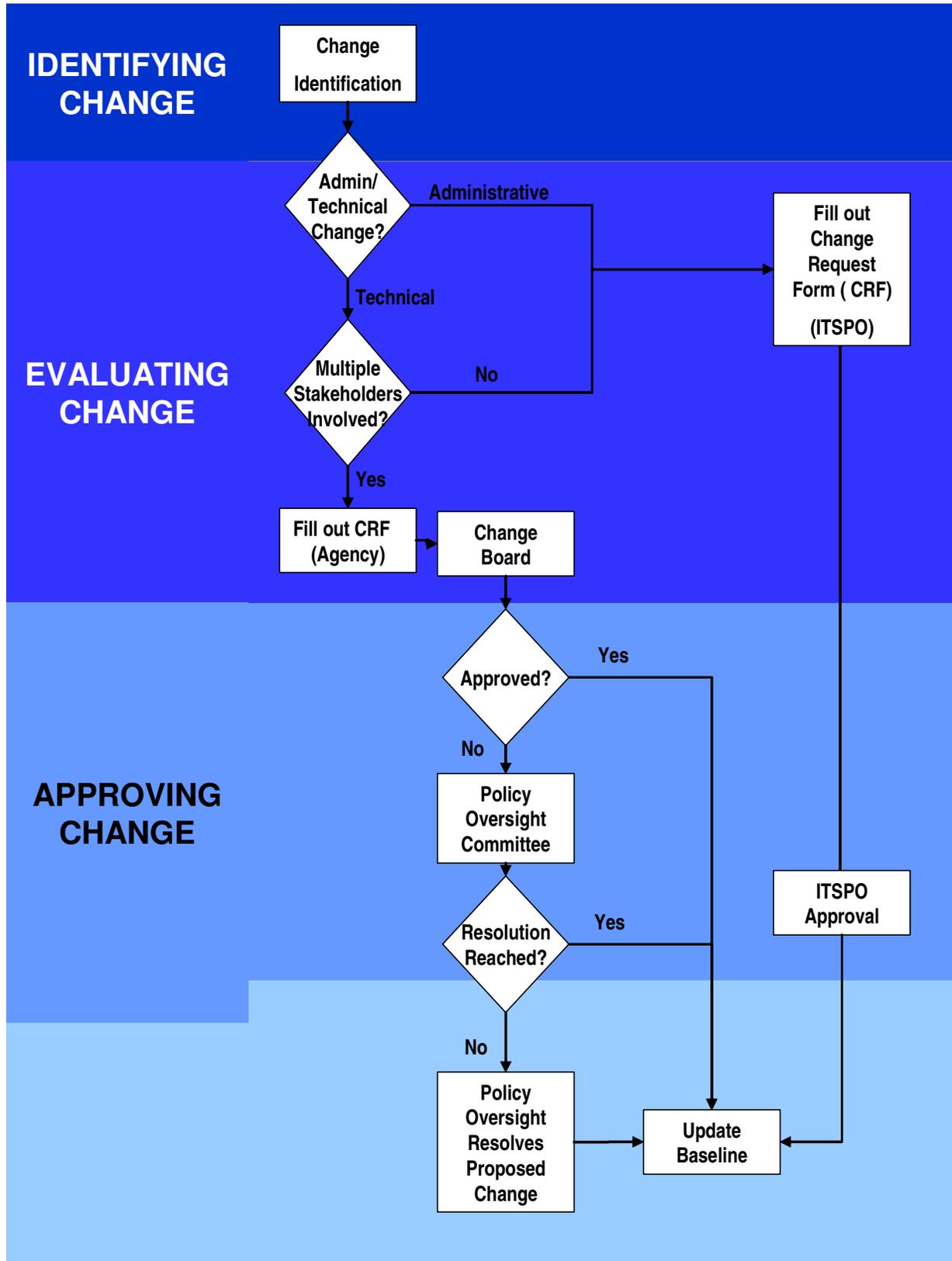


Figure 2: Illinois Statewide ITS Architecture Change Request Form (CRF)

Change Identification:		Request Date:	
Change Description:			
Rationale for Change:			
Request Originator Contact Information:	Name:		
	Agency:		
	Address:		
	Telephone:		
	Fax:		
	Email:		
	<i>To be filled out by Architecture Maintainer</i>		
Change Number*:			
Change Decision:	Accept	Reject	Defer
Decision Comments:			
Decision Date:			
Architecture Components Affected:			
Change Type:	Administrative: Minor	Administrative: Major	
	Programmatic: Minor	Programmatic: Major	

* XX-YY, where XX = year and YY = chronological value, e.g., the first change request of 2006 would be '06-01'

4. TIMETABLE FOR MAINTENANCE ACTIVITIES

A comprehensive architecture update will be completed every three years, concurrent with the update of the Statewide ITS Strategic Plan. This comprehensive update would include involving new stakeholders, reviewing services planned for the area, and other items, as appropriate. It is recommended that a major review and update of the architecture (including possibly additional stakeholder meetings) be performed in the 6 months prior to the regional transportation plan updates throughout the state as well as to support the bi-annual Change Management Board meetings.

Minor revisions and administrative updates, such as changes in the status of an individual architecture flow between stakeholders, can be made as the information is known or even on an annual basis. Minor changes can be made by members of the IDOT ITSPO staff on an ad-hoc basis. All revisions or changes will be managed through the Change Management Process laid out in Section 6 to ensure the integrity of the baseline Statewide ITS Architecture for Illinois. It is recommended that the first update to the architecture baseline be made approximately a year after completion of the initial version.

5. ILLINOIS STATEWIDE ITS ARCHITECTURE BASELINE

Establishing an architecture baseline requires clear identification of the architecture products that will be maintained, including specific format and version information. For the Statewide ITS Architecture the following outputs are recommended as the architecture baseline:

1. Architecture Document
2. Turbo Architecture Databases (one for commercial vehicle operations and one for the remaining statewide transportation functions)

For updates to the Architecture document, it is recommended that the source document, in Microsoft Word format, be held by IDOT ITSPO, while a PDF version of the document be created for general distribution. A version number along with the release date is highly recommended for inclusion inside the cover page in the Document Revision History Table.

For the Turbo Architecture databases, it is recommended that the source files be maintained by the IDOT ITSPO and a zipped version of the final delivered Statewide ITS Architecture database be available upon request. The name, date, and size of the each database file inside the zipped file should be entered into an architecture change log as version 1.0 of the baseline architecture.

6. CHANGE MANAGEMENT PROCESS FOR THE ILLINOIS STATEWIDE ITS ARCHITECTURE

Once the baseline is defined, the process for making changes to this baseline must be established. The change management process specifies how changes are identified, how often they will be made, and how the changes will be reviewed, implemented, and released.

6.1 Identifying Changes

The Illinois Statewide ITS Architecture was created after consultation with stakeholders at workshops in each IDOT District which identified the interregional ITS needs as well as projects both currently implemented those planned for the future. The resultant architecture will need to be updated to reflect changes resulting from project implementation or resulting from the planning process itself. There are many actions that may cause a need to update the architecture.

1. Changes for Project Definition. When actually defined, a project may add, subtract or modify elements, interfaces, or information flows of the Statewide Architecture. Because the architecture is meant to describe not only ITS priorities statewide, but also the current ITS implementations, it should be updated to correctly reflect the deployed projects.
2. Changes in Stakeholders. There are several “generic” stakeholders in the Illinois Statewide ITS Architecture that represent many similar stakeholders. This was done to provide both a template for future regional architectures within the state and ITS architecture compliance for those projects in a region currently without a supporting regional architecture. For example, small municipal transit agencies are all identified under one regional ITS element identified as "Small Municipal Transit Agencies".

As stakeholders are identified, their description will be added as appropriate to the Statewide ITS Architecture. Entirely new stakeholder entities from regional architectures are the most likely candidates to be added into the Statewide Architecture. Entirely new stakeholder entities proposed for the Statewide Architecture may be considered by the regional developers for inclusion into their respective regional ITS architectures. As their respective elements plan and deploy ITS systems, they should be added as separate elements and stakeholders in the architecture.

A tool to help in identifying stakeholder changes is the “Unconnected Stakeholders” Report located under the Tools Menu in Turbo Architecture. This report, when requested, will automatically identify in Statewide ITS Architecture any isolated stakeholders that are currently not be addressed by any elements or interfaces.

3. Changes for Project Addition/Deletion. Occasionally a project will be added, deleted or modified during the planning process. When this occurs, the aspects of the regional ITS architecture associated with the project have to be added, deleted or modified as appropriate to the Statewide ITS Architecture. A set of tools to help in identifying these changes are the “Unsupported Flows” and “Unconnected Elements” Reports located under the Tools Menu in

Turbo Architecture. These reports, when requested, will automatically identify in Statewide ITS Architecture any isolated elements that may be candidates for addition or deletion.

4. Changes in Project Status. As projects deploy, the status of the architecture elements, services and flows that are part of the project should be changed from planned to existing. Elements, services, and flows exist when they are substantially complete in that they have been turned on, tested, and are currently being used.

5. Changes in Statewide ITS Strategic Plan. For many reasons (e.g., funding constraints, technological changes, other considerations), a planned statewide project may end up being delayed or accelerated. Priority for individual projects can also change. Such changes must be reflected in the Illinois Statewide ITS Architecture and may also merit changes to the affected regional architectures.

6. Changes in Statewide Needs. Over time the needs across the state can change and the corresponding aspects of the Statewide ITS Architecture will have to be updated. While the Illinois Statewide ITS Architecture was developed with input from a large number of Stakeholders throughout the state, not all Stakeholders were able to actively participate. As ITS deployment increases and the benefits of integration are realized, additional stakeholders are likely to become interested in ITS and thus need to find their place in the Statewide ITS Architecture and supporting regional architecture. These new stakeholder architectural elements need to reflect their place in the ITS deployments, both at the statewide and at the regional levels, as needed. Specifically, the systems they operate and their interfaces will need to be included if they are not already covered in the baseline statewide architecture.

7. Changes to reflect National ITS Architecture Revisions. The National ITS Architecture, the template for development of regional ITS architectures across the country, may be expanded and updated from time to time to include new user services or better define how existing elements satisfy the user services. These changes should also be considered as the Statewide ITS Architecture is updated. Additionally, the National ITS Architecture itself is a living resource of information and in order to keep a life of at least 20 years into the future, it is expanded and updated from time to time to include new user services or refine existing services. In recent years the National ITS Architecture users asked that maintenance and construction activities be included in the architecture. With national security issues that have arisen since September 11, 2001, in order to address homeland security in transportation systems new security and emergency management entities are being added. How these changes in the national "template" effect the Illinois Statewide ITS Architecture should be considered as the Statewide Architecture is updated.

To obtain federal funding, ITS implementers will be required to self-certify that their projects are consistent with the Statewide ITS Architecture (and their regional architecture if it exists) or will request changes in the architecture to maintain consistency. Any stakeholders can propose a change to the baseline statewide architecture. Stakeholders should inform the IDOT ITSPO staff of the status of any projects with ITS aspects. To properly maintain the architecture, IDOT ITSPO staff should be informed not only of when projects are planned; but also when projects

are completed or when changes made during design or construction impact the Statewide Architecture.

Stakeholders should propose changes in writing to the IDOT ITSPO using the Change Request Form (Figure 2). Proposals should clearly describe the architecture aspects to be added, deleted or revised . The rationale for proposed modifications should be given. Each proposal should include contact information for the person proposing the change to answer questions as they arise.

6.2 Evaluating Changes

Each requested change will be reviewed by the IDOT ITSPO staff to ensure that the request warrants a change in the Statewide ITS Architecture. If the proposed architecture modification has an impact on other stakeholders, the IDOT ITSPO staff will contact the stakeholders to confirm their agreement with the modification. If the issue warrants it such as a major programmatic change, a stakeholder meeting to discuss the modification may be held. When a decision is reached on a specific change request, the bottom portion of the Change Request Form shown in Figure 2 should record the results.

6.3 Approving Changes

Approval are granted in accordance with the institutional decision process described in Section 2. If an individual change request is rejected, within two weeks the request originator will be informed of the decision (and the reason(s) for the decision) and will be invited to resubmit a change request if deemed appropriate by the maintainer.

All requested changes will be documented in the Statewide ITS Architecture Change Database. Below is a sample Change Database entry highlighting the information that would be taken from the Change Request forms and entered into the Change Database. The IDOT ITSPO maintains the Change Database for the Statewide ITS Architecture.

Change Number	Change Description	Request Originator	Change Decision	Decision Date	Decision Comment	Architecture Components Affected	Change Type
XX-YY*	Expanded description of the requested change	Name of request originator	Accept, reject, or defer	Date decision is made	Pertinent details associated with change decision	Listing of affected architecture components	Minor or major

* XX = year and YY = chronological value

6.4 Updating Baseline

Formal implementation of changes to the Statewide ITS Architecture will occur on an annual basis, beginning in January of 2006. The IDOT ITSPO staff will implement the approved changes from the Change Database at that time. The maintainer should ensure that updates are consistent with the most recent version of the National ITS Architecture and Turbo Architecture.

To properly track updates to the Statewide ITS Architecture, the maintainer should update the Document Revision History table at the front of the Statewide Architecture Report and the Change Log in Turbo Architecture. Figure 3 through Figure 8 demonstrate where and what data can be entered to accurately reflect the changes brought about by maintenance activities in Turbo Architecture.

Figure 3: Turbo Architecture –Change Log Entry Point

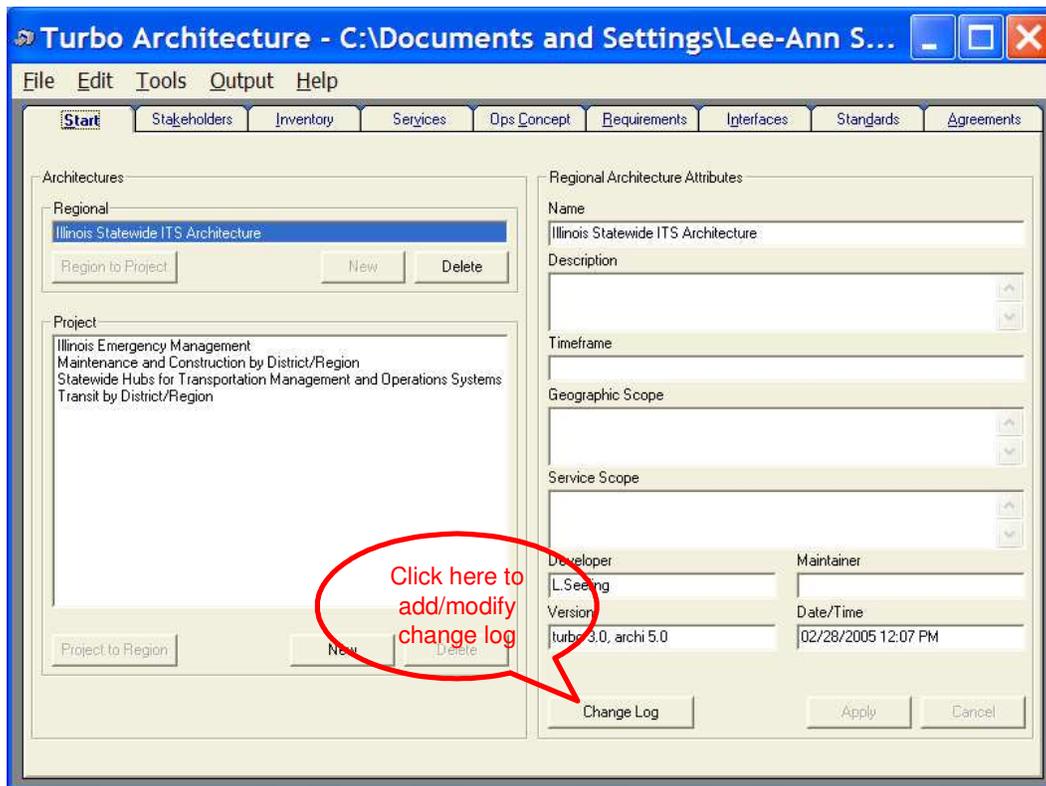


Figure 4: Turbo Architecture Maintenance Details Entry Point

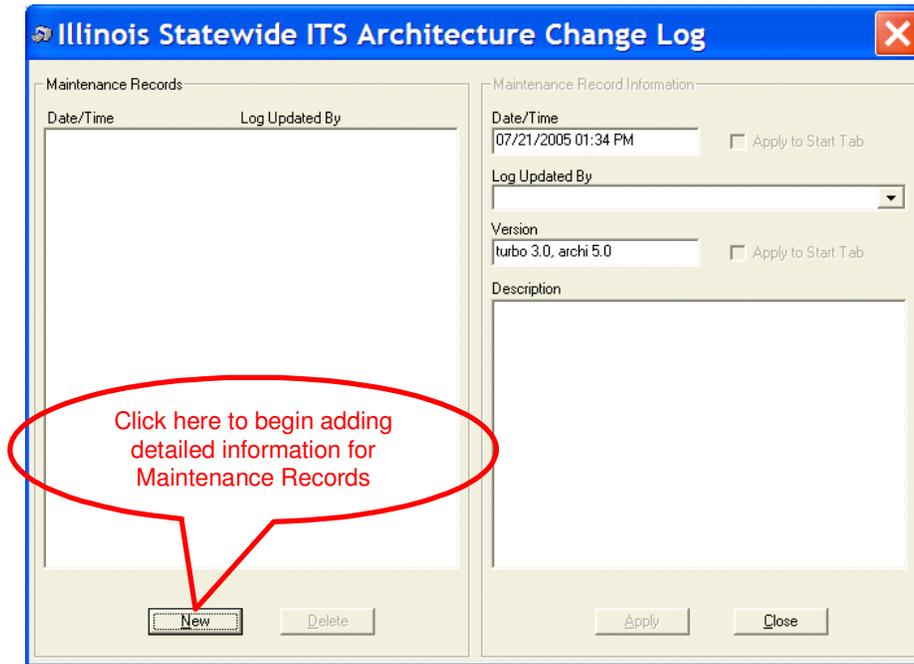


Figure 5: Turbo Architecture Maintainer Identification and Descriptive Text Entry Points

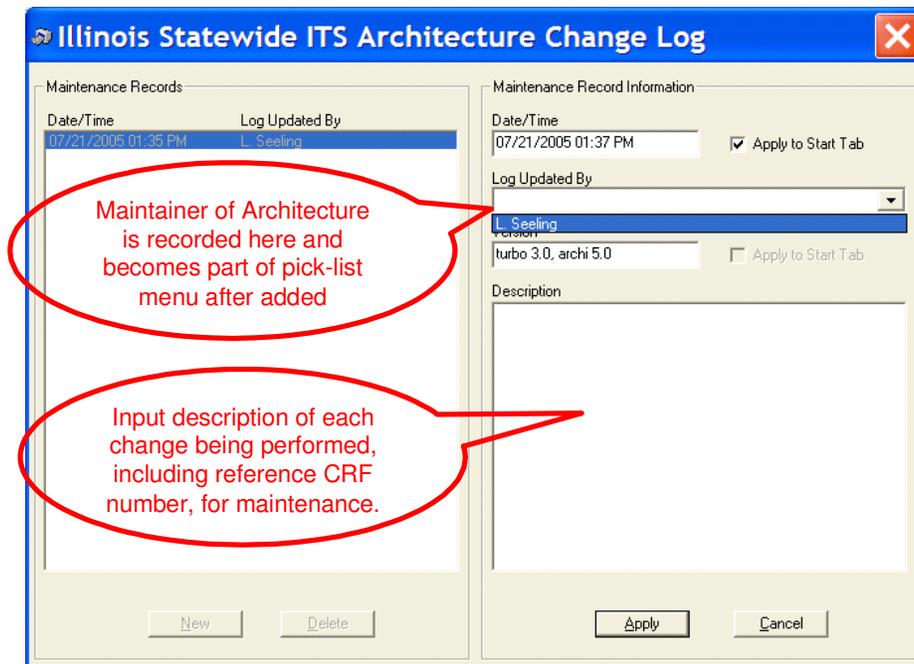


Figure 6: Turbo Architecture and National ITS Architecture Version Identification Point

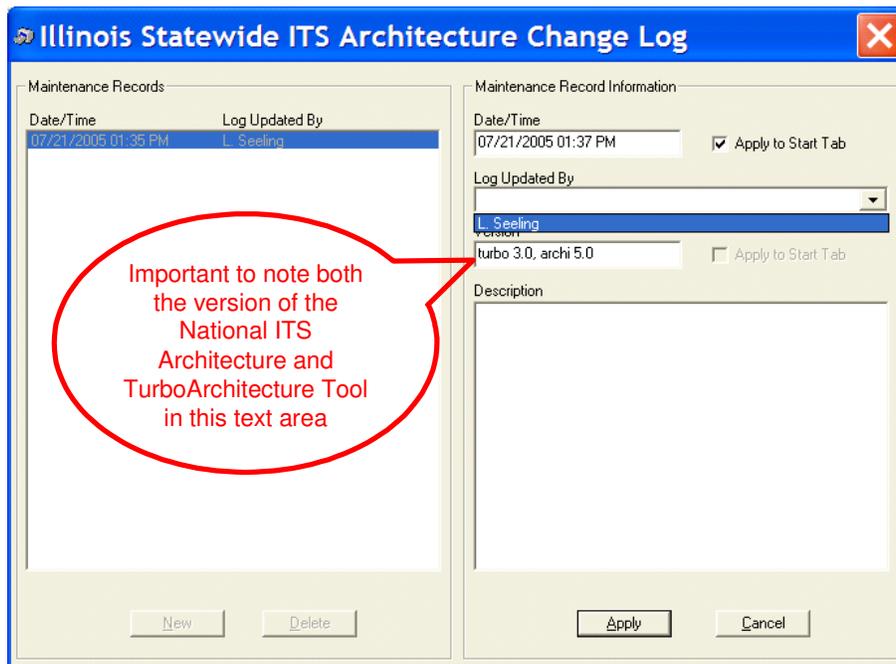


Figure 7: Turbo Architecture Update Acceptance or Cancellation Entry Points

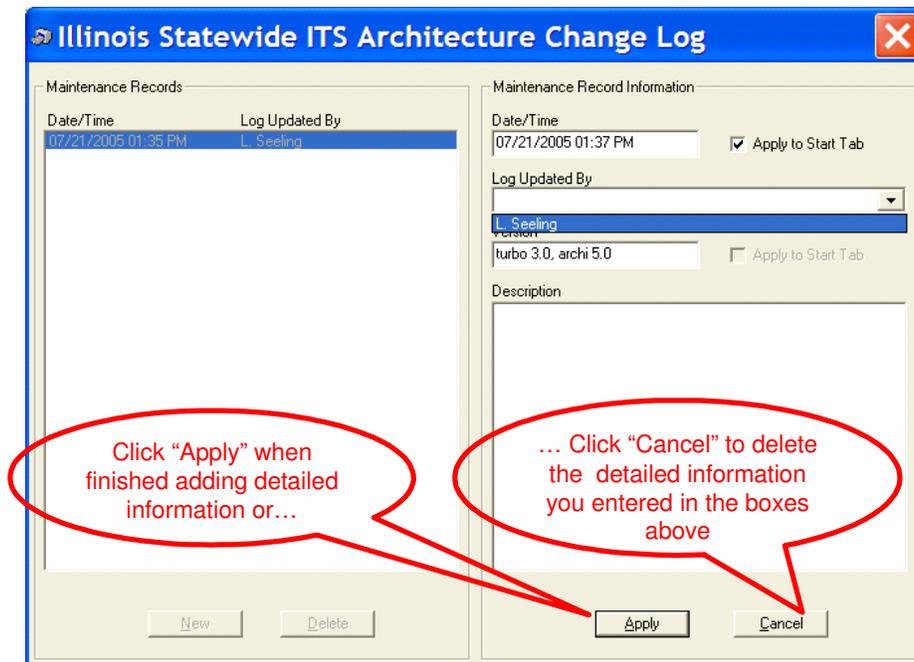
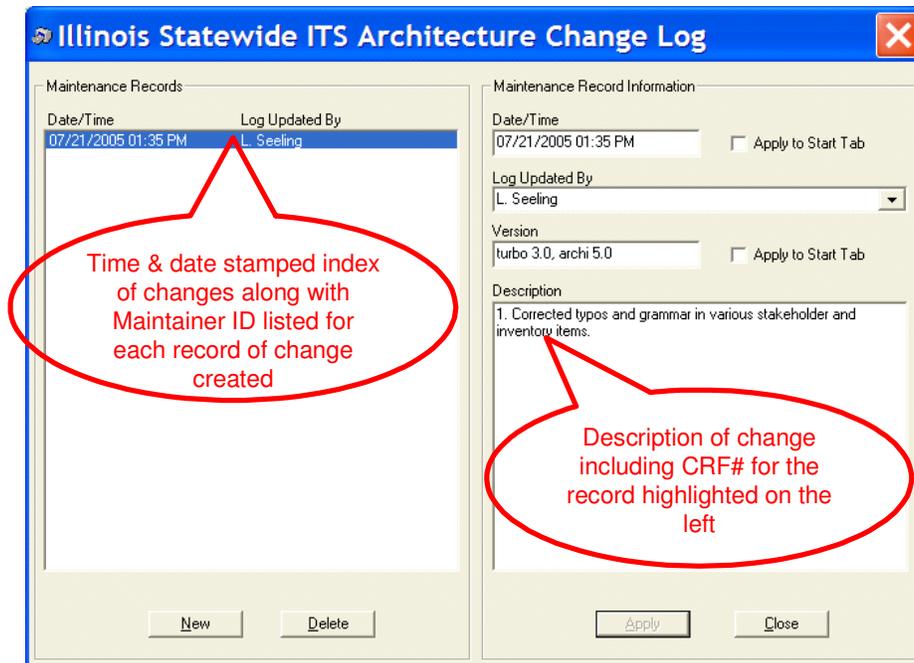


Figure 8: Resultant Updated Change Log for Architecture Maintenance Example Screen



Once the architecture maintenance is complete, the IDOT ITSP0 will submit both the updated architecture document and updated Turbo Architecture file to the Change Management Board and the Policy & Oversight Board for approval. The updated architecture will then undergo the same review and approval process as described above for individual architecture change requests.

6.5 Notifying Stakeholders

Once the regional architecture has been modified, the stakeholders in the region will be notified. The IDOT ITSP0 will maintain a list of stakeholders and their contact information. The stakeholders will be notified of architecture updates and informed on how to obtain the latest version of the architecture.

7. SUMMARY

Maintaining the Illinois Statewide ITS Architecture as described in this document helps assure compliance with federal requirements for ITS funding, supports on-going transportation planning and budgeting activities, and provides a mechanism for assuring proper integration between projects.