



# Project Plan for the Development of DIGGS

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Contact:

Loren L. Turner, P.E.  
Senior Transportation Engineer  
Caltrans, Division of Research & Innovation  
5900 Folsom Blvd. MS-5, Sacramento, CA 95819  
(916) 227-7174  
[loren.turner@dot.ca.gov](mailto:loren.turner@dot.ca.gov)

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## 1 Introduction

The “Project Plan” (also referred to as the “Project Roadmap”) is presented in this document with details, tasks, and activities to be carried out for the remainder of the Transportation Pooled Fund Project TPF-5(111), “Development of Standards for Geotechnical Management Systems.” A draft version of this project plan was presented at a DIGGS team meeting in Orlando, Florida in late March 2009 (<http://www.diggsml.com/march-2009-diggs-meeting-report-project-status-and-development-new-roadmap>). Discussions and recommendations stemming from that meeting were used to revise the draft plan. Additionally, in the Summer of 2009, the DIGGS Project Team contracted with Galdos Systems and Compusult Ltd. to carry out independent reviews of DIGGS version 1.0a schemas (<http://www.diggsml.com/diggs-project-team-contracts-galdos-systems-and-compusult-ltd-carry-out-review-diggs-version-1-0a>). The recommendations stemming from this review were also used to identify tasks.

## 2 The Need for a Project Plan

Following the March 2009 Orlando meeting, it was recognized by the team that a Project Plan was necessary for the following reasons:

- The original scope of work described in the Transportation Pooled Fund Project TPF-5(111) solicitation did not adequately describe the final deployable product.
- The absence of a clearly defined deployable product and a plan to achieve it had resulted in a wide range of stakeholder expectations.
- The project's planned end date of 6/30/08 had passed without a deployed version of DIGGS.
- The TPF project had a significant funding balance remaining, but no plan detailing how those resources would be used over the remainder of the project.
- The project team had not established a set of success indicators and/or performance metrics, which were needed to focus the work and evaluate competing priorities.
- The level of review and extent of participation in the DIGGS v1.0a release had been limited and insufficient to assess the true readiness for implementation.
- Reliance on mostly volunteer resources had resulted in workload distribution inequities.

The project plan needed to clearly outline the scope of work to be done, a schedule and sequence of tasks, and an estimate of costs. A change in project management methods and application of resources would also be adopted moving ahead, including an increased use of contracted IT professionals/consultants with specific expertise. Furthermore, development work on DIGGS would focus initially on the core domain data elements to get that part working robustly – production-level geotechnical borehole logging data.

### 3 Project Goals, Success Indicators, and Minimum Performance Requirements

The goals of this TPF project are to deliver:

- A robust and deployable version of the DIGGS schema that, at minimum captures and transfers the core geotechnical borehole, lab, and insitu data types.
- A suite of web-based and desktop client software tools that allow users with a wide range of technical skills to create, consume, view, and manipulate DIGGS files.
- Several documented case studies on pilot applications that demonstrate a tangible deployment of DIGGS for all pooled fund participants in addition to the benefits and quantification of level of effort required by users in adopting DIGGS.
- A successful transition of DIGGS governance to ASCE's GeolInstitute.
- A workshop and a final report at the conclusion of the TPF project.

Overall success of the TPF project is dependent upon achieving the goals cited above. However, the DIGGS standard itself must also meet minimum performance requirements. These include:

- DIGGS schema captures and transfers the core geotechnical borehole, lab, and insitu data types. This core data model needs to function robustly with unambiguous mapping to data commonly generated in geotechnical site investigations.
- DIGGS files can be created, imported, and exported using commercial geotechnical software (e.g. gINT, HoleBASE, and Earthsoft).
- DIGGS files can, to some extent, be created, imported, and exported using Microsoft Excel.
- DIGGS XSD and XML files can be opened, modified, and created using commercial XSD and XML development tools without extensive configuration and customization, including those from Altova, Stylus, and Oxygen.

Minimum requirements for DIGGS to be considered successful in future years after the completion of the TPF project (1 to 5 years):

- DIGGS is endorsed by the FHWA, referenced in NHI courses, and its use by state transportation agencies encouraged.
- DIGGS is adopted by the AGS community as its new standard and complies with Eurocode requirements.
- DIGGS is fully implemented in the COSMOS Geotechnical Virtual Data Center.

- DIGGS is expanded to include environmental, geophysical, and pile data.
- Government agencies begin to draft specifications and contract terms that require DIGGS as a data deliverable.
- Companies that manufacture geotechnical instrumentation and testing equipments adopt DIGGS as a standard for data collection and output.

## 4 Scope

The scope of the project plan is captured under ten tasks:

Task	Description
1	Conduct independent review of DIGGS v1.0a
2	Fix GML/XML Schema Issues Identified in Task 1
3	Develop suite of tools to create and review DIGGS XML files
4	Test and Finalize release of DIGGS v2.0
5	Assess GeoEnvironmental, Piling, Geophysics Schemas
6	Pilot Application – Geotechnical document exchange
7	Pilot Application – Borehole data exchange
8	Governance
9	Outreach and marketing
10	DIGGS/COSMOS Joint Workshop
11	Project Closure

### 4.1 Task 1 - Conduct independent review of DIGGS v1.0a

Task 1 will focus on identifying the issues with the current DIGGS v1.0a release.

### 4.2 Task 2 - Fix GML/XML Schema Issues Identified in Task 1

Task 2 will focus on carrying out corrective work identified in Task 1, leading to the release of DIGGS v1.1 in February 2010 and v1.2 by March 2010. These revised versions of DIGGS should be more compact, robust, and compatible with XML mapping tools. These versions will represent the first fully deployable versions of the standard and should be usable by software vendors and team members that are comfortable working with XML.

The development of the DIGGS v1.2 release will rely heavily upon extensive input from the DIGGS Core Special Interest Group (SIG). As such, a series of several webinars will be organized to discuss domain-dependent schema design issues. The XML/GML schema developer will facilitate these webinars providing a schema design perspective throughout the discussions.

### ***4.3 Task 3 - Develop suite of tools to create and review DIGGS XML files***

Task 3 will deliver a suite of tools that will allow the project participants with little or no XML knowledge to actively work with DIGGS files. Tools will include web-based, form driven, DIGGS file generators and viewers; AGS-to-DIGGS conversion web services; Excel spreadsheets with macros to generate DIGGS files; DIGGS-to-KML web services to view DIGGS data points in Google Earth; and advanced DIGGS file validation web services. The web services based tools will be made available on the DIGGS website and will have a simple interface to make it easy for users to upload DIGGS files for converting, processing, viewing, or validating files. Users that are comfortable with using Excel, Google Earth, and Explorer/Firefox will be able to work with DIGGS files with these new tools.

### ***4.4 Task 4 - Test and Finalize release of DIGGS v2.0***

Task 4 will leverage upon the availability of the new tools developed under Task 3. Since a broader group of users will be able to work with and generate DIGGS files, it is anticipated that a more comprehensive review of the DIGGS v.1.2 release will be possible. In addition to the review by the user community, a “round robin” test will be conducted by the four software vendors on the DIGGS team – gINT, Keynetix, Earthsoft, and Dataforensics. The test will involve a series of sample geotechnical data sets. One of the vendors will generate a DIGGS file from their software and pass the file to a 2<sup>nd</sup> vendor. The 2<sup>nd</sup> vendor, in turn, will import the DIGGS file into their software and note any irregularities. Next, the 2<sup>nd</sup> vendor will export a DIGGS file and pass it to the 3<sup>rd</sup> vendor. This process will proceed with all four vendors for a series of typical DIGGS files. Issues and problems encountered will be communicated to the XML/GML schema developer for review and the schema modified as needed. The XML/GML schema developer will consider the input from the software vendors as well as from the user community over a 4 month period and modify the schema as needed, concluding with the release of DIGGS v2.0 at the end of this task. The DIGGS v2.0 release will encompass the core geotechnical borehole, lab, and insitu data elements. The other DIGGS domain groups (e.g. GeoEnvironmental, Piling, and Geophysics) would be made available to users as a beta release with some of the schema issues fixed, but would not be included in the official release.

### ***4.5 Task 5 - Assess GeoEnvironmental, Piling, Geophysics Schemas***

Up to this point in the project, the tasks have focused primarily on redeveloping the core geotechnical borehole, lab, and insitu data elements within DIGGS, culminating in the release of DIGGS v2.0. Although some of the structural and organizational schemas issues will have been addressed in the existing GeoEnvironmental, Piling, and Geophysics schemas, unresolved issues will likely remain requiring a significant effort by the various SIGs.

Task 5 will focus on identifying the work required of the SIGs to further develop the specialized schemas to a level of maturity and robustness as the primary geotechnical borehole, lab, and insitu schemas developed under Tasks 1 through 4. Specific sub-tasks will be identified, scoped, and costs estimated. If the resources required are available under the contract with the XML/GML schema developer under Task 4, and there's sufficient interest and participation by the SIGs, schema development support will be provided. Beta versions of the specialized schemas will be made available to users, however, they will not be included in the official DIGGS v2.0 release.

#### ***4.6 Task 6 - Pilot Application – Geotechnical document exchange***

Under this task, the benefits of using DIGGS for the exchange of typical geotechnical documents will be demonstrated in a pilot application. The types of documents to be exchanged will include PDF, Excel, Word, and other file types commonly encountered in practice. Several agencies will be invited to participate in this pilot. Technical assistance will be provided to each participating agency to develop basic document management processes using commercial off the shelf (COTS) software tools to organize a sample set of digital documents, host the documents on a web server, obtain sufficient document metadata, generate corresponding DIGGS files that reference the file locations, and conduct the pilot exchange of files with other participating agencies. Several exchange mechanisms will be used during the pilot, including direct email exchange of DIGGS files, agency hosted data services, and online data centers such as the COSMOS Geotechnical Virtual Data Center (GVDC).

Upon conclusion of the pilot study, a report will be prepared that documents the experiences of each participating agency. The report will document the various technical methods and processes, software specific configurations, costs, resources required, and benefits. The report will serve as a resource for other agencies evaluating the merits of using DIGGS as a tool for the exchange of geotechnical documents. The report will also serve as a “how to” guide for those wanting to adopt DIGGS for this purpose.

#### ***4.7 Task 7 - Pilot Application – Borehole data exchange***

This task will be nearly identical in scope and deliverables to Task 6, except that more complex geotechnical borehole data will be exchanged in the pilot. This task will rely upon the release of DIGGS v2.0, since a complete version of DIGGS with numerous elements will be used. Agencies with a broad range of current in-house data management practices will be selected, ranging from agencies with no systems or software currently in place, to those with advanced enterprise-level data management systems in place. Additionally, participating agencies will represent the range from small to large, in terms of number of boreholes generated and/or managed annually. As in Task 6, a report will be prepared that documents the experiences of each participating agency.

#### ***4.8 Task 8 - Governance***

Task 8 will address the need for a long-term governance strategy for maintaining the DIGGS standard produced under this TPF project. Following the March 2009 Orlando meeting, a Governance Task Force was created, with Marc Hoit as its Chair. The Task Force produced a report (<http://www.diggsml.com/report-diggs-governance-task-force>), following a series of discussions with potential future governing bodies, and recommended pursuing an arrangement with ASCE GeoInstitute. ASCE GeoInstitute would act as the US Local Implementation Group (LIG) of DIGGS and would coordinate with other LIGs (e.g. the UK LIG under the Association of Geotechnical and Geoenvironmental Specialists) through an international governing body to be established at a later time.

This task will support meetings and preliminary discussions with ASCE GeoInstitute representatives beginning early 2010; work with ASCE to establish charter, policies, and governance infrastructure; and the transition of the management of DIGGS from the TPF to ASCE GeoInstitute. The transition of governance is planned to be complete by the time of the DIGGS Workshop in late 2010 or early 2011. Some “seed” funding will be set aside to help support first year transitional activities at the ASCE GeoInstitute.

#### ***4.9 Task 9 - Outreach and marketing***

Task 9 will provide some resources to support sending DIGGS delegates to a select number of key conferences and meetings to market and champion the DIGGS standard. Participation in these efforts will be supported near the end of the project, following the successful release of DIGGS v2.0 and conclusion of the pilot applications. One of the key meetings will include the AASHTO Bridge Sub-Committee meeting in Summer 2010.

This task will also produce a revised DIGGS marketing brochure as one of its deliverables. Resources will be allocated for continued support of the DIGGSml.com website.

#### ***4.10 Task 10 - DIGGS/COSMOS Joint Workshop***

Towards the end of the project a Workshop will be convened. The workshop will serve two purposes: (1) promote the DIGGS standard to the broader geotechnical community and stakeholders; and, (2) facilitate the implementation of DIGGS by providing a technical training forum.

The first goal will be accomplished through a series of presentations covering the chronology of events and tasks in the TPF project, including presentations of experiences during the pilot

applications. The presentations would be at a high level and would make the case for adoption of DIGGS.

The second goal would be accomplished through a series of technical break-out sessions. These sessions would be primarily technical and would focus on specific use-cases and implementation scenarios for software developers, data systems managers, or anyone interested in understanding the more technical aspects of DIGGS adoption.

At about the same time as the planned DIGGS workshop, the COSMOS group has planned to also host a workshop on the rollout of the COSMOS Geotechnical Virtual Data Center and provide technical training sessions to new data providers. Given the close relationship between the DIGGS and COSMOS efforts and the significant overlap in stakeholders, a joint workshop similar to the FHWA/COSMOS workshop in Newport Beach CA in 2004 appears to be a good opportunity for both efforts. Funding for the workshop would be shared between the DIGGS and COSMOS teams.

#### ***4.11 Task 11 - Project Closure***

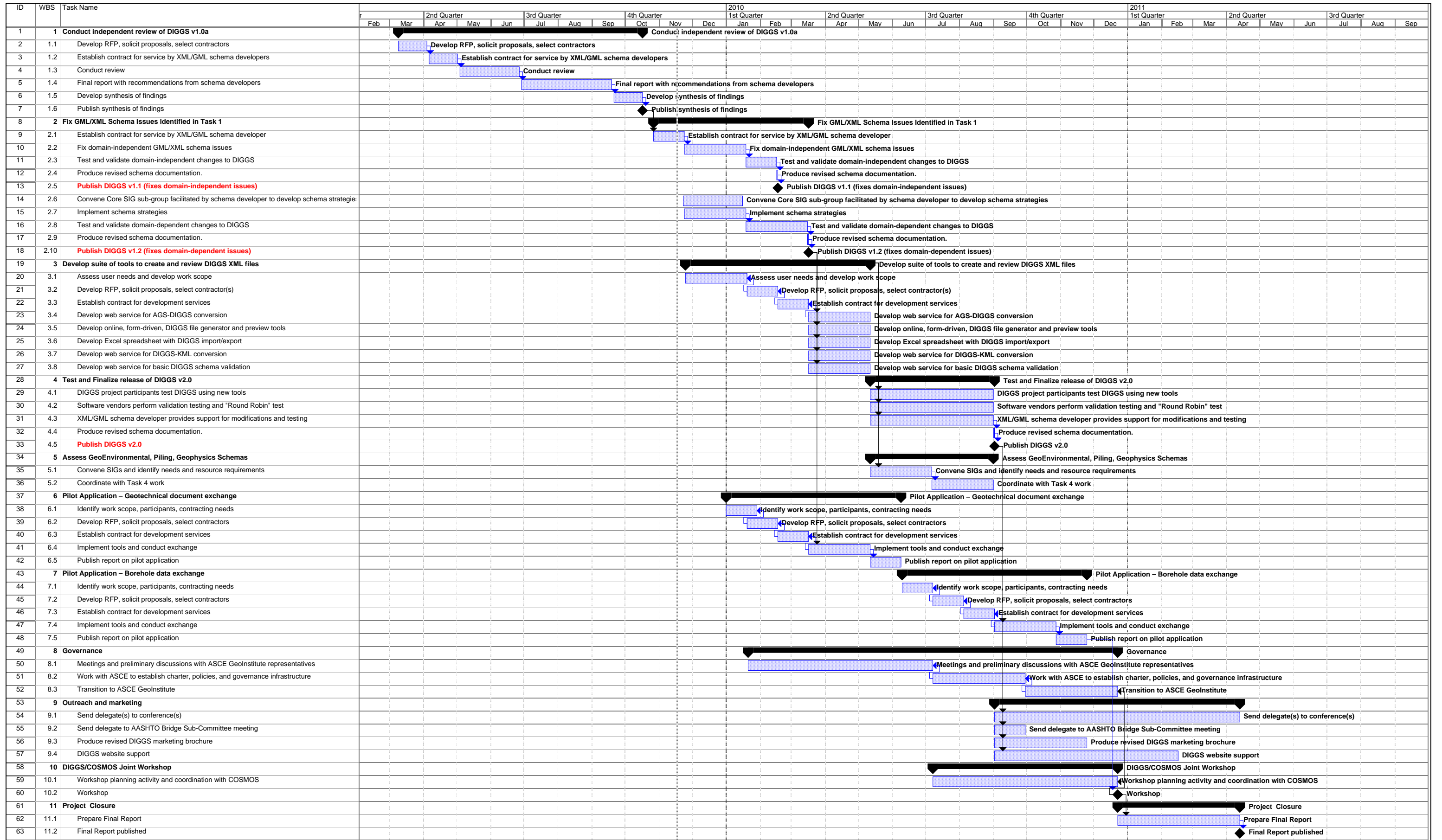
The final task for the project will be the preparation of the final report. The final report will include all documents and committee reports generated over the course of the project. The report will be posted to the TPF website and serve as the official documentation for the TPF effort.

## **5 Project Schedule**

A schedule of project tasks, activities, and deliverables is presented in the attached Gantt chart.

## **6 Project Costs**

Detailed cost information is provided in a separate document.



Project: DIGGS gantt  
Date: Tue 11/17/09

Task		Milestone		Rolled Up Task		Rolled Up Progress		External Tasks		Group By Summary	
Progress		Summary		Rolled Up Milestone		Split		Project Summary		Deadline	