

**WBS  
Objective:**

**2.1.1 Description: Project Management/Administration (Project Related)**

This task consists of the administrative effort required by principals, project manager, and involving personnel to complete the project on time, within budget, and provide a quality product.

**SOW:**

Project Management involves the planning, scheduling, organizing and controlling of resources to achieve specific objectives within established schedule, budget and quality standards. The Project Manager is responsible for but not limited to the following:

1. Assembly and direct the design team, including consultants.
2. Conduct project kick-off meetings.
3. Serve as the single point of contact for project communication.
4. Represent PennDOT at public meetings.
5. Coordinate project issues with outside agencies.
6. Schedule project development activities.
7. Review product quality and assure compliance with PennDOT's QC/QA plan.
8. Monitor design team performance and project development.
9. Control project costs.
10. Promote an atmosphere of good public relations and customer satisfaction.
11. Process requests for project authorization and funding.
12. Coordinate the flow of information concerning the project.

**2.1.1.1 Meetings**

Attend all project meetings as necessary, including meeting preparation and minutes. Meetings will include but will not be limited to:

Project Status Meetings  
Design Review Meetings  
Kick-off Meeting  
Design Field View Meeting  
Final Design Office Meeting  
Public Meetings

Preparation for the meetings will include an agenda and any visuals necessary to conduct the meeting.

Meeting minutes will be prepared in a timely and accurate manner.

**2.1.1.2 Coordinate Value Engineering**

The procedures for Value Engineering are found in Design Manual 1A.

The following items require coordination:

1. Selection of 5 person Value Engineering Team
2. Conducting the review
3. Preparation of the formal Value Engineering Report
4. Implementation of Value Engineering Review recommendation

**2.1.1.3 Quality Control/Quality Assurance**

Quality Control and Quality Assurance practices and procedures need to be incorporated and administered.

PennDOT has implemented procedures to place additional responsibilities on consultants for

quality of work. The consultants will be required to submit a corporate quality plan and submit job specific Quality Development plans for PennDOT approval. As part of quality reviews, process reviews, and IAPs, these plans and the consultants' conformance to them will be monitored, evaluated and documented.

Design Manual Part 1A can be used as a source of information to develop QC/QA policies and procedures.

**2.1.1.4 Preliminary Cost Estimates/PMC Approvals**

Develop a preliminary cost estimate based on the best available information. The cost estimate should include all anticipated costs including design, right-of-way acquisition, utilities, construction, etc.

**2.1.1.5 Project Schedule Development and Maintenance**

Develop the project design schedule using the WELCOM Open Plan software. The schedule should include all major milestones throughout the entire Design Phase from Preliminary Design to Contract Award and Execution. The project schedule should be updated on a regular basis and after major milestones have been completed.

**2.1.1.6 Project Team Selection and Management**

Initial task of the Project Manager is to assemble the Design Team with staff from across the organization and from supplemental-consultant resources as necessary. The individuals are selected for their expertise in various engineering disciplines required by the project. A typical highway project may include individuals from the following design disciplines: environmental, roadway, right-of-way, construction, geotechnical, traffic, contract management, structures, utilities, and maintenance.

It is the Project Managers responsibility to effectively communicate the project objectives and motivate the Design Team. The Project Manager is also responsible for defining the team members' roles and responsibilities and delegating decision-making authority to the various technical experts.

**2.1.1.7 Project Reporting**

On a regular basis (i.e., monthly or as necessary) prepare a project status report of which should address the current status of the project schedule and budget. Note any areas of concern such as delays in the project schedule or potential cost overruns.

**2.1.1.8 Agreements**

**2.1.1.8.1 Consultant Agreements**

**2.1.1.8.2 Municipality Agreements**

Conduct scope clarification and/or negotiation meetings, if necessary.

Prepare the final agreement for execution.

Administer the agreement throughout the duration of the project of which includes the review and approval municipal invoices.

This includes all supplements to agreements.

**2.1.1.8.3 Reimbursement Agreements**

Conduct scope clarification and/or negotiation meetings, if necessary.

Prepare the final agreement for execution.

Administer the agreement throughout the duration of the project of which includes the review and approval of invoices.

This includes all supplements to agreements.

**2.1.1.8.4 Traffic Signal/Lighting Maintenance Agreements**

1. Obtain a standard traffic signal maintenance agreement and modify for the municipalities involved.
2. Coordinate with the municipalities for signatures on the agreement and on the signal permit plans

**2.1.1.8.5 Other**

**2.1.1.9 MPO/LDD Coordination**

Notify the appropriate MPO/LDD about any public meetings for which an environmental document is prepared.

**2.1.1.10 Consultations**

Meetings with in-house departments or personnel should be conducted on a regular basis or as needed.

Document all meetings in the form of meeting minutes for the project file.

**2.1.1.11 FHWA Coordination**

Coordination with the appropriate FHWA representative will be required throughout the entire design phase of the project. This will include correspondence, attendance at meetings, formal submissions, etc. FHWA participation in Scoping Field View should be in accordance with Publication 10/10A, Design Manual Part 1/1A.

**2.1.1.12 Inter/Intra Agency Coordination**

1. Invite all regulatory/resource agencies to scoping field view meetings in accordance with Publication 10/10A, Design Manual Part 1/1A.
2. Discuss methodologies for identifying and analyzing environmental impacts with the regulatory/resource agencies and ask for their input.
3. Request regulatory/resource agencies' attendance at any project meetings/hearings.

**2.1.1.13 Consultant Coordination**

Coordination with the appropriate Consultant representative(s) will be required throughout the entire design phase of the project. This will include project correspondence, attendance at meetings, review of invoice and formal submissions, etc.

**2.1.1.14 Funding Authorization**

Prepare the necessary paperwork to obtain funding authorization in accordance with Publication 10, Design Manual Part 1. Establish ID-21 and D-4232 documentation. Refer to the Form D-4232 Manual for more information.

**2.1.1.15 Funding Closeout**

Prepare the necessary paperwork to closeout the project in accordance with Publication 10, Design Manual Part 1. Refer to the Form D-4232 Manual for more information.

**2.1.1.16 Engineering and Environmental Scoping**

Level 1 CEEs (Categorical Exclusion Evaluations) do not require field views, however, the CEE form can be used to guide the cultural scoping grounds for Level 1A CEEs. Although not strictly required on CEE Level 1A and 1B projects, serious consideration should be given to including the Bureau of Design on these projects.

Project Scoping will include conducting an engineering/environmental scoping field view of the project area and completion of a preliminary scoping form (Publication 294).

Coordinate Scoping Field Views through the Highway Quality Assurance Division of the Bureau of Design. The determination of the requirement for a separate project needs document will be made by the District Environmental Manager for CEE Level 1A and 1B projects and by FHWA for CEE Level 2 projects. All projects that involve Level 2 CEE must involve the Bureau of Design Project

Development Engineer. If historic resources could be impacted, the Department qualified cultural resource professional must be contacted.

1. Establish a Project Team. The Project Team is usually comprised of staff from PennDOT's originating office location, person(s) from PennDOT Central Office and FHWA.
2. Schedule a Scoping Field View with the Project Team.
3. Prior to the Scoping Field View visit, complete Part A and some of Part B of the Scoping Form.
4. Attend Scoping Field View and provide comments.
5. Develop an appropriate public/agency involvement plan in conjunction with the Team members at the Scoping Field View as outlined in PennDOT Publication 295.
6. Complete the entire Scoping Field View Form.
7. Distribute to attendees.

**Detail:**

The overall success of a project is measured by the Project Manager's ability to deliver a quality product on schedule and within budget. A Project Manager's effectiveness depends much on the knowledge gained through experience preparing preliminary and final design deliverables and most importantly, his or her ability to communicate effectively.

The number of meetings necessary will be a function of the duration and complexity of the project.

Conduct status meetings to identify project and scope. The regulatory/resource agencies will vary from project to project. Conduct regular status meetings.

**WBS  
Objective:  
SOW:**

**2.1.2 Description: Coordinate Constructability Review**

This task is the coordination of the constructability review team throughout design development. The constructability review team will be established at the beginning of the project. Constructability reviews will be conducted periodically throughout the design process. The reviews will be performed to identify potential construction problem areas, possible cost savings, means to expedite construction, and alternate methodologies. The review will focus on the following issues:

- \* Evaluate MPT vs. Construction Sequence
- \* Set mandatory sequence logic where necessary
- \* Detect potential problem areas
- \* Avoid ambiguities
- \* Limit inefficient and impractical design features
- \* Evaluate coordination between design sections, where applicable
- \* Avoid omissions and overlaps by reviewing specifications vs. plan and plan vs. plan

**Detail:**

**WBS  
Objective:**

**2.1.3 Description: Public Involvement**

This task includes the attendance and preparation of informational materials to be viewed and/or distributed to the general public at public meetings. This task may also include the preparation of newsletters, public announcements and all other aspects of public involvement as outlined in Publication 295.

**SOW:**

1. Obtain approval from PMC to proceed with public involvement activities.
2. Prepare announcement for public meeting.
3. Prepare visual materials and/or flyers for general public meetings.
4. Attend all public meetings and address comments made at the meeting.
5. Prepare minutes to the meeting and submit to the Project Manager for review. Revise if necessary.

**Detail:**

This WBS code should be tailored to each individual project so the tasks involved will vary from project to project.

**WBS** 2.1.4 **Description:** Value Engineering  
**Objective:** This task involves performing a value engineering review.  
**SOW:** Provide work as detailed by the Department. See Department Detail.  
**Detail:** None.

**WBS** 2.1.99 **Description:** Other Administrative Activities  
**Objective:** This includes any other necessary PennDOT administrative activities throughout the Design Phase of the project which are not otherwise covered under the standard administrative tasks.  
**SOW:** Provide work as detailed by the Department. See Below  
**Detail:**

**WBS** 2.2.1 **Description:** Wetland Studies  
**Objective:** Title 25, Chapter 105.17 of the Pennsylvania Code will be used to identify wetlands and determine the impact of the proposed alternatives.  
**SOW:** Preliminary assessment (field view) to determine presence/absence of resources will be conducted in accordance with Publication 325, Wetland Resources Handbook.

#### 2.2.1.1 Identification/Delineation

Conduct field views and site walkovers to identify the presence or absence of jurisdictional wetlands within the study area. Secondary sources normally used to characterize the areas include the County Soil Survey Reports (Soil Conservation Service) to identify known hydric soils, National Wetland Inventory Maps (US Fish and Wildlife Service) to locate anticipated wetland areas and USGS 7 1/2 min. Quadrangle Sheets (U.S. Geological Survey) to define the drainage and topography of the site. These sources provide the background information and a starting point for in-field investigations.

Delineate the wetlands within the study area utilizing the methodology presented in the U.S. Army Corps of Engineers (ACOE) Wetland Delineation Manual (1987). The wetland boundaries will be marked with surveyors flagging.

The functions and values for each wetland will be assessed using either the Corps Descriptive Method (CDM) or the WET 2.1 Analysis. This information will be compiled for inclusion into the Wetland Identification and Delineation Report. Determine if the wetlands within the study area meet the criteria of exceptional value.

A jurisdictional determination field view to verify wetland delineations will be conducted with appropriate review agencies including the ACOE and the Pennsylvania Department of Environmental Protection (PADEP).

A Wetland Identification and Delineation Report will be prepared to document the investigation including: methodology, findings, agency coordination activities and the photographs and data forms.

#### 2.2.1.2 Impact Assessment

Prepare an Alternatives Analysis to meet Section 404(b)(1) requirements of the Clean Water Act. Seek concurrence in accordance with appropriate module of Publication 325, Wetland Resources Handbook.

**Detail:** The following items may require an adjustment to the length of time it takes to complete this task:  
- The Consultant will require notification of the intended environmental documentation in order to adjust the scope to the level of detail required.

- Number of Copies of the Wetland Identification and Delineation Report that will need to be produced.

- The total acreage of the wetlands

- The number of wetlands

- The type of wetlands

A jurisdictional determination (JD) may not be required where wetland impacts are considered

DeMinimus.

**WBS**

**Objective:**

**2.2.2 Description: Wetland Mitigation**

To develop an approach for wetland mitigation and design or craft a methodology for mitigation that will be acceptable to the appropriate environmental agencies.

**SOW:**

Wetland mitigation action will in accordance with Publication 325, Wetland Resources Handbook.

**2.2.2.1 DeMinimus Wetland Mitigation**

No mitigation is required for these impacts.

**2.2.2.2 Wetland Banking**

Coordinate with the PADEP, ACOE, Pennsylvania Fish & Boat Commission (PFBC), and the U.S. Fish and Wildlife Service (USFWS) to determine if wetland banking is an appropriate method of mitigation and to outline the design parameters for the potential mitigation program.

**2.2.2.3 Individual Wetland Mitigation Site Plan**

Upon completion of the wetland avoidance and minimization measures during preliminary design, the conceptual wetland mitigation process will begin. Three key tasks are necessary in this process; 1) identify potential replacement sites; 2) development of a conceptual mitigation plan, including a rough grading plan and a written planting plan description; 3) presentation to resource agencies.

Coordinate with the PADEP to determine if the wetland registry has any suitable replacement sites. The USFWS will also be consulted to determine if the Wetland Reserve Program has any enrolled but unfunded sites in the area.

After the agencies have concurred on a suitable mitigation site, prepare a conceptual design plan for submittal to the agencies for review.

A Wetland Mitigation Site Selection Report will be produced to include the strategy and results of the mitigation plan development process. After review and approval, the report will be printed for distribution to the participating natural resource agencies. A field meeting will be coordinated with the agencies too present the report and results of the process.

**Detail:**

Confirm that impacts are classified as DeMinimus in accordance with Publication 325, Wetland Resources Handbook.

Any limitations or restrictions that will be imposed on Wetland designs that may impact the normal effort used to design mitigation sites should be known.

**WBS**

**Objective:**

**2.2.3 Description: Regional/Community Growth**

Perform a regional/community impact assessment in accordance with FHWA's Technical Advisory T 6640.8A (Publication No. FHWA-PD-96-036 "Community Impact Assessment", Contact the FHWA Office of Environmental and Planning at 202-366-0106 to obtain or inquire about), for foreseeable economic impacts from construction of the proposed project and from not constructing the proposed project. Determine if project will induce/inhibit, directly/indirectly growth.

**SOW:**

**2.2.3.1 Identification/Delineation**

Identify and gather the local and regional development and land use plans for the area surrounding the proposed project.

Determine acreage of land to be acquired under each proposed alternative.

Field verify existing land uses.

Develop mapping of existing and proposed land uses.

If any of the proposed alternatives are inconsistent with land use plans and policies, the appropriate planning and/or development officials will be contacted to determine if they would be supportive of changes to the development plans and/or zoning regulations.

**2.2.3.2 Impact Assessment**

Review local and regional comprehensive development plans, zoning regulations, and consult with local and regional planning agencies and other development organizations to identify impacts to existing and projected land use.

Evaluate the compatibility of the proposed alternatives with land use plans and policies.

Evaluate the potential for indirect impacts (e.g., changes in property values, economic and social stratification of the neighborhoods, generation of additional development).

Identify the impact of the project on area businesses, including those impacts due to changes in access and detours.

Evaluate short-term construction-related impacts plus long-term impacts to the property tax base.

**2.2.3.3 Secondary Cumulative Impact**

Evaluate the potential for indirect impacts (e.g., changes in property values, economic and social stratification of the neighborhoods, generation of additional development).

Determine if the project will induce/inhibit, directly/indirectly growth.

**Detail:** The Consultant needs to be informed of the intended environmental documentation in order to adjust the scope to the level of detail necessary to complete the project.

**WBS** **2.2.4 Description: Public Facilities/Services**

**Objective:** This task will identify existing public facilities and services within the project study area and determine possible impacts to them from the proposed project.

**SOW:** **2.2.4.1 Identification/Delineation**

Obtain information about community facilities and services such as educational institutions, health facilities, commercial business districts, religious facilities, recreation and cultural facilities, emergency services, etc within each neighborhood or community division.

Obtain information about general trip-making characteristics to and from these facilities.

**2.2.4.2 Impact Assessment**

Qualitatively evaluate impacts on regional transportation patterns such as changes in travel time and accessibility to markets, suppliers, recreational facilities, cultural facilities, and available labor pool.

**Detail:** The intended environmental documentation should be known in order to adjust the scope to the level of detail necessary to complete the project.

The sources for this information may include all or some of the following: U.S. Census Data, interviews with local and regional planning officials, public meetings and questionnaires.

Relevant information should be obtained from interviews with local, regional, and state officials.

**WBS** **2.2.5 Description: Community Cohesion**

**Objective:** This task will define neighborhood boundaries, community facilities and community services available within the project study area and determine possible impacts to them by the proposed project.

**SOW:** **2.2.5.1 Identification/Delineation**

1. Develop a profile which inventories the major physical, social, and economic characteristics of the community including the levels of interaction and interdependence.

2. Identify community facilities, services, businesses, and residences, travel patterns, emergency service routes, within the project study area including:

- A. Parks and Recreation Facilities;
- B. Churches;
- C. Emergency Service Providers;
- D. Schools and Education Facilities;
- E. Retail Stores and Centers;

3. Identify special population groups including senior citizen, handicapped and minority populations within the project study area from census data.

4. Identify areas where the proposed project will create physical or imagined barriers.

### 2.2.5.2 Impact Assessment

Particular attention will focus on impacts to special groups (senior citizens, handicapped individuals, racial minorities, etc.) and communities and neighborhoods that may be isolated or bisected as a result of the proposed project.

Identify access impacts to facilities, services, businesses, and residences, plus changes to travel patterns, emergency service routes, and the creation of physical and/or imagined barriers.

Identify impacts to community cohesion and community and neighborhood boundaries.

### 2.2.5.3 Environmental Justice

The Environmental Justice Evaluation should analyze the appropriate demographic information coupled with an appropriate level of public involvement and outreach to identify disproportionate effects and develop effective mitigation strategies. All projects are to be developed in a manner to avoid or mitigate disproportionately high and adverse effects to low income and minority populations. The Environmental Justice Evaluation results are to be included in the NEPA documentation should address the following:

The scope of the Environmental Justice Evaluation as developed through a collaborative process

--The Disproportionate Effects Evaluation Findings

--The public involvement and outreach activities and input received

--A description of unavoidable high and adverse disproportionate effects to low income and minority populations

--A description of beneficial effects and mitigation measures that can be taken to off-set and/or minimize adverse impacts to low income and minority populations.

**Detail:**

Information from local planning organizations and input from local residents, businesses and community officials should be obtained and used in the development of the community profiles.

Information from local residents and community officials should be obtained and used to determine the perceived impacts on the community, access and community services. This can consist input gained during public meetings, or through responses to mailed and/or windshield surveys.

**WBS**

**Objective:**

**SOW:**

### 2.2.6 Description: Maintenance/Operating Costs

To obtain a better understanding of the long term impact of each alternative, the operation and maintenance of each alternative will be investigated using the subsequent tasks.

#### 2.2.6.1 Identification/Delineation

Identify maintenance activities required for each alternative under evaluation. These activities may include but are not limited to: snow removal, line painting, mowing, resurfacing, and transit fueling and maintenance. Develop costs over a 20-year design life basis for each activity for each alternative and compare the alternative using a present worth at opening day for the 20 years of maintenance.

#### 2.2.6.2 Impact Assessment

The operation and maintenance costs between the alternatives will be compared with respect to the initial construction cost, effectiveness in addressing the transportation needs, and minimizing the impact to protected resources.

**Detail:**

The intended environmental documentation should be known in order to adjust the scope to the level of detail necessary. Preferences with average costs that are to be used for operation and maintenance activities as well as an agreed upon inflation rate. Changes to the design year and design life assumptions.

**WBS**

**Objective:**

**SOW:**

### 2.2.7 Description: Flood Plains

This task is the identification and quantification of regulatory floodplains and potential encroachments for each project alternative and preparation of the Floodplain Finding pursuant to Executive Order 11988.

#### 2.2.7.1 Identification/Delineation

Identify major drainage divides and courses using available mapping and limited field reconnaissance.

Existing 100-year floodplain and floodway boundaries for watercourses within the project study area will be identified and delineated on project mapping using available Federal Insurance Rate Maps (FIRMs) and Flood Hazard Boundary Maps (FHBM) prepared by the Federal Emergency



Management Agency (FEMA).

Additionally, coordination with the local municipalities located within the project study area is required to obtain local floodplain ordinances and any information on existing and proposed modifications to the FEMA

#### **2.2.7.2 Impact Assessment**

Perform an analysis of the encroachments to the regulatory floodplains and/or floodways for each project alternative. The analysis will contain avoidance measures and when avoidance is not feasible, minimization measures. The avoidance and/or minimization measures are to be documented.

Quantify the aerial extent of floodplain/floodway encroachments for all transverse and longitudinal encroachments pursuant to Executive Order 11988, U.S. DOT Order 5650.2, and PennDOT's current Strike-Off Letters and Publication 13M, Design Manual Part 2.

Prepare a tabulation of the impacts by watercourse and by type of impact and a discussion of the avoidance and minimization measures for each floodplain. This information will form the basis of the Floodplain Finding.

#### **Detail:**

#### **WBS**

#### **Objective:**

#### **2.2.8 Description: Wildlife/Waterfowl Refuges**

This task includes identifying wildlife/waterfowl refuges within the project area and quantifying impacts resulting from proposed alternatives

#### **SOW:**

#### **2.2.8.1 Identification/Delineation**

Coordinate efforts with the Pennsylvania Game Commission, Pennsylvania Fish and Boat Commission and the U.S. Fish and Wildlife Service to identify the boundaries of wildlife/waterfowl refuges within the project area.

#### **2.2.8.2 Impact Assessment**

The information collected through agency coordination and correspondence will be used to quantify potential impacts to wildlife/waterfowl refuges that would be impacted by the potential alternatives. Impacts will be summarized and presented in an Environmental Assessment Form. Perform an analysis to determine the impacts to any wildlife/waterfowl refuge for each project alternative and document the findings of the analysis for inclusion in the environmental report. A 4(f) analysis will need to be conducted for each impact.

#### **Detail:**

The Consultant needs to be informed of the intended environmental documentation in order to adjust the scope to the level of detail necessary to complete the project.

The intended environmental documentation should be known in order to adjust the scope to the level of detail necessary to complete the project.

#### **WBS**

#### **Objective:**

#### **2.2.9 Description: Aesthetics/Visual**

Perform a visual involvement assessment in accordance with the FHWA's Technical Advisory T 6640.8A based on guidelines provided in FHWA's Visual Impact Assessment for Highway Projects (September, 1990). This assessment profiles the principal visual characteristics of selected representative viewpoints along each alternative, the principal viewers, and the possible means to offset potentially adverse visual impacts.

#### **SOW:**

#### **2.2.9.1 Identification/Delineation**

- Identify areas particularly sensitive to visual intrusions and areas with important visual resources by field observation and interpretation of photographs and maps.
- Place the visual environment in a regional landscape context defined by land form, climate, vegetation, soils and fauna.
- Define the regional landscape context by individual landscape units.
- Define affected viewer groups.
- Define existing and potential viewsheds for observers based on topography, vegetation and man-made structures.
- Assess visual quality by field observation and interpretation of photographs and maps.
- Photograph existing conditions in the field.
- Establish "viewsheds" for any potential visual impact areas by field observation and interpretation of photographs and maps.
- Establish both "view of" and "view from" the proposed project by field observation and interpretation of photographs and maps.

- Solicit viewer input through windshield surveys, public meetings and/or local newspaper advertisements with both residents/businesses adjacent to the project and users of the proposed transportation facility.

#### **2.2.9.2 Impact Assessment**

Determine both adverse and beneficial impacts to the viewsheds (view from and view of) and to the viewer groups and viewpoints defined above. Changes to the viewshed resulting from proposed alternatives and/or proposed mitigation measures will be assessed by soliciting response from municipal government agencies and public viewer groups. Information will be obtained through opinions from reaction to photographs, architectural renderings and/or other means as deemed necessary to convey the viewshed changes and mitigation measures.

Determine changes to visual resources as a result of construction through the use of graphic modeling techniques.

Provide mitigation measures that eliminate or reduce the adverse impacts to the project. Appropriate mitigation measures include avoidance of visually significant areas and sites, manipulate design to enhance views from and of the alignment and avoidance of poor views. Incorporate art and architecture into the design.

**Detail:**

- The intended environmental documentation should be known in order to adjust the scope to the level of detail necessary to complete the project.
- Any known Public Viewer groups that oppose of the proposed project should also be determined. Determine if the proposed project is considered a threat by local viewers.
- How the project alternatives will impact their views are to be measured.
- Important visual resources to local viewer groups should be determined along with any historic or nationally recognized viewsheds.

Viewer group exposure early in the design process (prior to writing environmental documentation) is advisable in order to minimize adverse public comments in later stages of design. Local citizens groups, homeowner associations and cultural resource foundations are among the groups that should be included in this part of the process.

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#### **2.2.10 Description: Purpose & Need**

To conduct a detailed analysis that will establish the need and purpose for a transportation improvement. Reference Publication 319, Needs Study Handbook.

**SOW:**

Collect data on the following issues as necessary:

- Master Plan Consistency - collect information on air quality conformity, zoning, growth patterns, tax base, land values and network access.
- Transportation Demand - collect traffic volumes, historical growth trends, existing highway geometry, crash data, travel times, and other data required to analyze existing and anticipated highway capacities.
- Government Authority - investigate legislation and regulations that would impact the current highway network in the study area.
- Social Service Demands - inventory the public services and facilities of the study area including emergency services, goods movement, tourism, and recreation.
- Economic Development - collect data on land use and zoning as well as employment and population.
- Structural Conditions - inventory pavement and bridges associated with the critical movements of the study area.

**Detail:**

The intended environmental documentation should be known in order to adjust the scope to the level of detail necessary.

Size of the study area should be defined prior to this task.

Existing Studies involving the study area should be made available.

**WBS**

**Objective:**

#### **2.2.11 Description: Alternatives Analysis and Development**

This task is to assess a number of broad transportation improvement categories then to refine the assessment of more detailed alternatives resulting in a preferred alternative. Reference Publication 10/10A, Design Manual Part 1/1A

**SOW:**

##### **2.2.11.1 Preliminary (Phase I)**

Based on appropriate field verification, develop an environmental constraints map depicting baseline socioeconomic and environmental constraints inventoried within the Study Area. The constraints will be determined through secondary sources. Because limited access to private property may be required to complete this task, prepare and issue Letters of Intent to Enter on an

as-needed basis. The following constraints are to be analyzed:

- Special Population Groups
- Socioeconomic Characteristics
- Land Use
- Community Facilities and Services
- Hazardous Waste and Materials
- Vegetation and Wildlife
- Wetlands
- Farmlands
- Surface Water Resources
- Drainage/Floodplains
- Cultural Resources
- Section 4(f) Resources
- Noise and Air Quality
- Coastal Zone Involvement
- Geological Features
- Groundwater Recharge, Aquifer Areas and Soils and Geological Features
- Visual Impacts

Develop alternatives at the direction of PennDOT. The following alternatives are assumed to be included in the Study:

- Transit Alternative, (e.g. busway, light rail, HOV lanes, etc.)
- TSM and TCM Alternative, (Traffic Management, Transit Management, Demand Management, Restraint Management)
- Network Upgrade Program Alternative,
- Build Alternatives, and
- A No Build Alternative.

Evaluate and compare the practicability and feasibility of the alternative alignments, the Transit Alternative, the prescribed TSM, TCM, and Network Upgrade Program alternatives, and the No Build Alternative.

This analysis will be based on the following criteria:

- The cost effectiveness of the alternatives based on estimated construction costs and on the transportation benefits they provide.
- The extent in which the alternatives avoid or minimize impacts to the identified environmental and engineering constraints, taking into consideration potential direct, secondary, and cumulative impacts.
- The level of right-of-way impacts and costs associated with each alternative.
- The effectiveness of an alternative to satisfy the design year transportation improvement needs of the region, as defined in the Needs Study.
- The effectiveness of the alternatives in satisfying the preferences and expectations of the agencies and public as expressed during the public/agency coordination process.
- Conformance with local planning effort.

Based on the results of this evaluation, identify the most feasible and practicable alternatives for further detailed study. Those alternatives defined as having significant impacts prompting agency rejection, or determined to be cost prohibitive, impractical from an engineering perspective, or unable to satisfy the identified design year transportation needs of the region will be dismissed from further consideration.

The results of this selection process will be summarized in a comparison matrix and documented in the Alternative Analysis Report. The comparison matrix will provide a ranking of all alternatives by order of preference.

Prepare an Alternative Analysis Report that will effectively communicate the applied analytical methods, the study results, and the public/agency coordination efforts. The report should be concise with clear illustrative graphics in accordance with PADOT and FHWA guidelines.

#### **2.2.11.2 Detail (Phase II)**

Develop an environmental constraints map depicting baseline socioeconomic and environmental constraints inventoried within the Study Area. The constraints will be determined as scoped in

other tasks of this project. The following constraints are to be analyzed:

- Special Population Groups
- Socioeconomic Characteristics
- Land Use
- Community Facilities and Services
- Hazardous Waste and Materials
- Vegetation and Wildlife
- Wetlands
- Farmlands
- Surface Water Resources
- Drainage/Floodplains
- Cultural Resources
- Section 4(f) Resources
- Noise and Air Quality
- Coastal Zone Involvement
- Geological Features
- Groundwater Recharge, Aquifer Areas and Soils and Geological Features
- Visual Impacts

Determine the existing baseline engineering constraints within the Study Area for the preferred alternative. These constraints will be determined with work performed under other tasks of this project. Once established, these constraints will be identified on the Environmental Constraints Map.

The constraints investigation will focus on the following issues:

- Geotechnical Engineering
- Traffic
- Structures
- Utilities
- Existing Transportation Facilities
- Right-of-Way

Develop and refine alternative alignments within the Study Area. These alignments will consist of original, continuous roadways on new alignment which extend to the corridor termini. The alignments should, to the extent possible, accomplish the following:

- Comply with established design criteria.
- Avoid engineering and environmental constraints identified on the constraint map to the maximum extent possible.
- Alleviate transportation deficiencies and satisfy the transportation improvement needs of the study region, as identified in the Needs Study.
- Accommodate opening day and design year traffic volume projections (to obtain from others).
- Take into account the preferences and expectations expressed during the public and agency coordination process.
- Perform preliminary impact assessment.

Preliminary designs are to be developed for each of the alternative alignments. Elements of the preliminary design will include:

- Development of horizontal and vertical alignments to the extent necessary for evaluation of construction costs and impacts to right-of-way and identified environmental and engineering constraints.
- Identification of intersection and/or interchange locations and possible types.
- Preparation of plans and profiles to a comparative level of detail for each alignment alternative. Consideration will be given to balancing, earthwork when investigating line and grades of the alternative alignments.
- Development of typical sections for representative roadway and ramp configurations based on established design criteria.
- Identification and approximate sizing of all major structures including bridges, overpasses/underpasses, tunnels, retaining walls, etc. on plan and profile sheets.
- Identification and compilation of data in line segments to facilitate interconnection between the alignment alternatives. The primary alignments may be interconnected to generate improved alignments that would minimize costs and/or environmental effects.

Evaluate and compare the practicability and feasibility of the alternative alignments and the No Build Alternative. This analysis will be based on the following criteria:

- The cost effectiveness of the alternatives based on estimated construction costs and on the transportation benefits they provide.
- The extent in which the alternatives avoid or minimize impacts to the identified environmental and engineering constraints, taking into consideration potential direct, secondary, and cumulative impacts.
- The level of right-of-way impacts and costs associated with each alternative.
- The effectiveness of an alternative to satisfy the design year transportation improvement needs of the region, as defined in the Needs Study.
- The effectiveness of the alternatives in satisfying the preferences and expectations of the agencies and public as expressed during the public/agency coordination process.
- Conformance with local planning effort.

Based on the results of this evaluation, identify the most feasible and practicable alternative alignment. The results of this selection process will be summarized in a comparison matrix and documented in the Detail Alternative Alignment Report. The comparison matrix will provide a ranking of all alternatives by order of preference. Prepare a Detail Alternative Analysis Report that effectively communicates the applied analytical methods, the study results, and the public/agency coordination efforts. The report should be concise with clear illustrative graphics in accordance with PADOT and FHWA guidelines. Plans, profiles, or other mapping developed for each of the evaluated alternatives shall be reproduced at an appropriate scale for inclusion in the Report.

**Detail:**

Elimination of any Alternatives

Number of Report for Draft and Final

Availability of the Transportation Need Analysis

Availability of secondary sources for natural, cultural, and social resources

Results of the Alternatives Analysis Report if preformed by others

**WBS**

**Objective:**

**2.2.12 Description: Hazardous and Residual Wastes**

This task consists of applying the waste site evaluation procedures to a transportation improvement project. Reference Publication 281.

**SOW:**

**2.2.12.1 Phase I Environmental Site Assessment (ESA)**

Conduct the following tasks to determine the presence of environmental property concerns:

1. Perform a paper study of records that are relevant to the project study area for indications of hazardous and environmentally sensitive waste(s), practice(s), or material(s).
2. Obtain Intent to Enter letters from the District prior to site reconnaissance.
3. Conduct a detailed, noninvasive visual inspection of entire site and adjacent properties for indications of hazardous wastes or environmentally sensitive contaminants. This individual should be OSHA certified. The use of photographs or videotape to document the existing conditions and findings at the site is at the discretion of the investigator.
4. Interview persons whom are thought to have knowledge of releases at or from sites in and around the project area. Maintain written records of all interviews.
5. Develop a site sketch.
6. Gather and organize all information from the investigation.
7. Study the compiled data and evaluate the impact of the known environmental conditions.
8. Develop recommendations for further action at sites where environmental conditions of concern were noted.
9. Describe in a complete, concise, manner all evidence gathered in relation to the recognized environmental conditions within the overall scope of the project.
10. Provide to the District, in either written or oral form, a draft report. Revise as necessary.
11. Present final report to the District.

**2.2.12.2 Phase II Environmental Site Assessment (ESA)**

Perform the following tasks leading up to the determination of whether or not a Phase III Environmental Site Assessment is warranted:

1. Collect soil and sediment samples by hand or with non-motorized hand tools. Water samples can only be obtained from surface water bodies or existing groundwater wells.
2. Conduct an analysis on the samples collected. This analysis is limited to broad screening analytical methods and/or contaminants known to be on-site.
3. Depending on the site conditions and the goal of the geophysical investigation, the use of non-intrusive geophysical investigative methods may be required.
4. Gather and organize all existing information obtained during the Phase II investigation.
5. Study the compiled data and evaluate the impact of the known environmental conditions on the project.
6. Develop recommendations for further action at sites where environmental conditions of concern were noted.
7. Prepare a draft Phase II report but also may be requested to make a presentation to the District. Submit report to the District for review/comment. Revise draft report as necessary.
8. Present Final report to the District.

**2.2.12.3 Phase III Environmental Site Assessment (ESA)**

Conduct the following tasks to answer specific waste-related questions raised as a result of a Phase I, Phase II, or another Phase III assessment:

1. Prepare field sampling and health and safety plans. Field sampling plan must include site map showing proposed sampling/monitoring well locations, sampling methods analytical requirement, decontamination and waste disposal procedures, and QA procedures.
2. Collect soil sediment and water samples in areas of concern in accordance with standard environmental investigation practices. Perform the following tasks leading up to the determination of whether or not a Phase III Environmental Site Assessment is warranted:
3. Gather and organize all existing information obtained during the Phase II investigation.
4. Study the compiled data and evaluate the impact of the known environmental conditions on the project.
5. Develop recommendations for further action at sites where environmental conditions of concern were noted.
6. Prepare a draft Phase II report but also may be requested to make a presentation to the District. Submit report to the District for review/comment. Revise draft report as necessary.
7. Present Final report to the District.

**Detail:**

If project involves Underground Storage Tank(s), follow the additional considerations outlined in Publication 281.

- If a Phase III ESA is recommended, the draft Phase II report must be submitted to the BEQ for review/comment before the report is finalized.
- A Phase II UST ESA may be warranted if the Phase I ESA could not determine the presence/absence of UST's or the location of UST's within the project right-of-way. If warranted, follow the guidelines established in Publication 281.

Groundwater contamination assessment can be conducted with Geoprobe-like equipment instead of conventional monitoring well installations and sampling.

**WBS  
Objective:**

**2.2.13 Description: Streams and Waterways**

This task is the identification, inventory, classification and analysis of the physical and biological elements of streams and waterways within the project study area and the quantification of potential

**SOW:**

stream impacts.

**2.2.13.1 Investigation/Inventory/Classification**

Use available mapping of the project study area to identify the streams and waterways within the project study area. Baseline conditions of water quality data (biochemical, chemical and physical parameters) will be compiled from existing data and field analysis. A representative from the PA Fish and Boat Commission may accompany the field analysis team.

The biotic and abiotic qualities of surface water resources will include, but not be limited to, a qualitative analysis of macroinvertebrate and fin fish species, presence of reptiles and amphibians, dominant aquatic vegetation, stream depth, width, riffle:pool ratios, flow, substrate type, bank conditions, etc.

In addition, identify any pollution indicators present within the watercourses from both point and non-point sources. Water samples will be collected at pre-determined locations for field and laboratory analysis.

The following chemical parameters will be tested:

pH (lab and field)  
Total Manganese  
Alkalinity  
Acidity  
Specific Conductance  
Suspended Solids  
Total Aluminum  
Sulfates  
Total Iron

Prepare a composite summary for each surface water resource. Also, prepare a tabulation of impacts to each surface water resource by alternative. The analysis will include a discussion of avoidance and/or minimization measures.

The analysis will also include a comparative qualitative analysis of the baseline water quality (chemical and biological) data and preliminary engineering data to predict potential impacts. Impacts to be addressed will include direct loss of aquatic habitat, recreational opportunities, water supply, biotic organisms, and construction and operation.

**2.2.13.2 Stream and Waterways Mitigation**

1. Coordinate with the agencies to determine the expected mitigation measures and site locations for the project.
2. Prepare a conceptual mitigation plan based on the information obtained from the agencies and site visits. The conceptual plan may include a narrative discussing the rationale for the plan.
3. Submit the conceptual plan to PennDOT for review and comment. Revise and submit to the agencies for review and comment.

**2.2.13.3 Enhancement**

The stream mitigation plan will include an investigation of enhancement of existing streams recommended by the agencies. Coordination with the agencies is required to determine suitable candidate streams and potential enhancement techniques.

**2.2.13.4 Relocation**

If the stream mitigation plan includes the relocation of a portion of a stream identified by the agencies, coordination with the agencies is required to determine suitable candidate streams and potential relocation reaches and techniques.

**2.2.13.5 Restoration**

The stream mitigation plan will include an investigation of restoration of existing streams recommended by the agencies. Coordination with the agencies is required to determine suitable candidate streams and potential restoration techniques.

**2.2.13.6 Restrictions/Conditions**

Coordination with the agencies is required to determine any restrictions and/or special conditions associated with existing streams to be included in the mitigation plan. Restrictions and/or special

conditions that affect the design or construction of the stream mitigation will be discussed in a stream mitigation summary report.

**Detail:**

Coordinate with PennDOT and the agencies to develop the mitigation plan.

**WBS**

**Objective:**

**2.2.14 Description: Agricultural Resources**

This task consists of applying the procedures of the agricultural evaluation process to a transportation improvement project. Reference Publication 324 - Agricultural Resources Handbook and Federal Farmland Impact Assessment form.

**SOW:**

**2.2.14.1 Agricultural Research**

Conduct the following tasks to determine the extent of productive farmlands:

1. Determine presence or absence of agricultural land within the project study area.
2. Gather information regarding agricultural resources through one or more of the following resources: aerial photographs, agency consultation, interviewing property owners and the current farm operators.
3. Present information on project mapping to determine the impacts associated with the project alternative(s). The impacts should be calculated and based on the right-of-way developed for the project. All methods and results of the impact assessment should be carefully described and recorded in the project file.
4. Minimization measures are developed if there is no feasible alternative to the use of primary agricultural land.
5. Summarize the findings in the appropriate NEPA clearance document and the technical support data.

**2.2.14.2 Agricultural Lands Condemnation Approval Board (ALCAB)**

Perform the following tasks leading up to the completion of a Farmlands Assessment Report:

1. Identify all lands in agricultural production within the project study area as defined by Act 43. This can be done by reviewing aerial photography, conducting a windshield survey or field reconnaissance, and/or contacting agencies for information.
2. Develop an overall environmental features map for the project.
3. Assess the direct impacts upon each agricultural resource identified in the project area by overlaying the preliminary alternatives footprint on the environmental features mapping. The impacts will be direct and the discussion of impacts should be presented according to the resource. Estimations of agricultural resource impacts should be based upon the approximate required right-of-way developed for the project.
4. Verify the presence of agricultural resources within the project impact area and quantify the direct/indirect impacts of the project on those resources.
5. Gather specific information regarding the characteristics of agricultural resources in the project study area.

Note: At this point, the alternatives carried forward for detailed study have been selected. This involves the following steps:

- a. Identify capability classes of soils
- b. Collect tax parcel data
- c. Interview property owners
- d. Interview farmers

6. Prepare detailed agricultural resource mapping for the alternatives retained for detailed study in coordination with the Project Team.

7. Provide a detailed impact assessment for each alternative being considered. Note: This is an ongoing process until the Preferred Alternative is identified. The Project Team should consult the officials, agencies, or organizations, which have jurisdiction over special status agricultural lands, after the impacts have been calculated. Contact should be made with preserved farmland easement owner(s) about any impacts. Municipal officials should be consulted about impacts to



agricultural zoning districts. For Agricultural Security Areas (ASAs), the municipal officials and the local agricultural area advisory committee should be contacted. The county agricultural land preservation board should also be consulted in all of these situations. Officials' meetings should be carefully recorded by the preparation of minutes. Minimization of harm and possible mitigation measures should be developed at this time.

8. A presentation should be made to PennDOT BOD and Office of Chief Counsel (OCC) (as appropriate) in a workshop forum. Presentation materials shall consist of a tabulation of impacts to agricultural resources and a general discussion of effects on individual farming operations. Also, the alternatives analysis and minimization of harm efforts associated with each alternative should be presented.

9. The Farmlands Assessment Report (FAR) is prepared which documents the information gathered during the previous steps. The FAR will only address productive agricultural land, ASA's, and primary agricultural land.

10. Attend a workshop prior to obtain final approval of the FAR. In preparation of the workshop, presentation materials need to be developed.

11. A request for an ALCAB hearing along with the names and mailing addresses of property owners and ten copies of the final FAR are sent to the District. This occurs after designation of Preferred Alternative and informing the public of the Preferred Alternative (usually by way of public hearing for DEIS or EA).

12. Schedule and attend at least two dry-run presentations of the material for the ALCAB hearing. Prepare exhibits to support or assist the verbal testimony to be presented at the hearing. Prepare a handout with the agenda, list of witnesses, and a list of exhibits.

13. Attend ALCAB hearing and present the FAR.

**Detail:**

A presentation to PennDOT BOD may be necessary if concerns are raised regarding the significance of the impact to primary agricultural land or to the level of public opposition. Collection of additional data may be necessary throughout the course of the project.

Impact Assessment findings should be presented (Step 8) prior to the identification of the Preferred Alternative.

The agricultural resource evaluation must be documented in the technical support file. Once the Preferred Alternative is determined, the DEIS or Draft EA can be circulated for public review and comment.

Final approval of the FAR will be done after Step 10.

Condemnation Approval (Step 11) should be obtained just prior to the issuance of the ROD or FONSI.

ALCAB's decision is either rendered at the conclusion of the hearing or 60 days following the hearing.

The farmland assessment report is only required if the improvement is not covered by ACT 100 and the farmland needs to be condemned for ROW, otherwise this task is not applicable.

**WBS**

**Objective:**

**2.2.15 Description: Noise**

This task is the development of the noise study in accordance with Publication 10A, Design Manual Part 1A and FHWA Highway Traffic Noise Guidance and an analysis of the feasibility and reasonableness of mitigation for those sites meeting the noise abatement consideration criteria as specified in the latest PennDOT Design Manual and FHWA Guidance to support the environmental document.

**SOW:**

**2.2.15.1 Noise Analysis**

1. Identify all of the sensitive receptors. Sensitive receptors are residences, schools, churches, parks, recreation areas, and hospitals. Add other sites as deemed applicable by PennDOT. Base the selection of sensitive receptors upon their sensitivity to noise according to their Noise Activity Category and their distance from the project. A 500 foot maximum is sufficient for a typical widening/minor relocation project and a 1000 foot maximum for a new alignment alternative project is sufficient.

2. Perform sound level measurements in the field. The scope should assume that there will be sufficient number of measurement sites to adequately cover a representative number of sites. Absolutely do not perform measurements for every receptor site unless they are truly in their own distinct sound level environment.
3. Perform peak hour measurements as opposed to continuous 24-hour site measurements when possible. According to the Design Manual, continuous 24-hour measurement sites are not typically required. They are only required if there is any question as to the noisiest hour (or period) for any project. An evaluation of the available traffic counter data during the scoping phase will help determine the noisiest period(s) of the day.
4. Develop/obtain the environmental traffic data required for the air quality study. The following parameters must be ascertained for the Existing year, and the No-Build and Build Alternatives in the Design Year:
  5. Identification of analyzed roads.
  6. Annual Daily Traffic (ADT) with a peak hour factor (K), or, peak hour volumes, or, if applicable, the Design Hourly Volume (DHV).
  7. Posted and operating speeds.
  8. Fleet mix (%autos, medium trucks, and heavy trucks). FHWA's Traffic Noise Model (TNM) also allows for input of motorcycles and buses. Coordinate with PennDOT for concurrence to add these variables and if the data is available.
  9. Using TNM, develop the predicted sound levels by including plan sheet information, design files, cross-sections, profiles, traffic data, terrain, tree zones and receiver information which is required for the model.
  10. Identify areas where noise levels approach or exceed noise abatement criteria for the designated design year (FHWA/PennDOT criteria). Additionally, identify those areas which will have a substantial increase (PennDOT criteria) in predicted noise levels over existing noise levels.
11. Prepare a technical file report.
12. Prepare documentation for inclusion into the preliminary draft environmental report. Present the technical file in the following format:
  - Introduction
  - Project Description
  - Receptor Sites/Selection Criteria
  - Methodology
  - Affected Environment
  - Environmental Consequences
  - Mitigation
  - Construction Noise
  - Coordination with Review Agencies
  - References
  - Appendix-Measurement Site Field Sheets, Model Input/Output Files
  - Project Vicinity & Location Map
  - Project Limits & Local Network Map
  - Roadway Geometry on Plan Sheets
  - Receptor Locations, Measurement Sites, Noise Sensitive Areas
  - Proposed Mitigation Locations, if applicable.
  - FHWA Noise Criteria Table
  - PennDOT Noise Criteria Table
  - Table of Existing Leq Noise Levels at the Measurement Sites
  - Table of Existing and Predicted Leq Noise Levels at the Receptor Sites
  - Number, Identification, and Type of Impact(s) by Alternative in a Table
  - Mitigation, including PRELIMINARY approximate lengths, heights, costs, and feasibility/reasonableness determinations, if applicable, in a Table.
  - Table of Noise Level dBA for Various Construction Equipment

13. Provide a copy of the final report in the electronic medium currently in use by PennDOT (Microsoft Word, Word Perfect, etc.). Include the TNM input/output files.

#### **2.2.15.2 Noise Mitigation**

Evaluate the options of noise abatement according to the Design Manual and FHWA abatement considerations.

Present the PRELIMINARY cost-effectiveness and engineering feasibility for any proposed barriers in graphic and table format. The table should delineate the approximate location of the barrier(s) by station number, height, length, cost, and the approximate range of predicted insertion loss. Include impacted and non-impacted receptors in the number of benefited receptors that receive a 3 dBA or more reduction in noise levels as a result of the barrier.

Complete the Feasibility and Reasonableness Worksheet in the Design Manual.

Describe the construction noise impacts associated with this project and any feasible mitigation measure as taken from the Design Manual.

#### **Detail:**

Prior to starting the actual work, coordinate with PennDOT to verify the correct procedures through a meeting or telephone call and follow-up coordination letter. Reference all data, assumptions, study techniques, and computer models used for this study.

Correspondence between the FHWA and other agencies will only be initiated with the concurrence of PennDOT.

Follow detail concurrent with detail presented in Noise Analysis Task.

#### **WBS**

#### **Objective:**

#### **2.2.16 Description: Threatened and Endangered Species**

This task includes the coordination with the U.S. Fish and Wildlife Service, PA Game Commission, PA Fish and Boat Commission, PNDI, PADEP and DCNR to determine the presence or absence of state or federally listed threatened and endangered species in the project area. This information will be used to determine if the proposed alternatives will impact the life requisites of threatened, endangered species, biological resources and species of special concern in the project area.

#### **SOW:**

#### **2.2.16.1 PNDI Search**

Request a database search of the project area for records of threatened or endangered species within or surrounding the project area. These results will be made available to the appropriate natural resource agencies and will be used as one of many tools to assess the habitat of the project area.

#### **2.2.16.2 U.S Fish and Wildlife Section 7 Consultation**

The informal process includes the evaluation of various alternatives to the proposed action. This can be accomplished with direct consultation with the Federal Action Agency or the designated non-federal agency. Documentation may include a Construction Options Report that details the consideration of alternatives and the overall impact on the Threatened & Endangered (T & E) Species.

A Biological Assessment (BA) Report must be provided to the responsible Federal Agency. The BA should document the proposed action, the impact on the T & E Species, and methods to avoid/minimize stated impacts. The responsible Federal Agency will review the documentation and request consideration of the BA by the USFWS. This request will initiate the formal Section 7 Consultation process.

The USFWS will review the BA and issue a Biological Opinion (BO) based on the coordination effort and the stated documentation. A "non-jeopardy" opinion, with mitigation terms and conditions to minimize harm to the species, allows the project to move forward. A "jeopardy" opinion indicates that the project will contribute to the extinction of the species or critical habitat. Major reconsideration of the project will be required.

#### **2.2.16.3 Pennsylvania Fish and Boat Commission**

Coordinate with the PA Fish and Boat Commission to identify state listed threatened or endangered fish, amphibians, and reptiles, including their associated habitats. This will be accomplished through agency field-views and coordination meetings. This information will be used in preparation of the environmental documentation and in analysis of the project alternative impacts.

#### **2.2.16.4 Pennsylvania Game Commission**

Coordinate with the PA Game Commission to identify state listed threatened or endangered terrestrial wildlife species, wildlife management areas, and habitats of concern. This will be accomplished through agency field-views and coordination meetings. This information will be used in preparation of the environmental documentation and in analysis of the project alternative impacts.

**Detail:** The intended environmental documentation should be known in order to adjust the scope to the level of detail necessary to complete the project.

The USFWS has 135 calendar days to issue a Biological Opinion after initiation of the formal consultation process (i.e. the receipt of the BA) by the Federal Action Agency.

Informal Consultation is used to facilitate an open dialogue between the USFWS and the Federal Action Agency. The discussions and necessary engineering and/or investigations are used to review alternatives to the proposed actions that avoid impacts to the listed species or critical habitat. If this can be accomplished, the process is complete and no BA or subsequent BO is required.

Formal Consultation is required for any proposed action that "may affect" listed species or critical habitat. The Federal Action Agency is required to provide the USFWS with the relevant engineering, scientific, and commercial data regarding the listed species and the project impacts to enable the USFWS to render an opinion. This format is called the Biological Assessment.

The intended environmental documentation should be known in order to adjust the scope to the level of detail necessary to complete the project.

**WBS** **2.2.17 Description: Terrestrial Habitat Investigation**

**Objective:** This task includes the field/office studies required to identify and delineate the project area land uses to determine the various terrestrial habitats.

**SOW:** This task includes using existing topographical and aerial maps to determine the boundaries of the different land uses in the project area. Determine the appropriate level of Andersen Land Use Classification needed for the project. Boundaries should be transferred onto project area mapping and compartment sizes calculated.

Land use boundaries will be field-verified by a trained biologist to assess the accuracy and to determine the appropriate Andersen Land Use Classification. A summary matrix will be prepared to categorize the acreage of each vegetation type within the project area.

Based on the level of environmental documentation required for a project, the vegetative and wildlife communities within the project area may require additional assessment through the use of the PAM HEP procedure.

An assessment of impacts from the project is required to evaluate if mitigation is appropriate.

**Detail:** The intended environmental documentation should be known in order to adjust the scope to the level of detail necessary to complete the project.

**WBS** **2.2.18 Description: Erosion and Sedimentation Control Study**

**Objective:** This task includes the conceptual layout of the major E&S facilities (e.g. sediment control basins) for each project alternative. Perform the preliminary design to size the basins.

**SOW:** 1. In conjunction with the drainage and stormwater management design the major erosion control facilities (e.g. sediment basins) will be located to determine right-of-way requirements.

2. Perform the preliminary design to size the basins.

3. Coordinate with the County Conservation District and/or PADEP to present the conceptual E&S control approach and to determine any specific information requirements that will be needed for the E&S plan review.

**Detail:** Determine the location of the major E&S facilities. Coordinate with the County Conservation District and/or PADEP.

**WBS** **2.2.19 Description: Conceptual Stage ROW Survey/Displacements**

**Objective:** This task includes the development of the preliminary Right-of-Way requirements for each project alternative to quantify the project displacements.

**SOW:** Use the cut and fill lines from the line and grade work to determine approximate Right-of-Way

limits. Determine the number of displacements that fall within the defined potential Right-of-Way through the use of aerial photographs, mapping and field reconnaissance. Reference the Right-of-Way manual.

- For residential displacements:

1. Determine the number of individuals and families displaced;
2. Determine the age, race, income level and tenure of individuals and families displaced;
3. Determine the number of elderly or handicapped individuals affected;
4. Determine the ownership status.

- For business displacements:

1. Determine the size and type of business activities performed;
2. Determine the type of ownership and tenure;
3. Determine the number of employees of each business;
4. Determine the availability of comparable services within the area;

Evaluate the availability of adequate replacement housing in the area for residents and suitable relocation sites for businesses by obtaining access to "Multi-List" publications.

Identify any special factors to be considered in the relocation of affected neighborhoods, public facilities, non-profit organizations and residents.

Develop an acquisition and relocation program in accordance with the guidelines set forth in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

**Detail:**

The intended environmental documentation should be known in order to adjust the scope to the level of detail necessary to complete the project.

Instigate early and continuous coordination with local and county governmental entities in order to obtain input that may lessen the impacts of displacements and community access issues.

Hold public meetings early in the EA/EIS process

**WBS**

**Objective:**

**SOW:**

**2.2.20 Description: Other Documents/Approvals**

This task includes the preparation of project documents and coordination of necessary approvals. As needed, documentation of methodology, analysis and results will be organized in a bound report format.

Graphics will be Black and White unless otherwise specified. The purpose of the documentation is to summarize the activities. Full documentation of all calculations will not be included.

As needed, communicate, via telephone or personal meetings with agencies and interested parties in order to obtain an understanding of concerns so that they can be addressed to ensure approvals in a timely manner.

**2.2.20.1 Act 120 Compliance**

Perform the following tasks:

1. Identify Section 2002 resources.
2. Determine whether Section 2002 resources are used.
3. Evaluate whether a Section 2002 total avoidance alternative exists and whether it is feasible and prudent.
4. Evaluate all remaining feasible and prudent alternatives to determine which would result in the least harm to the Section 2002 resource(s).
5. Prepare a Section 2002 Evaluation document.
6. Circulate Draft Section 2002 Evaluation to the Act 120 agencies with jurisdiction over the Section 2002 resources.
7. Review and address comments received on the Section 2002 Evaluation document and prepare a Final Section 2002 Evaluation for the Secretary of Transportation's approval.

8. Publish Secretary's findings in the PA Bulletin which officially records the determination of project approval.

**Detail:** Anticipated technical report subjects

Anticipated number of extra coordination meetings with which agencies.

This task must be performed when land is being used for one of the following:

- recreation area
- wildlife and/or waterfowl refuge
- historic site
- state forest
- state game land
- wilderness area
- public park

**WBS**  
**Objective:**  
**SOW:**

**2.2.21 Description: Coastal Zones**

This task is the coordination and identification of coastal zones that may be affected by the project.

**2.2.21.1 Identification/Delineation**

Perform the following tasks:

1. Coordinate with the appropriate agency to determine the presence of a Coastal Zone Management Plan (CZMP). If a CZMP is in affect for the project area, field views, mitigation issues or permitting issues may necessitate the need for meetings throughout final design. Conduct meetings as needed.

2. If a CZMP is present, determine the specific conditions established in the plan that may affect the development of the project. Prepare a summary of the special conditions of the plan that would affect the project.

3. Prepare any information requirements to be reviewed by the authorized agency. All documents will be submitted to PennDOT for review prior to submittal to the authorized agency

**2.2.21.2 Impact Assessment**

1. Perform an analysis of the CZMP. The analysis will contain measures to address the specific requirements of the CZMP.

2. Prepare a summary of the measures taken to address the specific requirements of the CZMP. These measures will be approved by PennDOT and incorporated into the design plans.

**Detail:** The agencies involved in this task will be established during the environmental clearance process.

Determine if a CZMP is present. Determine the agencies involved with managing the CZMP.

Determine the specific requirements of the CZMP and its affect on the project

Determine the specific requirements of the CZMP, its affect on the project, and the measures taken to address the requirements. Incorporate the measures into the design plans.

**WBS**  
**Objective:**

**2.2.22 Description: Navigable Waterways**

This work is the coordination with the U.S. Coast Guard to determine the presence of navigable waterways, any impacts to navigable waterways, and preparing a Section 10 Permit, if navigable waterways will be impacted

**SOW:**

**2.2.22.1 Identification/Delineation**

Coordinate with the U.S. Coast Guard to determine the navigable status of a waterway. Determine if the project will require a permit under Section 10 of the Rivers and Harbors Act of 1899

**2.2.22.2 Impact Assessment**

1. Determine the impact to the navigable water and the specific information requirements for the Section 10 Permit.

2. Prepare Section 10 Application package. The application will include, but not be limited to, the following information: name and address of the applicant; the waterway and location of the bridge; citation to the act of Congress or the State legislature authorizing the bridge; a map of the location and plans of the bridge showing the features which affect navigation; and papers to establish the

identity of the applicant. Four sets of plans must be submitted with the application.

3. Submit application to PennDOT for review. Revise if necessary. Submit permit application with plans to the U.S. Coast Guard.

4. Attend public hearing, if applicable. A public hearing will only be held when there are substantial issues concerning the effect that the proposed bridge will have on the reasonable needs of navigation.

**Detail:** This task requires coordination with the U.S. Coast Guard to determine the navigable status of a waterway.

Determine specific permit requirements, if needed. This task may also include the preparation of a permit application to obtain the Section 10 Permit.

**WBS Objective:** **2.2.23 Description: Wild & Scenic Rivers**  
This work is the coordination with the environmental agencies to determine if a stream or river is classified as a Wild & Scenic River. The impacts to such waterways will be assessed and avoidance, minimization, and/or mitigation measures will be implemented

**SOW:** **2.2.23.1 Identification/Delineation**

1. Coordinate with the DCNR and appropriate federal agency to determine the status of a waterway as a Wild & Scenic River.

2. Determine the length of the waterway that is classified as a Wild & Scenic River.

**2.2.23.2 Impact Assessment**

1. Determine the impact to the Wild & Scenic River.

2. Coordinate with the environmental agencies to determine avoidance, minimization and/or mitigation measures to be employed.

3. Submit impact assessment to PennDOT for review. Revise if necessary. Submit appropriate information with plans to the agencies for review.

**Detail:** Determine the impacts to Wild & Scenic Rivers and the measures to avoid or mitigate for the impacts. Coordinate with the agencies.

**WBS Objective:** **2.2.24 Description: Groundwater**  
This task is the determination of the local and regional groundwater resources and the impact on those resources by the project.

**SOW:** **2.2.24.1 Identification/Delineation**

This task consists of the review of available records, coordination with the appropriate agencies, and collection of local information to document the known groundwater resources in the project area.

The following work elements are required for the successful completion of this task:

1. Coordinate the effort with the environmental manager, the geotechnical manager, and other disciplines involved. Attend meetings as necessary for the environmental review process. Perform QA/QC on all deliverables prepared for this task.

2. Perform an office investigation. Review background geological information and maps, available Geotechnical Engineering Reports, project files, and previously prepared environmental documents.

3. Visit the project site, interviewing local residents and authorities. Document existing water supplies and sources. Follow up with interviews at local public water companies, water well drillers, planning commissions, etc.

4. Contact State and Federal agencies who might have information on regional conditions. These include: PAGS, PADEP, FEMA, and USACoE.

5. Prepare a technical memorandum to the project manager. Present the findings of the study, the methodology, and the information sources. Include plans, maps, cross-sections, and data tables as needed for supporting documentation.



#### 2.2.24.2 Impact Assessment

This task consists of evaluating the impacts to groundwater resources by project alternatives.

The following work elements are required for the successful completion of this task:

1. Coordinate the effort with the environmental manager, the geotechnical manager, and other disciplines involved. Attend meetings as necessary for the environmental review process. Perform QA/QC on all deliverables prepared for this task.
2. Perform an office investigation. Review the memorandum documenting the groundwater resources, superimpose the proposed project alternatives on maps and /or plans attached to that memorandum, and establish a preliminary understanding of the direct and indirect impacts from each alternative.
3. Visit the project site, noting how the alternatives will traverse the area. Verify the preliminary understanding of the anticipated impacts from each alternative.
4. Analyze the comparative impacts. Tabulate the direct and indirect impacts for each alternative. For the indirect impacts, determine the qualitative risk: e.g.; probable, possible, negligible. Compare the local and regional groundwater impacts among the alternatives, using a matrix or other defensible method, to determine a ranking of the alternatives based on this impact.
5. Prepare a technical memorandum to the project manager. Present the findings of the study and the assessment methodology. Include plans, maps, cross-sections, and tables as needed for supporting documentation.

**Detail:**

The intended environmental documentation should be known in order to adjust the scope to the level of detail necessary.

**WBS**

**Objective:**

#### 2.2.25 Description: National Historic Landmarks

To identify National Historic Landmarks that may be affected or impacted by the project and to assess the potential effect of the project on the National Historic Landmark(s).

**SOW:**

#### 2.2.25.1 Identification/Delineation

Conduct background research to identify the location, boundaries, and significance of National Historic Landmarks.

Indicate, if appropriate, the location of National Historic Landmarks and their boundaries on project constraint

#### 2.2.25.2 Impact Assessment

Identify the "qualifying characteristics" for the identified National Historic Landmark.

In accordance with 23 CFR Part 771.135, evaluate the potential for Section 4(f) impacts for direct and indirect impacts on the National Historic Landmarks. Part of this evaluation includes the evaluation of physical and/or secondary and cumulative impacts on the National Historic Landmark.

Present the results of the 4(f) evaluation(s) in a report meeting the NEPA guidelines.

Apply the Criteria of Adverse Effects (36 CFR 800.5(a)(1)) for the identified National Historic Landmark(s).

Compare the project characteristics with the examples of adverse effect specified in 36 CFR 800.5(a)(2).

Present the results of the application of the Criteria of Adverse Effect and the comparison with the examples of adverse effects in a report meeting BHP Guidelines.

Special requirements for protecting National Historic Landmarks are set forth in the 36 CFR 800.10(a). Section 110(f) requires that measures be taken to minimize harm to any National Historic Landmark that may be directly and adversely affected by an undertaking. If the undertaking will have an adverse effect upon a National Historic Landmark, the Advisory Council on Historic Preservation (ACHP) shall be invited to participate in consultation to resolve any adverse effects.

**Detail:**

For each National Historic Landmark, the report must summarize the description of the resource, its



eligibility, its qualifying characteristics, and its National Landmarks boundary. The report must document the analysis of potential direct physical, visual, auditory, and secondary and cumulative effects of the project on the National Historic Landmark. Other potential effects may need to be analyzed based on the nature of the proposed project.

The report includes a list of National Historic Landmarks for which resolution of adverse effects and 4(f) impacts is recommended. It is possible that the report may find that the project will have NO ADVERSE EFFECT or no 4(f) impacts on National Historic Landmarks.

**WBS**

**Objective:**

**2.2.26 Description: Natural/Wild Areas**

To identify Natural/Wild Areas that may be affected or impacted by the project and to assess the potential effect of the project on those areas.

**SOW:**

Obtain information from the U.S. Department of the Interior, National Park Service as well as the Pennsylvania Department of Conservation and Natural Resources to determine the presence or absence of recognized natural or wild areas within the project area. Other state or local level agencies may also be contacted for information on any known master plans for development of adjacent public or private land holdings.

**2.2.26.1 Identification/Delineation**

Through a collaborative process, identify, quantify and assess the impacts on recognized natural or wild areas that may result from project implementation. For each alternative under consideration, the environmental document should identify the potential adverse effects on the natural, cultural and recreational values of the listed natural or wild area. Any unavoidable impacts should be mitigated to the extent possible.

**2.2.26.2 Impact Assessment**

Assess the impacts on recognized natural or wild areas that may result from project implementation. For each alternative under consideration, the environmental document should identify the potential adverse effects on the natural, cultural and recreational values of the listed natural or wild area. Any unavoidable impacts should be mitigated to the extent possible.

**Detail:**

**WBS**

**Objective:**

**2.2.27 Description: Air Quality**

This task involves the development of the air quality study in accordance with Publication 321, Project Level Air Quality Handbook.

**SOW:**

**2.2.27.1 Identification/Delineation**

Microscale Analysis:

Perform the project screening analysis for CO. If the project passes, prepare a brief text documenting the results of the screening analysis. If the project does not pass the screening analysis, continue with the analysis as described in the following paragraphs.

Identify all of the sensitive receptors. Sensitive receptors are residences, schools, churches, parks, recreation areas, and hospitals. Add other sites as deemed applicable by PennDOT. Base the selection of sensitive receptors upon their sensitivity to Carbon Monoxide (CO) and their distance from the project. A 500 foot maximum is sufficient for a typical study.

For intersection analyses, identify only those intersections with LOS of D, E, or F, and/or those that will change to LOS D, E, or F for the future years need to be considered. If there are any intersection with LOS D, E, or F, analyze only the intersection with the greatest potential to exceed the NAAQS for CO, usually the intersection with the worst volume/capacity ratio. Do not include any intersections that are improved from an existing, ETC, or design year LOS D, E, or F, to an LOS of C or better. Record the criteria used for selection of specific intersection for study.

Identify intersections in the project area that are located in any CO SIP determination if it is likely to be impacted by the project in the ETC and/or Design Year. Currently, this may not apply because the Philadelphia area is in maintenance for CO. However, if there are any intersections identified, the predicted CO levels can not be made worse by the proposed project.

Mesoscale/Regional/Project Level Analysis:

Determine if the project is exempt or non-exempt from a project level analysis. If exempt, provide text documenting the exempt determination. If the project is non-exempt, determine if the project is included in an approved and conforming TIP/SIP/LRP. If it is listed, compare the proposed project alternatives to the project as described and analyzed for the emissions budget. If they are the

same or similar, provide text identifying the project's inclusion in the conforming TIP/SIP/LRP. If the project does not meet any of these criteria, perform an analysis as indicated in the impacts assessment section for project level analysis.

### **2.2.27.2 Impact Assessment**

#### Microscale Analysis

Perform a microscale CO concentration analysis for the existing year, ETC year and Design Year for the No-Build and Build Alternatives.

Obtain existing CO background levels for both the peak one-hour and peak eight-hour periods through PennDOT. Identify the source of these background levels from a monitoring site located near the project area. If not available or applicable, use EPA current default backgrounds or procedures described in the EPA publication titled "Guidelines for Modeling CO from Roadway Intersections", EPA-454/R-92-005.

Develop/obtain the environmental traffic data required for the air quality study. The following parameters must be ascertained for the No-Build and Build Alternatives in the Existing Year, Project Expected Time of Completion Year (ETC Year) and the Design Year:

- \* Identification of analyzed roads.
- \* Annual Daily Traffic (ADT) with a peak hour factor (K), or, peak hour volumes, or, if applicable, the Design Hourly Volume (DHV) for freeflow conditions.
- \* Posted speeds.
- \* Operating speeds.
- \* Highway Capacity Manual (HCM) signalized intersection analysis traffic data for any signalized intersections that meet the LOS D, E, or, F criteria.
- \* CO emission factors from the EPA Mobile Source Emission Factors model (current version). Take credit for the Inspection/ Maintenance (I/M) program in areas where there may be a potential for CO impacts. Obtain the I/M input from PennDOT. Additionally, obtain the temperature to be used from which is to be used representative of winter conditions. The meteorological parameters representing the atmospheric dispersion conditions are to be approved by PennDOT prior to their use.

The Microscale Analysis should include the prediction of one-hour and eight-hour CO concentrations (inclusive of background levels) at the following receptor sites:

- \* Free-Flowing Sections of the Roadway- predict CO levels at the edge of the highway right-of-way (ROW) line. Use an EPA approved line source model (i.e. CALINE 3, CAL3QHC). The meteorological parameters representing the atmospheric dispersion conditions are to be approved by PennDOT prior to their use.
- \* Sensitive Receptors-Predict beyond the ROW only for sensitive receptors such as residences, schools, churches, parks.
- \* Signalized Intersections-Analyze with EPA approved CAL3QHC-A Model for Predicting Carbon Monoxide Concentrations Near Intersections, November, 1992, or latest EPA approved version.

Selection of the intersections to be analyzed will use the following criteria and chosen in consultation with PennDOT:

- 1) High traffic volumes and/or worst LOS for ETC Year and/or Design Year.
- 2) Intersections that meet the LOS D, E, or F criteria.
- 3) Any CO SIP intersection, if applicable.

#### Mesoscale/Regional/Project Level Analysis:

If this analysis was required:

- \* Calculate the emission factors for VOC and NOx using the EPA Mobile Source Emission Factors

model (current version) for summer temperature conditions (ozone season) for all the roadway network operating speeds. The roadway network for this analysis is defined by any road that has an AADT change as a result of the proposed alternative. If there is a large amount of roads that change, limit the analysis to those roads that change by 10 percent (+/-). Coordinate with PennDOT.

\* Take credit for the Inspection/ Maintenance (I/M) program in areas where there may be a potential for CO impacts. Obtain the I/M input from PennDOT.

\* Develop daily Vehicle Miles Traveled (VMT) by operating speeds for every road in the network that has an AADT change as a result of the proposed alternative. If there is a large amount of roads that change, limit the analysis to those roads that change by 10 percent (+/-). Coordinate with PennDOT.

\* Multiply the appropriate emissions factor (for both VOC and NOx) times its matching speed VMT to get the grams per day. Convert into kilograms and/or tons per day.

\* Total the kilograms and/or tons per day (for both VOC and NOx) for each proposed alternative.

\* Perform the above for the CAAA base year 1990, ETC, and the design year. If the 1990 and/or ETC year are not readily available, then derive these volumes from a simple straight-line or empirical method.

The project level analysis is NOT considered a potential impact if it passes the following tests:

\* The build ETC and design year VOC/NOx totals are less than the 1990 totals.

\* The build ETC and design year VOC/NOx totals are no more than 10% greater than the corresponding No-Build ETC and design year VOC/NOx totals.

An examination of the local MPO's TIP/SIP/LRP is required to see if the additional VOC and/or NOx emissions are within the approved budgets if the build versus no-build test is not met. It is likely that the 1990 test will be met in Pennsylvania. Additionally, consultation with the regional MPO will be required to verify the predicted totals to insure that the same input parameters are used for the emissions budget as those used in the project level analysis.

NOTE: This will be a highly unlikely scenario since nearly all projects are part of a conforming and approved TIP/SIP/LRP well before environmental documents are analyzed. However, there have been projects that have been conceived in between the Transportation Conformity analysis periods and this was the process used to bring it within the VOC and NOx budgets.

**Detail:**

Prior to starting the actual work, coordinate with PennDOT to verify the correct procedures through a meeting or telephone call and follow-up coordination letter. Reference all data, assumptions, study techniques, and computer models used for this study.

Correspondence between the Federal Highway Administration (FHWA), the US Environmental Protection Agency (EPA), and other agencies will only be initiated with the concurrence of PennDOT.

Indicate all data, assumptions, study techniques, and computer models used for this study as coordinated with PennDOT.

Prepare a technical file report. Additionally, prepare documentation for inclusion into the preliminary draft environmental report. Present the technical file in the following format:

1. Introduction
2. Project Description
3. Receptor Sites/Selection Criteria
4. Methodology
5. Affected Environment
6. Environmental Consequences
7. Mitigation
8. Conformity Determination
9. Coordination with Review Agencies
10. References

Include the following graphics:

1. Project Vicinity & Location Map
2. Project Limits & Local Network Map
3. Intersection Geometry from Plan Sheets, Photos, etc.
4. Sensitive Receptors and Intersection Locations

Include the following tables:

1. NAAQS
2. Traffic Data Used for Air Quality Analysis
3. CO Concentrations at Signalized Intersections and Interchanges
4. CO Concentrations at Sensitive Receptor Locations

Provide a copy of the final report in the electronic medium currently in use by PennDOT (Microsoft Word, Word Perfect, etc.). Include the MOBILE and CALINE3/CAL3QHC input and output files.

**WBS**  
**Objective:**

**2.2.28 Description: Cultural Resource Early Coordination**

To initiate consultation for Section 106 with the SHPO, potential consulting parties, and to inform the public at the start of a project. Alternative pathways for consultation may be considered, including PCRRF's and executing project specific programmatic agreements.

**SOW:**

Provide a brief but concise description of the proposed project and project area.

Determine the area of potential effect (APE) for the project in accordance with 36 CFR 800.2 and 36 CFR 800.16, including reasonably foreseeable secondary and cumulative impacts as defined under NEPA, staging areas, temporary easements, and designated borrow and waste areas.

Review existing archaeological site survey data maintained in the Pennsylvania Archaeological Site Survey (PASS) files and existing historic structure and district survey data maintained in the Historic Resource Site File (HRSF). National Register files, and other historic resource and context files maintained by the Bureau for Historic Preservation, in Harrisburg.

Confer with the District Qualified Professionals to determine the need for PCRRF and/or project-specific programmatic agreement, and to prepare as directed.

Prepare public information materials, in accordance with the Public Involvement Handbook (Publication 295) and guidance from the District Qualified Professionals, which may include newspaper announcements, flyers, non-manned and manned stations at public meetings and presentations, letters to local historic groups, and radio announcements.

Consult with appropriate Federally recognized tribes on projects where effects are anticipated on archaeological sites that have or are expected to have burials.

**2.2.28.1 Establish Area of Potential Effect**

Determine the "area of potential effect" (APE) for the project, in accordance with 36CFR 800.2 and 800.4, and conduct survey work at a level sufficient to identify all potentially significant cultural resources located within the APE, in accordance with 36 CFR 800.4. As per the Revised Section 106 Regulations effective June 17, 1999, the SHPO/THPO must be consulted in determining the area of potential effect (800.49(a)).

Evaluate whether project meets threshold for Section 106 application (Is the project an "undertaking"?). If there is no "undertaking", then there is no potential to cause effects on historic properties. Such a finding may be documented, and no further cultural resources work is required.

Identify the appropriate SHPO/THPO. For most projects, the SHPO will be the Pennsylvania Bureau of Historic Preservation (BHP). If a project includes actions in more than one state, or on state and tribal lands, initiate consultation with appropriate SHPO and/or THPO to designate a lead reviewing agency.

Determine scope of efforts. Consult with the SHPO/THPO and consulting parties to determine the definition of the Area of Potential Effect (APE) and the plan for investigation. Prior to consultation, background research to identify previously recorded historic properties is required. Items required for use in consultation: a USGS quadrangle map illustrating the project area, preliminary project plans, and results of background research.

### **2.2.28.2 PCRRF**

Provide a brief but concise description of the proposed project and project area. Identify Engineering District, Contact Person, Traffic/State Routes and Sections, USGS topographic location (attach USGS Quadrangle showing project area), and list funding sources.

Note any bridge involvement in the project, whether the bridge is listed in the "Survey of Historic Highway Bridges in Pennsylvania" (August 1986) and if a previous determination of eligibility to the National Register of Historic Places had been conducted.

Review Pennsylvania archaeological site survey (PASS) files maintained at the Bureau for Historic Preservation (BHP), Harrisburg, Pennsylvania, or other repository to obtain all available information on previously recorded archaeological sites within and immediately adjacent to the project area.

Review the National Register of Historic Places historic structure files and area cultural resource management reports maintained at the BHP in Harrisburg, Pennsylvania, or other repository to identify other cultural resource management efforts conducted near the proposed right-of-way, and assess the level of cultural resources work previously done in the general area.

Review secondary source material and conduct informant interviews with individuals who may be familiar with cultural resources in the vicinity of the project area or who may be able to provide information regarding the land use history of the proposed project area.

Review environmental data and factors affecting site preservation to assess the potential for encountering archaeological sites within the project area.

Complete the PCRRF and attach relevant documentation (i.e., project maps, photos, archival materials, written descriptions, etc). Submit PCRRF to the PennDOT District Engineer for forwarding and review by PennDOT Bureau of Design and BHP.

### **2.2.28.3 Programmatic Agreement**

Consult with the consulting parties to develop acceptable approaches that will accomplish or prioritize cultural resources work in accordance with applicable law and regulation and proposed project goals.

Programmatic Agreements (Pas) will vary with the nature, size, and schedule of the project. In general, PA stipulations may address (but are not limited to): project sequencing or staging; treatment of archaeological resources including Phase I survey and Phase II testing; processing, analysis, and curation of artifacts; treatment of cemeteries, burial places, or human remains; issues involving Indian Tribes or Native Hawaiian organizations; archaeological monitoring; unanticipated discovery; public participation; performance standards; project scheduling; review responsibilities; PA amendment procedures; and dispute resolution.

Prepare a draft PA for review by all consulting parties that have responsibility in the PA.

Revise the draft PA in consideration of comments by consulting parties. Obtain signatures of all consulting parties.

### **2.2.28.4 Public Involvement**

Develop a plan to involve the public. Section 106 requires public comment and participation in the identification of and assessment of effects on historic properties. This plan may be coordinated with NEPA public involvement activities.

Identify other consulting parties. This identification may be coordinated with NEPA stakeholders identification activities. This identification may be required by Section 106 even when it is not by NEPA (e.g. in the CE process). Examples of other consulting parties are town or city councils, historical societies, tribal organizations that are not federally recognized, and other ad hoc citizen organizations. Consulting parties may support, oppose, or have no opinion regarding the proposed project.

#### ***Detail:***

For projects affecting historic or archaeological resources consult:

1. Act No. 1988-72, Title 37, the History Code

2. 36 CFR, Part 800, Section 10 of the National Historic Preservation Act (NHPA) of 1966 as amended in 1992 (for projects involving Federal actions)

3. PennDOT's current historical and archaeological procedures.

Note that under the Revised Section 106 regulations effective June 17, 1999, the Advisory Council on Historic Preservation must be invited to consult in the development of PAs. PAs are now applicable on tribal lands only if signed by the THPO (Tribal Historic Preservation Officer), tribe, or designated representative of the tribe (800.14(b)(3), 800.6(b)(1), 800.14(b)(2)).

**WBS  
Objective:**

**2.2.29 Description: Archeology/Geomorphology**

To determine the presence or absence of prehistoric and historic archaeological resources within the project area (Phase I), assess the significance of identified resources in terms of eligibility for listing in the National Register of Historic Places (Phase II), determine project effects on significant resources, and develop appropriate mitigation strategies, including data recovery, if warranted (Phase III). Geomorphological investigation may be used to record site stratigraphy and document depositional processes, document degree of disturbance, and assess the potential for deeply buried cultural resources

**SOW:**

**2.2.29.1 Phase 1**

Determine the "area of potential effect" (APE) for the project, in accordance with 36CFR 800.2 and 800.4, and conduct survey work at a level sufficient to identify all potentially significant cultural resources located within the APE, in accordance with 36 CFR 800.4. As per the Revised Section 106 Regulations effective June 17, 1999, the SHPO/THPO must be consulted in determining the area of potential effect (800.49(a)).

Review archaeological site survey (PASS) files maintained at the Bureau for Historic Preservation (BHP), Harrisburg, Pennsylvania, and historic structure forms, National Register of Historic Places historic structures files, and area cultural resource management reports maintained at the BHP in Harrisburg, Pennsylvania, to identify recorded archaeological sites and inventoried historic structures in or adjacent to the project area, and to assess the level of cultural resources work previously done in the general area.

Review relevant primary and secondary source material including archival collections, historic maps, atlases, and local histories. Consult with regional and local historical societies, and conduct informant interviews with property owners and other informants, as appropriate. Review relevant geology; physiography; hydrology; pedology; climate; flora and fauna; current land use; and similar environmental data to prepare the environmental setting section of the report.

Develop prehistoric and historic period context statements. In general, Phase I context statements will provide project area-specific background data and clarify research expectations. Prioritize survey areas into differential zones for the location and/or preservation of cultural materials.

Conduct a pedestrian reconnaissance of the project area to confirm the presence and condition of resources identified during the background research, assess current land use, and delineate areas suitable for sub-surface testing

Based upon the results of the pedestrian reconnaissance, hand-excavate shovel test probes (STPs) in undisturbed portions of the project area at intervals appropriate to the project area prioritization (i.e., high, moderate, or low probability), and in accordance with BHP Guidelines. Map and photograph identified cultural features (e.g., prehistoric fire hearths, wells, privies, refuse pits, architectural remains, etc.) in situ.

In fluvial or coluvial settings where potential exists for the preservation of deeply-buried cultural materials in stratified contexts, conduct manual or mechanically-assisted deep testing. If appropriate, a professional geomorphologist should determine site depositional history, degree of disturbance, and potential for cultural preservation.

Process and label recovered artifacts according to the Curation Guidelines of the Section of Archaeology, The State Museum of Pennsylvania, Pennsylvania Historical and Museum Commission (revised 1999). Conduct Phase I-level analysis (i.e., cultural/temporal affiliation, artifact type, material, and function). On completion of the project pack and ship artifacts to the State Museum of Pennsylvania or other approved repository for permanent curation.

Present results of the Phase I work in a report. The report should include the results of the background research, field methodology employed, field results, and recommendations for additional work, if any. The report is to be suitably illustrated with photographs, shovel probe profiles, maps, to support the results of the Phase I findings. If additional work is required, the



report shall make specific recommendations for Phase II testing

**2.2.29.2 Phase 2**

Conduct site-specific background research at a level sufficient to place the resource within its geographic and historic context, and characterize eligibility for nomination to the National Register of Historic Places. Typical additional documentation for historic archaeological sites may include deeds, chain of title searches, tax assessments, insurance surveys, and census data.

Develop a Phase II work plan for each site determined to be potentially eligible based on Phase I survey data as well as additional background research. Examples of specific work plans may include, but are not limited to, one or more of the following strategies; (1) a controlled surface collection of artifacts in plowed fields, (2) plowing or disking of the project area and surface collection, (3) mechanical removal of topsoil (stripping) to enhance feature identification, (4) excavation of test units placed advantageously or randomly, and (5) mechanical deep testing in deeply stratified settings.

Conduct Phase II artifact analysis; (1) assess prehistoric lithic artifacts for cultural/temporal affiliation, artifact type, raw material, presumed function, and modification or usewear, (2) classify Native American ceramics by cultural affinity, type/ware and temper, (3) categorize historic artifacts by material type, function, and diagnostic attributes, and (4) classify floral and faunal specimens by major taxon and structural form.

Present results of the Phase II work in a report. The report will define the boundaries of the site in three dimensions, and will include the results of the background research, field methodology employed, field results, and an evaluation of the archaeological site's eligibility for the National Register of Historic Places. The report is to be suitably illustrated with photographs, stratigraphic profiles, and maps, to support the results of the Phase II evaluation. The report will also contain, for sites determined to be potentially eligible, an evaluation of the potential for direct physical and/or secondary and cumulative impacts, as well as the potential for adverse effects, from project implementation. For sites determined to be potentially eligible and for which project avoidance is not an option, the report shall include a recommended research design and work plan for a Phase III data recovery.

**Detail:**

For projects covering an area of 5 acres or less, which are not stratified and where no sites are found, a shortened report format is acceptable. This format should include an abstract describing the nature of the project, brief environmental setting of the project area, method of testing (including the number of subsurface probes), and recommendations.

The Guidelines for Archaeological Investigations (Pennsylvania Museum and Historical Commission, 1991), discuss specific Phase I investigative methods according to the project setting (i.e., prehistoric, historic, urban, and submerged).

Further guidance on conducting archaeological investigations can be found in the Advisory Council's Handbook on the Treatment of Archaeological Properties (1980) and the Secretary of the Interiors Standards for Archaeology and Historic Preservation (36 CFR 61.3 (b) and Chapter 6, Section C.1.a)

The Guidelines for Archaeological Investigations (Pennsylvania Museum and Historical Commission, 1991), discuss specific Phase II investigative methods according to the project setting (i.e., prehistoric, historic, urban, and submerged).

**WBS Objective:**

**2.2.30 Description: Historic Structures**

To identify buildings, structures, objects, and districts eligible for or listed on the National Register that may be affected or impacted by the project and to assess the potential effect or impact of the project on the resources.

**SOW:**

**2.2.30.1 Eligibility**

Evaluate whether project meets threshold for Section 106 application (Is the project an "undertaking"?). If there is no "undertaking", then there is no potential to cause effects on historic properties. Such a finding may be documented, and no further cultural resources work is required.

Identify the appropriate SHPO/THPO. For most projects, the SHPO will be the Pennsylvania Bureau of Historic Preservation (BHP). If a project includes actions in more than one state, or on state and tribal lands, initiate consultation with appropriate SHPO and/or THPO to designate a lead reviewing agency.

Develop a plan to involve the public. Section 106 requires public comment and participation in the

identification of and assessment of effects on historic properties. This plan may be coordinated with NEPA public involvement activities.

Identify other consulting parties. This identification may be coordinated with NEPA stakeholders identification activities. This identification may be required by Section 106 even when it is not by NEPA (e.g. in the CE process). Examples of other consulting parties are town or city councils, historical societies, tribal organizations that are not federally recognized, and other ad hoc citizen organizations. Consulting parties may support, oppose, or have no opinion regarding the proposed project.

Determine scope of efforts. Consult with the SHPO/THPO and consulting parties to determine the definition of the Area of Potential Effect (APE) and the plan for investigation. Prior to consultation, background research to identify previously recorded historic properties is required. Items required for use in consultation: a USGS quadrangle map illustrating the project area, preliminary project plans, and results of background research.

Survey historic properties. Carry out the plan for investigation established through scoping. May include Phase I and Phase II level investigations. Documentation of negative findings is required. For buildings, structures, objects, and districts, map the location of all resources over 50 years of age identified. Document each of the resources to the level specified in scoping, including physical description and historical background.

Evaluate historic significance. The plan of investigation specified in scoping may permit that some buildings, structures, objects, districts, and sites may be determined not significant, and therefore not eligible for the National Register of Historic Places, at the end of Phase I investigations. Generally, buildings, structures, objects, and districts eliminated at this phase are those that lack sufficient integrity to illustrate their history.

Resources investigated at the Phase II level should be evaluated through the application of the four National Register Criteria (36 CFR 60.4)

Present results of cultural resources work in a report. Results of Phase I investigations should be presented in a Phase I management summary meeting the BHP Guidelines. The Phase I management summary includes the recommendations for resources to be promoted to Phase II investigations. It is possible that a Phase I management summary may find that there are no historic properties present in the APE and, therefore, the project will have NO EFFECT on historic properties. Results of the Phase II investigations should be presented in a Determination of Eligibility Report meeting the BHP Guidelines. The report includes the recommendations for resources to be promoted to Adverse Effect Assessment. It is possible that a Phase II management summary may find that there are no historic properties present in the APE and, therefore, the project will have NO EFFECT on historic properties.

#### **2.2.30.2 Effect**

Identify the "qualifying characteristics" for identified historic properties.

Apply the Criteria of Adverse Effects (36 CFR 800.5(a)(1)) for identified historic properties.

Compare the project characteristics with the examples of adverse effects specified at 36 CFR 800.5(a)(2).

Present the results of the application of the Criteria of Adverse Effects and the comparison with the examples of adverse effects in a report meeting the BHP Guidelines

#### **Detail:**

For each resource, the report must summarize the description of the property, its National Register eligibility, its qualifying characteristics, and its National Register boundary. The report must also document the analysis of potential direct physical, visual, auditory, and secondary and cumulative effects of the project on each resource. Other potential effects may need to be analyzed based on the nature of the proposed project.

The report includes a list of resources for which resolution of adverse effects is recommended. It is possible that the report may find that the project will have NO ADVERSE EFFECT on historic properties.

#### **WBS Objective:**

#### **2.2.31 Description: Resolution of Adverse Effects**

To resolve adverse effects to historic properties, resulting in an MOA, including archaeological data



**SOW:**

recovery (Phase 3) and recordation.

Meet with consulting parties including the SHPO to seek measures to avoid, minimize, and mitigate (in that order) adverse effects to historic properties (archaeological and historic).

Develop rehabilitation plans meeting Secretary of Interior Standards.

Prepare draft MOA for review by all consulting parties. Revise as necessary.

Develop appropriate data recovery work plan for adverse effects to archaeological sites.

Coordinate with FHWA, Central Office, the District qualified archaeological professional and other consulting parties as identified to address relevant research issues and gain information important in history or prehistory.

Document affected architectural resources to standards as specified in the MOA.

Implement MOA stipulations of the MOA, as well as any other commitments as specified in the NEPA document.

Prepare materials for public dissemination of information resulting from mitigation, as specified in the MOA.

**2.2.31.1 Memorandum of Agreement (MOA)**

Consult with the consulting parties to develop alternatives or project enhancements that will avoid identified adverse effects.

If avoidance is not practicable, develop alternatives or project enhancements that will minimize identified adverse effects.

If minimization is not practicable, develop mitigation plan. Examples of mitigation include HABS or HAER level documentation of buildings or structures, interpretive and/or educational programs, and streetscape enhancements.

Prepare draft MOA for review by all consulting parties including all parties that will have responsibilities in the MOA.

Revise draft MOA in consideration of comments by consulting parties.

Obtain signatures of all consulting parties

**2.2.31.2 Phase 3 Archaeology**

Conduct additional background research sufficient to formulate and address specific local and regional research topics. Topics will vary with project type, but could, for example on prehistoric sites, include paleoenvironmental reconstruction; seasonality of occupation and subsistence strategies; cultural interactions and exchange mechanisms; and raw material procurement and utilization. For historic sites, research topics may include, consumer behavior trends and intrasite (agricultural) land-use patterns. Background research might also incorporate use of oral histories as well as other primary and secondary archival research data.

Develop Phase III work plans. Phase III excavations should address specific and relevant research issues to insure that project activities provide information important in prehistory or history (36 CFR 60.4(d)).

Conduct Phase III investigation. Phase III activities typically include: horizontally and vertically extensive manual and mechanical excavation; geomorphological and stratigraphic assessment; soil chemical analysis, documentation of cultural features; lithic raw material identification; flaked stone and ground stone artifact analysis; prehistoric ceramic artifact analysis; cordage and textile analysis; radiocarbon or other dating techniques; analysis of vertebrate and invertebrate faunal remains; human skeletal analysis; floral remains analysis; remote sensing studies, and archaeomagnetic studies. Conclusions may address general site character, chronology, subsistence and seasonality, spatial and temporal intensity of site utilization, and external correlation's to local and regional settlement systems.

Conduct Phase III analysis. Phase III studies will supplement Phase II-level data, and include more precise or detailed research methodologies. Examples of additional studies appropriate to a Phase III-level of investigation of a prehistoric site may include: microscopic lithic edge-wear analysis; thin

sectioning and petrographic analysis; neutron activation analysis; x-ray fluorescence; and archaeomagnetic dating. On historic sites, additional studies would typically include glass and ceramic ware type as well as functional analyses, flat glass thickness measurements, perishables (wood/leather/textiles) analysis, and vertebrate faunal analysis.

Present results of the Phase III work in a report. The report will include the results of the background research, research design/questions, field methodology, field results, and an interpretation of the results based on a synthesis of the diverse analytical procedures employed during the investigation and a comparison with similar archaeological sites. The report is to be suitably illustrated with photographs, stratigraphic profiles, maps, and analytical documentation to pose answers to the research questions established in the research design.

### 2.2.31.3 Recordation

Document the architectural resource(s) to the appropriate standards as specified by the requirements of the MOA, NEPA, Section 4(f), or other Section 106 documents.

Coordinate with the appropriate state and/or federal agency, to determine the required level of documentation for the architectural resource(s) to fulfill the provisions of the MOA, NEPA, Section 4(f), or other Section 106 documents.

### 2.2.31.4 Other Mitigation Actions

Coordinate with the appropriate local, state and federal agencies to implement the mitigation measures of the MOA and any other commitments as specified in NEPA, Section 4(f), or Section 106 documents.

Implement mitigation measures of the MOA and any other commitments as specified in NEPA, Section 4(f), or Section 106 documents. Examples of mitigation measures include HABS/HAER level documentation of buildings or structures, interpretive and/or educational programs, and streetscape enhancements.

Prepare the appropriate mitigation documentation and reports that detail the mitigation measures and committed project design features, measures, and alternatives that minimize adverse effects on historic resources.

#### Detail:

Specific Phase III work plans and research designs vary with resource type and are to be developed in close cooperation with the PHMC and the PennDOT Bureau of Design

Recordation materials may include Site Maps and Plans, Photographic Documentation, Pennsylvania State Historic Resource Survey Forms, National Register of Historic Places Forms, and HABS/HAER reports. All submitted recordation materials must meet the appropriate requirements as outlined in How to Complete the Pennsylvania Historic Resource Form (January 1991), the National Register Bulletins, Guide for the Preparation of Photographic Documentation in accordance with the Standards of the Historic Building Survey/Historic American Engineering Record (March 1991), Guide to Written Reports for the Historic American Building Survey (HABS) (October 1990), and Guide to Written Reports for the Historic American Engineering Record

Prepare a mitigation report that gives a brief description of the project, lists the resources with adverse effects, details the committed measures to minimize or avoid the adverse effects, lists the schedule and time frame for fulfilling the commitments, and details public and agency involvement.

#### WBS

### 2.2.99 Description: Other Preliminary Engineering and Environmental Analysis Activities

#### Objective:

This includes any other necessary PennDOT preliminary engineering and/or environmental analysis activities for the project which are not otherwise covered under the standard preliminary engineering and/or environmental analysis tasks.

#### SOW:

Provide work as detailed by the Department. See Below.

#### Detail:

#### WBS

### 2.3.1 Description: Level 1A CE

#### Objective:

This task consists of the assembly and approval of the Level 1A Categorical Exclusion Complete Part A, sheet A-1 and A-2, of the CEE form (Publication 294), which includes a Project Description and may also include a location map(s) and/or illustrations.

#### SOW:

Sheet C-1 will also require completion.

Submit the completed CEE form and pertinent supporting documents for review, concurrence, and approval to the District Office. If necessary, revise the CEE form and/or supporting documentation as directed.

**Detail:** The following items may effect this task:

- Severity of Environmental Impacts
- Availability of reports and studies of the proposed project or surrounding area

District Environmental Manager approves this level of Categorical Exclusion  
District office may schedule a scoping field view, depending on the type of improvements.

**WBS**  
**Objective:**  
**SOW:**

**2.3.2 Description: Level 1B CE**

This task consists of the assembly and approval of the Level 1B Categorical Exclusion Complete Part A and B, of the Categorical Exclusion Evaluation (CEE) form (Publication 294), that includes a Project Description and, may also include a location map(s) and/or illustrations.

Sheet C-2 will also require completion.

Submit the completed CEE form and pertinent supporting documents for review, concurrence, and approval to the District Office. If necessary, revise the CEE form and or supporting documentation as directed.

**Detail:** The following items may effect this task:

- Severity of Environmental Impacts
- Availability of reports and studies of the proposed project or surrounding area
- Special interest groups

District Engineer approves this level of Categorical Exclusion  
Central Office should be involved in the field view.

**WBS**  
**Objective:**  
**SOW:**

**2.3.3 Description: Level 2 CE**

This task consists of the assembly and approval of the Level 2 Categorical Exclusion Complete Part A and B, of the Categorical Exclusion Evaluation (CEE) form (Publication 294), which includes: Additional narrative will be included, as appropriate. Supplemental information will be attached to the CEE form or placed in the technical file, as appropriate.

Conduct secondary document research and review, and project site walkovers in order to complete an environmental evaluation.

Determine the level of Public and Agency Involvement required. Work items for Public Involvement have been defined in task 2.1.6.

Determine the need for permits required for all project resultant temporary and permanent actions. Work items for permit activities are defined under other work tasks.

Determine what if any supporting documents are required for the CEE. Work items to complete these supporting documents are defined under other work tasks.

Specify and define mitigation measures for impacted environmental issues listed under Section A, Environmental Evaluation Areas, listed above. Provide the general description and the location of any resources within or adjacent to the project work limits that are to be avoided during construction. Also provide measures to mitigate impacts to resources that can not be avoided.

Sheet C-2 will also require completion.

Submit the completed CEE form and pertinent supporting documents for review, concurrence, and approval to the District Office (Step 4 of the CE Process). If necessary, the consultant will revise the CEE form and or supporting documentation as directed. The District will submit the CEE to the Bureau of Design and FHWA for approval.

**Detail:** The following items may effect this task:

- Severity of Environmental Impacts
- Availability of reports and studies of the proposed project or surrounding area
- Special interest groups

Federal Highway Administration approves this level of Categorical Exclusion

Central Office and FHWA should be involved in field view.

**WBS**

**Objective:**

**SOW:**

**2.3.4 Description: Environmental Assessment (EA)**

This task consists of the assembly and approval of the Environmental Assessment (EA). Publication 363, Environmental Assessment Handbook applies to this task.

**2.3.4.1 Prepare EA**

Perform the following tasks:

1. Conduct detailed field work to identify and define environmental resources.
2. Coordinate with resource agencies.
3. Develop environmental features mapping.
4. Define criteria for the project engineering.
5. Develop all reasonable alternatives.
6. Develop alternatives as to avoid/minimize environmental impacts.
7. Analyze environmental impacts of project alternatives.
8. Refine project alternatives to avoid/minimize environmental impacts.
9. Determine the need for a public meeting. Conduct a public meeting, if necessary.
10. Maintain a written record of public and agency comments for Technical file.
11. Enter design criteria on EA form.
12. Make list of alternatives developed and complete Form 3B in accordance with EA Handbook.
13. Complete summary of impacts table and Form 3C in accordance with EA Handbook.
14. Reassess documentation level.
15. Develop conceptual mitigation measures to minimize impacts of the alternatives on the resources.
16. Review data and make recommendation on a Preferred Alternative.
17. Conduct a public meeting if requested.
18. Initiate 401/404 Process, if appropriate.
19. Hold permit coordination meeting with PADEP, USACOE and the USEPA.
20. Prepare Draft 401 Permit Application in coordination with regulatory agencies.
21. Identify and justify the Preferred Alternative on the EA Form.
22. Summarize mitigation commitments for Preferred Alternative on EA Form.
23. Complete EA Form in its entirety.
24. Transmit ten (10) copies of the completed EA to PennDOT for review/comment. Revise EA, as necessary.
25. Advertise for availability of a public hearing.

**2.3.4.2 Public Hearing**

Hold public hearing, if requested. Refer to Publication 295, Public Involvement Handbook.

Prepare presentation information and determine who will be making the presentation

**2.3.4.3 Revised EA**

Perform the following tasks:

1. Prepare response to comments, if requested, and compile final EA package.
2. Apply for 401 WQC and 404 Permit, if required

**2.3.4.4 Finding of No Significant Impact (FONSI)**

Perform the following tasks:

1. Prepare FONSI request for the selected alternative and include the following items: summary of EA availability and Public Hearing procedures; copy of comments received during comment period; public hearing transcript (if held); responses to all substantive comments received; and the completed EA Form.

2. Submit ten (10) copies of the FONSI request package to Originating Office  
The FHWA approves the Environmental Assessment

**Detail:**

This task may be affected by the amount of public controversy. Court recorder is required.

This may not be necessary

FONSI is approved by the FHWA

**WBS  
Objective:  
SOW:**

**2.3.5 Description: Environmental Impact Statement (EIS)**

This task consists of the assembly and approval of the Environmental Impact Statement (EIS)

**2.3.5.1 Draft EIS**

Perform the following tasks:

1. Obtain Technical Files
2. Assemble Technical Documentation
3. Prepare "stand alone" Technical Basis Reports (TBR) for specific technical subject areas from the raw data contained in the Technical Files. The following reports are mandatory if the project affects the resources they are intended for: Section 4(f) Evaluation, Section 106 Reports and a Farmlands Assessment Report. If permits are required, technical documentation should be prepared in such a way as to address or support permitting requirements.
4. Reproduction and distribution of TBR's for technical reviews to be done by the BOD, Environmental Manager, Central Office, FHWA and the cooperating agencies.
5. Begin writing chapters of the DEIS following the format recommended in the CEQ Regulations and outlined in Publication 278. The use of charts, tables and illustrations are emphasized as important formatting techniques to use to help the reader understand the information presented. Communication between the individual authors is essential while the research and writing are progressing. The Project Manager should insure that the communication is occurring as well as assigning an editor to work out inconsistencies in the final stages, before publication.
6. An internal interdisciplinary review of the working Pre-DEIS and its TBR's should be scheduled with the Environmental Manager, Project Engineer and team of experts prior to forwarding it to Central Office. The results of this review must be documented by the preparation of written review comments, drafting a statement that the document is not ready for a review by BOD, or approving the document. Revise the document, as necessary.
7. Submit 12 copies of the Pre-DEIS to BOD with accompanying cover letter that includes the comments from the Originating Office made in their review of the Pre-DEIS.
8. Attend interdisciplinary team meeting at Central Office to discuss revisions. Revise the Pre-Draft document based on the revisions. Submit two copies of the official DEIS to the Originating Office.
9. Prepare and submit Section 404 Permit Application to the ACOE, if applicable.

10. Print approximately 50 copies of the DEIS with a copy of the original title page signed by FHWA for the Originating Office for distribution. If directed, prepare cover letter and circulate copies to all on DEIS distribution list. Cover letter must include the following information: (1) 45-day comment period, beginning on the day the notice appears in the Federal Register and allowing for 30 days between the release of the DEIS and the Public Hearing and (2) Request that state agencies forward their comments to the Originating Office by the end of commenting period.

11. Publicize DEIS availability in accordance with Public Involvement procedures and EIS handbook.

### **2.3.5.2 Public Hearing**

Perform the following tasks:

1. Prepare presentation information, determine who will be making the presentation, and attend the Public Hearing
2. Obtain Public Hearing transcript and all other written correspondence from the originating office. Compile, number and index the statements received during the DEIS commenting period which will include all written and oral testimony from the Public Hearing as well as all other written correspondence received from agencies and the public. All original documentation shall be collected into a project file.
3. Organize a group of Project Team members which will review and prepare draft responses to all comments received. This will entail scheduling a meeting, identifying substantive comments and issues and, developing written responses with proposed actions to resolve issues. The documentation will be structured such that a copy of the correspondence or testimony (w/numbered comments) should appear on the left, annotated by corresponding responses on the right.
4. Request that BOD schedule a meeting to review comments on the DEIS and discuss preparation of the Final EIS. Forward copies of the Public Hearing transcript, comments and correspondence received, and the draft responses to meeting participants prior to meeting.
5. Finalize all responses and include in the Final EIS. Ensure that no issues remain outstanding.

### **2.3.5.3 Final EIS**

Perform the following tasks:

1. Prepare the Pre-Final EIS and the draft Mitigation Report. The Final EIS will recommend an alternative selected on the basis of public and agency input. At this time, the Comments and Coordination Report and any revisions to the technical documents should be completed. The draft Mitigation Report is an internal informational document and is not to be circulated with the FEIS.
2. Submit Pre-Final EIS to the Originating Office for an interdisciplinary review. Revise or modify as necessary.
3. Submit 12 copies of the Pre-Final EIS and the draft Mitigation Report to BOD. The accompanying cover letters should include the comments that the Originating Office made in its review of the Pre-Final EIS.
4. Participate in BOD interdisciplinary review. Revise the document based upon comments presented at this review meeting.
5. Provide the BOD with six copies of the Pre-Final EIS with a cover letter to the FHWA Division Office for PennDOT signature summarizing the interdisciplinary review.
6. Revise document based on FHWA review comments.
7. Print 26+ copies of the approved Final EIS and forward to BOD. Print enough copies for the Originating Office, FHWA Division Office, any person(s), organizations, or agencies that made substantive comments on the Draft EIS and/or requested copy of the FEIS, and public institutions in the project area. Prepare cover letters to transmit copies of the FEIS, requesting comments.
8. Summarize all comments on the FEIS and transmit to FHWA. A meeting with BOD may be warranted if specific issues remain unresolved.

9. Publicize FEIS availability in accordance with Public Involvement procedures.

**2.3.5.4 Record of Decision (ROD)**

Perform the following tasks:

1. Submit information to FHWA for preparation of the ROD.
2. After receiving the ROD from FHWA, prepare a PA Act 120/Section 2002 Finding, if applicable. Forward a draft to the originating office.
3. As appropriate, publicize the selected alternative officially announcing that the project will proceed to final design, and establish a tentative schedule for design and construction.

**Detail:**

The following items may effect this task:

- Severity of Environmental Impacts

Federal Highway Administration approves the circulation of this document.

This task may be affected by the amount of public controversy. Court recorder is required.

Approval to distribute this document comes from the Federal Highway Administration.

After receiving a signed copy of the ROD the Act120/Section 2002 findings must be submitted to the Secretary for approval.

**WBS  
Objective:  
SOW:**

**2.3.6 Description: Environmental Evaluation Report**

This task consists of the assembly and approval of the Environmental Evaluation Report.

Reference the CEE Handbook, Publication 295 for detail requirements.

Perform the following tasks:

1. Conduct detailed field work to identify and define environmental resources. Both quantitative and qualitative data will be collected. At this time, any pertinent reports will need to be prepared. Coordination with person(s), organizations, or agencies may be required to complete this task.
2. All reports should be submitted to PennDOT for review and revised as necessary. The Cultural Resource reports should be submitted to the PHMC to obtain the SHPO's concurrence with the report.
3. Develop a features map showing the various resources in the study area.
4. As appropriate, coordination with the resource agencies, municipal officials and others should be conducted.
5. Establish the engineering criteria in accordance with Publication 13M, Design Manual Part 2 and AASHTO's "A Policy on Geometric Design of Highways and Streets".
6. Develop study alternatives, in coordination with the Project Team. All reasonable alternatives that would meet the project purpose and need should be developed and analyzed. Attempts should be made to avoid and minimize impacts to natural, cultural and socioeconomic resources and take into consideration local land use planning and community goals as alternatives are developed.
7. Assess the impacts of each alternative on natural, cultural and socioeconomic resources. A reexamination of the design of alternatives to seek out alignment shifts or measures to reduce or eliminate impacts will be conducted. Both quantitative and qualitative assessments should be included in the impacts analysis.
8. Hold public meetings at various stages of development of the environmental document. In preparation of these meetings, the consultant may be required to identify appropriate locations and schedule the meetings. All public and agency comments presented at these meetings shall be included in the Technical Support Data files. Refinements to the alternatives should be made, as appropriate. Prepare presentation materials for the meetings as well as newsletters, brochures, fliers, posters, internet sites, etc.



9. Maintain coordination with the resource agencies throughout the project development process.
10. Complete Parts of EER form as the development of the project progresses.
11. Develop mitigation measures to minimize impacts of the alternatives on the resources. Coordination with the resource agencies, the public and others should be undertaken.
12. Identify the Preferred Alternative in consultation with the Project Team. The Preferred Alternative should be the most reasonable, least costly that fulfills the project needs and meets appropriate engineering design criteria while resulting in the fewest impacts to the natural, cultural and socioeconomic environment.
13. Develop presentation materials and attend public meeting. Present resolution of comments received at first public meeting. Document all comments gathered not only at this public meeting but through all public involvement activities.
14. Complete EER Form in its entirety and submit to Project Manager for review/comments. Revise as necessary and submit ten copies of the EER w/attachments to BOD.
15. Revise EER Form as necessary and only schedule a meeting if there are substantial or numerous comments. Address review comments and submit five copies to BOD for backcheck.
16. After BOD approves of document for circulation and if a public hearing is required, transmit the EER to the list of Act 120 agencies. Attend public hearing.
17. Prepare responses to the comments presented at the hearing as well as any submitted to PennDOT. Revise EER as necessary.
18. Submit copies of the EER to the BOD for concurrence/approval.

**Detail:**

Note: This task applies only to 100% State funded projects with significant environmental impacts. Act 120/Section 2002 findings must be submitted to the Secretary for approval.

**WBS**

**Objective:**

**2.3.7 Description: Section 4(f) Evaluations**

To determine if a transportation project will "use" a resource protected by Section 4(f) by documenting the impact, assuming there are no feasible and prudent total Section 4(f) avoidance alternatives, in a Section 4(f)

**SOW:**

**2.3.7.1 Inventory Section 4(f) Resources**

1. A file search is conducted at the PHMC to determine (a) historic and archaeological properties listed in the National Register of Historic Places and (b) historic sites previously determined to be eligible for the National Register located in the project area.
2. Complete identification and effect assessment (Section 106) process for historic properties.
3. Contact the local municipalities, local park authorities, the PGC, USFWS, NPS, DOI, DCNR among other agencies for information regarding the existence of public parks, recreation areas, and wildlife and waterfowl refuges in the study area.

**2.3.7.2 Programmatic 4(f)**

1. Programmatic 4(f) applicability should be determined by scoping the project.
2. Consult with the official(s) with jurisdiction to determine the applicability of Section 4(f) and to determine if use will occur.
3. Confirm that the Programmatic 4(f) is applicable, and obtain FHWA Division Office approval to apply Programmatic Section 4(f).
4. Identify and describe in detail the location and design of any alternative that totally avoids the use of all Section 4(f) resources. Determine whether any of these alternatives are feasible and prudent and, if a feasible and prudent total Section 4(f) avoidance alternative exists, it must be selected. If more than one, select one of them for the project. However, if one or more of the alternatives totally avoid the resource, but are not feasible and prudent, detailed documentation as to why they are not must be prepared.

5. All alternatives that were not considered as total Section 4(f) avoidance alternatives in the NEPA process must be identified. Thereby, identifying which alternatives are feasible and prudent and which are not. The direct and constructive uses of the Section 4(f) properties should be identified.
6. A comparison is made of the alternatives that use Section 4(f) resources. This comparison is done by shifting or modifying the design to avoid or minimize the use of each Section 4(f) resource. Also, the feasible and prudent alternative that results in the least harm to Section 4(f) resources is identified.
7. Mitigation measures such as noise walls, landscaping, replacement of parkland or any other items that reduce the use of the Section 4(f) resources should be presented.
8. The modified alternatives should be compared to determine which one results in the least harm to the Section 4(f) resources.
9. Receive written agreement from the official(s) with jurisdiction over the Section 4(f) resource regarding the assessment of impacts to the Section 4(f) resource(s) and the measures to minimize harm to the Section 4(f) resource(s).
10. Identify the feasible and prudent total Section 4(f) avoidance alternative, if one exists, or the one with the least harm to Section 4(f) resources.
11. Address FHWA Division comments on the Programmatic Section 4(f) documentation.
12. Receive FHWA Division Office final approval on the Programmatic Section 4(f) documentation.

**2.3.7.3 Individual 4(f)**

1. Consult with the official(s) with jurisdiction to determine the applicability of Section 4(f) and to determine if "use" will occur.
2. Identify and describe in detail the location and design of any alternative that totally avoids the use of all Section 4(f) resources. Determine whether any of these alternatives are feasible and prudent and, if a feasible and prudent total Section 4(f) avoidance alternative exists, it must be selected. If more than one, select one of them for the project. However, if one or more of the alternatives totally avoid the resource, but are not feasible and prudent, detailed documentation as to why they are not must be prepared.
3. All alternatives that were not considered as total Section 4(f) avoidance alternatives in the NEPA process must be identified. Thereby, identifying which alternatives are feasible and prudent and which are not. The direct and constructive uses of the Section 4(f) properties should be identified.
4. A comparison is made of the alternatives that use Section 4(f) resources. This comparison is done by shifting or modifying the design to avoid or minimize the use of each Section 4(f) resource. Also, the feasible and prudent alternative that results in the least harm to Section 4(f) resources is identified.
5. Mitigation measures such as noise walls, landscaping, replacement of parkland or any other items that reduce the use of the Section 4(f) resources should be presented.
6. The modified alternatives should be compared to determine which one results in the least harm to the Section 4(f) resources.
7. Receive written agreement from the official(s) with jurisdiction over the Section 4(f) resource regarding the assessment of impacts to the Section 4(f) resource(s) and the measures to minimize harm to the Section 4(f) resource(s).
8. Identify the feasible and prudent total Section 4(f) avoidance alternative, if one exists, or the one with the least harm to Section 4(f) resources.
9. Include all correspondence in the appendix of the Draft Section 4(f). Also, include a copy of the MOA, if applicable. The appendix of the Final Section 4(f) should include all formal comments received on the Draft Section 4(f) from the officials having jurisdiction over the Section 4(f) resources, the DOI, and any other applicable agencies.

**Detail:**

- A questionnaire could be used to begin gathering information on potential Section 4(f) resources.
- The project area is geographically large enough to include all Section 4(f) resources which may be used directly or constructively by the project.

The programmatic section 4(f) must be applicable.

Federal Highways Administration must approve this document.

PA Act 120 Compliance must also be performed.

The Individual Section 4(f) must be circulated.

For EIS's, the Draft Section 4(f) Evaluation is typically circulated as a separate section bound with the DEIS. The Final Section 4(f) Evaluation is typically included with the FEIS and approval of the Section 4(f) Evaluation is documented in the ROD.

For EA's, the Draft Section 4(f) Evaluation is typically circulated as a separate section bound with the EA. Comments on the Draft Section 4(f) Evaluation are typically addressed with the revised EA or in an attachment to the EA, and the conclusions of the Section 4(f) and the Section 4(f) approval are typically included in the FONSI.

For CEE's, the Draft Section 4(f) Evaluation is typically circulated as a separate document. The conclusions and approval are typically issued in a separate approval letter.

The Final Section 4(f) Evaluation will need to undergo a legal sufficiency review at the FHWA Region Office

**WBS**      **2.3.8 Description: Design Approval**

**Objective:** This task consists of authorized personnel granting Design Approval.

**SOW:** Submit the project plans to BOD at the time of receiving a signed CE/FONSI/ROD for location/design approval.

**Detail:** This task is dependent on having environmental clearance.

**WBS**      **2.3.99 Description: Other Environmental Clearance/Designation Activities**

**Objective:** This includes any other necessary PennDOT environmental clearance/designation activities for the project which are not otherwise covered under the standard environmental clearance/designation tasks.

**SOW:** Provide work as detailed by the Department. See Below.

**Detail:**

**WBS**      **2.4.1 Description: Surveys**

**Objective:** This task consists of providing the survey requirements associated with specific PennDOT projects designated for studies, reports, design and construction. Publication 122M applies to this task.

**SOW:** Surveys may consist of either; Conventional or Three- Dimensional Data Collection, or a combination, as directed by the District.

Base mapping must be supplemented with conventional survey applications.

The following subtasks are considered survey requirements, relative to the existing topography within specific project boundaries.

1. County Tax Records investigation(s) to obtain names and addresses of involved property owners.
2. Issue a "Notice of Intent to Enter" letter (Form 983) to each property owner by certified mail.
3. Obtain published horizontal and vertical control data for specific project use.
4. Prior to initiating surveys, develop a Traffic Control Plan for implementation during surveys within existing highways and streets.
5. Establish horizontal and vertical control relative to referenced monumentation.
6. Establish the preliminary mainline horizontal alignment in the field.

7. Obtain profiles and cross sections along each of the project's established roadways, baselines, and centerlines.
8. Field edit mapping topography, including the type, size, location, and elevation of existing storm drain and utility facilities; and evident property corners.
9. Establish existing stream baseline and obtain stream profile and cross sections.
10. Establish existing railroad baseline, tied to the centerline, and obtain railroad profile and cross sections, subject to the railroad's inspector and protection requirements.
11. Perform existing bridge structure surveys including type, size, location and pertinent elevation data.
12. Perform Map Accuracy Tests to verify spatial accuracy.
13. Flag horizontal alignment prior to the Design Field View.
14. Stakeout the approved Baselines and Centerlines.
15. Stakeout the Core Boring Hole locations.
16. Establish and record final Benchmarks and References for construction stakeout.
17. Set monumentation points on the Legal Right-of-Way Lines.
18. Field Survey Notebook compilations, numbering and content indexing.

**Detail:**

The following items may require an adjustment to the length of time it takes to complete this task.

- \* Excessive distance from the project to achieve tie-ins to establish vertical and horizontal control points.
- \* Unusual traffic control requirements needed to perform field survey work.
- \* Hostile denial of entry by property owner(s) to allow surveys to be performed.
- \* Special equipment and/or crafts required for waterway and tunnel surveys.
- \* Sight line clearing of dense vegetation for surveys
- \* Traverse line establishment for inaccessible area surveys.

**WBS**

**Objective:**

**SOW:**

**2.4.2 Description: Aerial Mapping**

This task includes the requirements to produce a controlled aerial mapping product in accordance with the industry standards and PADOT criteria.

When directed by the Department, aerial mapping shall be produced for project studies and designs.

The engineer/surveyor responsible for this work shall contact the District Project Manager and the Department Photogrammetry and Survey Division Chief to arrange an initial meeting to discuss and formulate the specific project's mapping requirements, before the start of any targeting or ground control work.

The procedures, as outlined in Part B of the Department's Survey and Mapping Manual, shall be followed for obtaining data, compilation and delivery of the final aerial mapping products, such as:

- \* Project Development
- \* Aerial Photography Acquisition
- \* Targeting and Control Survey
- \* Analytical Aerotriangulation
- \* Digital Map Compilation
- \* Digital Map Editing and Plotting
- \* Digital Mapping Accuracy Testing
- \* Electronic Media Preparation and Archiving
- \* Survey Field Book Data Entries

**Detail:**

The following items may require an adjustment to the length of time it takes to complete this task.

- \* Excessive distance from the project to achieve tie-ins to established vertical and horizontal control

points.

- \* Unusual traffic control requirements needed to perform field survey work.
- \* Hostile denial of entry by property owner(s) to allow surveys to be performed.
- \* Special equipment and/or crafts required for waterway and tunnel surveys.
- \* Sight line clearing of dense vegetation for surveys.
- \* Traverse line establishment for inaccessible area surveys.

**WBS**

**Objective:**

**2.4.3 Description: Preliminary Drainage Design**

This task includes all elements to develop preliminary drainage design with associated hydraulic computations

**SOW:**

1. Develop a storm sewer drainage system layout for the selected alignment using very preliminary calculations and engineering judgement.
2. Size major culvert cross pipes by determining approximate drainage area.
3. Determine the need for top of slope and toe of slope ditches.
4. Identify existing drainage restrictions and coordinate with stormwater management strategy.
5. Identify drainage structures which will require agency permitting.

Include the following on the Design Field View Plans:

- \* Minor drainage features (inlets and pipes)
- \* Major drainage structures
- \* Drainage ditches

**Detail:**

**WBS**

**Objective:**

**2.4.4 Description: Storm Water Management Design**

This task is the development of the preliminary storm water management design with associated hydraulic computations.

**SOW:**

1. Obtain local stormwater management plan and requirements.
2. Perform preliminary stormwater management analysis.
3. Coordinate with local stormwater management plan.
4. Determine the approximate size and location of the stormwater management basin.
5. Show the stormwater management basin on the design field view plan.

**Detail:**

**WBS**

**Objective:**

**2.4.5 Description: Cross Sections**

This task consists of preparing representative cross sections on all alignments considered in previous environmental studies at intervals such that approximate right-of-way limits can be defined. Earthwork calculations are included in this task.

**SOW:**

This task is the preparation of cross sections during preliminary engineering to assist in evaluating alternate alignments. It includes development of sections at critical locations to assess impacts on right-of-way limits, earthwork, existing structures, drainage controls, environmentally sensitive areas and other features that could be impacted by the alignment.

Following identification of the preferred alternate, the designer will prepare critical cross sections as part of the Design Field View Submission in accordance with Design Manual Part 1A.

**Detail:**

The following items may necessitate an adjustment to the time to complete this task:

- \* Number of alternatives and roadways
- \* Extent of interchanges
- \* Restrictions on available right-of-way

**WBS**

**Objective:**

**2.4.6 Description: Line and Grade**

This task consists of the development of the horizontal and vertical geometry. Publication 13M, Design Manual Part 2 applies to this task

**SOW:**

Prior to developing the vertical and horizontal geometry, all environmental and property constraints will be identified. The engineer will have a comprehensive understanding of all of the constraints

and will discuss these with the District prior to finalizing the geometry.

Secure sufficient field survey information to develop the final geometry. Develop all control points for the vertical and horizontal geometry. The engineer will analyze the compatibility and acceptability of the horizontal and vertical geometry.

The following work elements are required for the successful completion of this task:

1. Finalize horizontal and vertical geometry and submit plans in accordance with Publication 10A, Design Manual Part 1A.
2. Review for compliance with design criteria and environmental constraints.
3. Tabulate project control point coordinates (POT, PC, PT, and PI) for all roadways and channel relocations.
4. Apply the project traffic data to the design criteria to determine lane requirements, turning movements, and weaving movements.
5. Check final structure depths and adjust vertical alignment as necessary. If alternative structures are being utilized, use the worst case scenario.
6. Tabulate pavement grades and superelevation for development of cross sections.

**Detail:**

The following items may require an adjustment to the length of time it takes to complete this task:

- Number and type (complex, diamond, etc.) of interchanges
- Number of intersections
- Number of bridges, culverts, retaining walls, noise walls, etc. in project
- Number of driveways to be accommodated
- Number of side roads, auxiliary roads, service roads, and frontage roads
- Airport clearance if an airport is within a 2 mile radius
- The Department may want to combine the line and grade with the typical section submission

**WBS**

**Objective:**

**2.4.7 Description: Typical Sections**

This task consists of the development of typical sections. Publication 10A, Design Manual Part 1A and Publication 13M, Design Manual Part 2 apply to this task.

**SOW:**

The following items should be included on each typical section:

- Pavement width and cross slope (clarify lane widths to two decimal places to match existing pavement width)
- Pavement depths
- Shoulder type, width, depth and cross slope
- Median type, width and cross slope
- Embankment and cut slopes
- Swales and contiguous gutters as applicable
- Subbase drainage treatment
- Rate of superelevation
- Unusual design conditions (i.e., special treatment of subgrade, subbase or under-drain)
- Median barrier and guide rail
- Point of profile grade
- Centerline or baseline
- Limits of variable widths
- Base course and subbase widths and depths (and slopes if not parallel with pavement)
- Seeding treatment
- Station Control

The following work elements are required for the successful completion of this task:

1. Develop superelevation rates and place on the related typical section.
2. Develop pavement design and list on each typical section.
3. Label all items in accordance with the item description on the summary of quantities sheet.
4. Submit typical sections for review and approval by the Department.

**Detail:**

The following items may require an adjustment to the length of time it takes to complete this task:

- Number of roadways
- Number of interchanges
- Number of lane transitions
- Number of wall structures
- Number of special conditions (i.e. pavement width transitions, multiple shoulder treatments, multiple pavement types, & sidewalks)
- New or rehabilitation
- Disposition of existing pavement on rehabilitation projects
- Construction Type (new or rehabilitation)
- Combine typical section submission with line and grade submission
- Identify all design exceptions including connections to existing roadways

**WBS**

**Objective:**

**2.4.8 Description: Alignment Refinements/Enhancements**

This task consists of developing reasonable alignment refinements as they relate to the purpose and need of the project. Review these enhancements as they relate to project features, construction, design, right-of-way requirements, and PennDOT criteria.

**SOW:**

1. Develop line, grade and typical sections for various alignment alternatives. Design detail should be sufficient to determine project impacts and approximate construction costs.
2. Evaluate/review the alternatives based on environmental and engineering features.
3. Refine alternatives if appropriate.

**Detail:**

The level of detail in developing the alternatives and the extent of the evaluation will vary with project complexity and the significance of the environmental impacts.

**WBS**

**Objective:**

**2.4.9 Description: Preliminary Pavement Design**

This task consists of assembling design data and determining preliminary pavement and subbase types.

**SOW:**

Because the pavement design analysis is typically not completed until after the Design Field View Submission, approximate pavement and shoulder depths are shown on the typical sections in Preliminary Design.

Approximate depths are based on traffic volumes and the functional classification of the roadway.

**Detail:**

**WBS**

**Objective:**

**2.4.10 Description: Design Field View**

This task consists of the development, submission and approval of the Design Field View submission.

**SOW:**

1. Conduct design field view at the end of the preliminary engineering and within several weeks of the Design Field View Submission.
2. Evaluate the proposed alternatives under field conditions.
3. Solicit comments from review agencies for further project development.
4. Determine the preferred alternative if applicable.

**2.4.10.1 Submission Development**

Upon receipt of Design Approval, the drawings will be further refined and developed to prepare a submission for the Design Field View.

The submission will include the following:

1. Line and Grade
2. Alternate Interchange Schematics
3. Rough preliminary signing layout including the type of sign supports, paint markings, and other traffic control devices to determine if the project is operational and can be signed.
4. Typical sections
5. Structure locations
6. Approximate pavement depth



7. Mass diagrams of grading quantities
8. Draft of Soils and Geological Engineering Report and Profile.
9. Traffic Control Plan
10. Drainage and Preliminary Hydraulic studies
11. Service road justification
12. Utilities
13. Preliminary traffic signals plan
14. Comments from the District Safety Review Committee
15. Agreements with Cities and other Political Subdivisions

**2.4.10.2 Design Field View Approval**

1. Secure design field view approval for the preferred alternative developed during preliminary engineering.
2. Obtain written approval from the agency of authority to advance to final design.

**2.4.10.3 Mass Diagrams**

As alternate vertical and horizontal alignments are investigated, mass earthwork diagrams should be prepared in accordance with Publication 10A, Design Manual 1A. Those diagrams support the proposed preliminary design alternates.

The engineer should use mass diagrams to assist in developing the following project elements:

1. Roadway Line and Grade
2. Limits of Construction Sections
3. Temporary Roadways
4. Economical Waste and Borrow Sites
5. Sequence of Grading
6. Construction Staging
7. Estimated Unit Cost for Excavation

Mass diagrams are also to be provided as part of the Design Field View Submission.

**2.4.10.4 Design Exceptions**

Prepare the Design Exception Submission after the approval of the proposed design exception(s) by the District Safety Review Committee. Include this report in the Design Field View Submission. Address the following items as applicable:

- \* Provide project identification information
- \* Describe proposed work, design criteria, include typical sections
- \* Provide traffic information
- \* Identify substandard design elements
- \* Provide cost information with and without design exception
- \* Provide justification for retention of the design exception
- \* Evaluate accident history
- \* Describe remediation
- \* Provide collision diagrams and/or accident cluster diagrams
- \* Compare accident rates to statewide averages
- \* Describe mitigation measures
- \* Describe date and type of future upgrades
- \* Describe advantages and disadvantages of meeting full criteria

Complete the "Design Exception Data Checklist" Design Manual 1A. Include the following in the submission:

- \* Project location map
- \* Scoping field view minutes

- \* Accident analysis with collision diagrams
- \* Letter of recommendation from Safety Review Committee
- \* Plan, profiles, cross sections, typical sections if not previously included in the Design Field View Submission
- \* Bridge sufficiency rating and letter from District Bridge Engineer (if applicable)
- \* Ramp design sheet (Publication 13M, Design Manual Part 2), if applicable
- \* Photographs of existing conditions, if applicable

#### **2.4.10.5 Preliminary Erosion and Sedimentation Pollution Control Plan/NPDES Permit**

Preliminary Erosion and Sedimentation Control Plan includes the preliminary sizing and placement of major sediment control facilities (e.g. sediment basins). This effort must correspond with the stormwater management design to use the stormwater basins for erosion and sediment control during construction. Right-of-way requirements must be considered for sediment traps, collection ditches and drainage easements.

This task also includes the coordination with the County Conservation Districts and/or PADEP to review the conceptual approach to the erosion and sediment control design and permitting.

#### **2.4.10.6 Preliminary Roadside Development Plan**

Prepare a lump sum cost estimate for landscaping if landscaping is part of the project. Include this estimate in the Design Field View Submission.

Landscaping plans are not required as part of the Design Field View Submission.

#### **2.4.10.7 Preliminary Interchange/Intersection Design**

Interchange schematics are to be prepared in accordance with Publication 10A, Design Manual Part 1A.

These schematics are to be used to determine and evaluate the following factors:

1. System continuity
2. Traffic capacity and operational characteristics
3. Alternate structure types
4. Constructibility and safety
5. Preliminary construction cost estimates
6. Approximate right-of-way requirements
7. Environmental impacts

The number of alternate schematics will be determined, based on specific considerations of the project. From the evaluation of the alternates, a preferred interchange will be identified and then refined during development of the Design Field View Submission.

**Detail:**

The following items may require an adjustment to the length of time it takes to complete this task:

- Size of the Project
- Type of Project

The following items effect who has approval authority for the Design Field View:

- Exempt --> Central Office
- Non-Exempt --> Federal Highway Administration

Preliminary sizing of sediment basins and right-of-way requirements.

Coordination is needed with the agencies on the approach and permitting.

**WBS**

**Objective:**

**SOW:**

**Detail:**

#### **2.4.11 Description: Alignment Studies**

This task involves performing alignment studies.

Provide work as detailed by the Department. See Department Detail.

None.

**WBS**

**Objective:**

**SOW:**

**Detail:**

#### **2.4.12 Description: Background drawings**

This task involves developing background drawings.

Provide work as detailed by the Department. See Department Detail.

None.

**WBS 2.4.99 Description: Other Preliminary Roadway Design Activities**

**Objective:** This includes any other necessary PennDOT preliminary roadway design activities for the project which are not otherwise covered under the standard preliminary roadway design tasks.

**SOW:** Provide work as detailed by the Department. See Below.

**Detail:**

**WBS** **2.5.1 Description: Roadway Borings**

**Objective:** This task is the performance of roadway test borings by an approved test boring contractor in accordance with Publication 10A, Design Manual Part 1A, Publication 293, and Publication 222M.

**SOW:** The following work elements are required for completion of this task:

1. Coordinate the effort with the District Geotechnical Engineer (DGE) and the other engineering disciplines involved. Perform QA/QC on work processes and products.
2. Advertise and receive bids on a contract for performance of the test borings in accordance with Publication 222M, based on the approved PSDEP for preliminary (pre-final) design.
3. Submit a summary of the bids to the District for approval to award the contract and proceed with the work.
4. Upon notice to proceed, notify the affected public, and award and administer the test boring contract in accordance with Publication 222M.
5. Provide PennDOT-certified inspectors to oversee the field operations and log the borings as they are drilled.
6. Upon completion of the field work, verify contract terms have been met, close out the subcontract, and prepare and submit the subcontractor evaluation form.
7. Prepare a record copy of the engineer's logs for the borings for submission with the GER for Pre-Final Design.

**2.5.1.1 Soils and Geological Engineering Investigations**

The following work elements are required for the successful completion of this task:

1. Coordinate the effort with the District Geotechnical Engineer (DGE) and the other engineering disciplines involved. Perform QA/QC on work processes and products.
2. Perform an office investigation. Review background geological information and maps, boring logs, project files and reports, environmental documents, and right-of-way plans to describe the soil/rock/hydrologic setting. Contact Federal and State agencies with access to soils and geologic data.
3. Visit the site, interviewing local residents and engineers. Perform a detailed field reconnaissance and refine the soil/rock/hydrologic setting description.
4. Prepare a Problem Statement and Draft Exploration Plan (PSDEP) for the project in accordance with Publication 293. Determine the field and laboratory investigation needs. Assemble a soil/rock boring and testing plan. As warranted by the project, assemble a water/soil/sediment sampling and testing plan, a field instrumentation plan and a geophysical investigation plan. Submit the PSDEP for approval.
5. Upon approval of the PSDEP, coordinate with the driller performing the soil/rock drilling. Perform the water/soil/sediment sampling and testing.
6. Collect readings and present reduced data from the field instruments. Perform the geophysical investigation and document findings and conclusions.
7. Assemble soil/rock/water data generated from this investigation into a set of tables for use in the GER for Pre-Final Design.

**Detail:** This task should be performed in conjunction with the other tasks under the "Geotechnical" task.

The engineer should review the environmental documents to determine if a Health and Safety Plan (HASP) is required as part of the drilling contract. The District should alert the engineer if other

environmental constraints potentially could impact field operations.

If authorized by the DGE, installation of field instrumentation may be included with this contract.

Maintenance and protection of traffic should be in accordance with Publication 203M. The District should determine if a formal Traffic Control Plan (TCP) is required, if it is necessary to notify the affected public prior to performing the work, or any other special requirements are necessary.

The amount of boring in the drilling contract often varies from that assumed during earlier phases of design. The District should verify the adequacy of committed funds prior to approval of the contract.

This task should be performed in conjunction with the other tasks under the "Geotechnical" task.

Administration of the drilling contract and performance of the borings are performed under the "Roadway Borings" task. If authorized by the DGE, installation of field instrumentation may be included with that contract.

Laboratory soil testing must be performed by an AMRL-accredited facility, and should not be a part of the

**WBS  
Objective:**

**2.5.2 Description: Preliminary Geotechnical Engineering Report**

This task is the preparation of a Geotechnical Engineering Report for Pre-Final Design in accordance with Publication 10A, Design Manual Part 1A and Publication 293.

**SOW:**

The following work elements are required for the successful completion of this task:

1. Coordinate the effort with the District Geotechnical Engineer (DGE) and the other engineering disciplines involved. Perform QA/QC on work processes and products.
2. Perform analysis and design associated with embankment and cut slope construction, stormwater management facilities, drainage conduits, pavements, unsuitable materials, special geotechnical treatments, benching and transition zones, and geotechnical instrumentation for construction control.
3. Develop recommendations for use by the design team, and draft special provisions and details for construction.
4. Identify the anticipated scope of geotechnical investigations required during Final Design.
5. Prepare the GER for Pre-Final Design, presenting the recommendations and providing supporting documentation. Follow the outline in Publication 293, including a summary of the structure-related geotechnical investigations and reports for the project. Submit both a draft (95%) and a final (100%) version of the GER to the DGE.
6. Gather the information and materials necessary to assemble a preliminary soil profile plan. Obtain plan and profile sheets for the alignment from the design team. Obtain approval of the proposed graphics layout, scales and symbology.
7. Prepare the preliminary soil profile cover sheet and index sheet. Develop graphic logs of the borings. Prepare the profile sheets, showing the graphic boring logs and test results. Assemble the cover, index and profile sheets and submit a half-size copy as an appendix to the GER.

**2.5.2.1 Reconnaissance Soils and Geological Engineering Report**

The following work elements are required for completion of this task:

1. Coordinate the effort with the District Geotechnical Engineer (DGE), District Bridge Engineer, BOD Bridge Quality Assurance Division (BQAD), and the other engineering disciplines involved. Perform QA/QC on work processes and products.
2. Perform an office investigation. Review background geological information and maps, boring logs, project files and reports, environmental documents, and right-of-way plans to describe the soil/rock/hydrologic setting. Contact Federal and State agencies with access to soils and geologic data. Review previous geotechnical work performed in the vicinity of the structure.
3. Visit the site, interviewing local residents and engineers. Perform a detailed field

reconnaissance and refine the soil/rock/hydrologic setting description.

4. Determine the important site characteristics and evaluate their impact on the proposed construction.
5. Develop a plan for core boring and testing, based on the requirements of Design Manual Part 4. Prepare a tabular summary of the proposed drilling following the format of Publication 222M.
6. Prepare the RSGER, presenting the information required in Design Manual Part 4, with the boring and testing plan as an appendix. Submit the report for approval.

**Detail:** This task should be performed in conjunction with the other tasks under the "Geotechnical" task.

Emphasis in the preliminary (pre-final) phase is on developing roadway-related geotechnical recommendations, and providing guidance to allow design finalization.

Although Design Manual Part 3 has standards for graphic layout, scales, and symbology for the soil profile, variation is allowed upon approval by the DGE. This approval normally is given upon request and typically depends on the size and complexity of the project. The profile may also include selected cross sections if directed by the DGE.

The RSGER is a required part of the TS&L submission for each structure on the project.

Preliminary structure core borings may be performed prior to the RSGER if roadway borings are taken or if the complexity of structure or site conditions warrant.

**WBS  
Objective:**

**2.5.3 Description: Final Geotechnical Engineering Report**

This task is the preparation of the Final Geotechnical Engineering Report in accordance with Publication 10A, Design Manual Part 1A.

**SOW:**

This task consists of the development of the Final Geotechnical Engineering Report (GER) presenting final geotechnical design and construction recommendations for the project, along with supporting documentation, based on the subsurface conditions determined from the Final Design roadway investigations and any previous project geotechnical investigations. It also includes preparation of geotechnical reports for Structure TS&L Submissions (Reconnaissance Soils and Geological Engineering Reports) and Structure Foundation Submissions (Geotechnical Engineering Reports for Structures). Previous geotechnical investigations may include: Phase I Preliminary Design GER (prepared during EIS Step 4), Phase II Preliminary Design GER (prepared during EIS Step 5 or EA alternatives analysis), and Pre-Final Design GER (prepared for the Design Field View Submission).

The following work elements are required for the successful completion of this task:

1. Coordinate the geotechnical effort in Final Design. Coordinate with the District Geotechnical Engineer (DGE), BOCM Chief Geotechnical Engineer (CGE), District Bridge Engineer (DBE), BOD Bridge Quality Assurance Division (BQAD), and other disciplines involved in design. Attend meetings necessary for the design process. Perform QA/QC on all subtasks and deliverables.
2. Perform an office investigation. Review background geological information and maps, boring logs, project files and reports, environmental documents, and R/W plans to describe the soil/rock/hydrologic setting.
3. Visit the site, interviewing local residents and engineers. Perform a detailed field reconnaissance and refine the soil/rock/hydrologic setting description.
4. Prepare the Problem Statement and Draft Exploration Plan (PSDEP) for the project in accordance with Publication 293. Determine the field and laboratory investigation needs. Assemble a soil/rock boring and testing plan, water/soil-sediment sampling and testing plan, a field instrument plan and a geophysical investigation plan based on project needs.
5. Prepare a Reconnaissance Soils and Geological Engineering Report (RSGER) for each TS&L submission, in accordance with Publication 15M, Design Manual Part 4.
6. Perform the soil/rock boring investigation. Notify the affected public. Locate the borings in the field. Assemble, advertise, award and administer the test boring contract in accordance with Publication 222M.

7. Administer the soil/rock testing program. Perform the water/soil sediment sampling and testing.
8. Collect readings and present reduced data from field instruments. Perform the geophysical investigation.
9. Perform analysis and design associated with embankment and cut slope construction, storm water management facilities, culverts and conduits, retaining structures, bridges, other structures, pavements, unsuitable materials, special geotechnical treatments, benching and transition zones, and geotechnical instrumentation for construction control. Develop recommendations for use by the design team and special provisions and details for construction.
10. Prepare a Geotechnical Engineering Report for foundations at each structure in accordance with Design Manual Part 4.
11. Prepare the GER for Final Design, presenting the recommendations and providing supporting documentation and following the outline in Publication 293. Prepare the "Subsurface Profile" in accordance with the requirements of Publication 14M, Design Manual Part 3. Submit both a draft (95%) and a final (100%) version of the GER to the DGE and CGE.
12. Review the plans, specifications and estimates for construction of the project, to verify proper implementation of the geotechnical recommendations and incorporation of the special provisions and details.

#### **2.5.3.1 Soil Profile**

This task consists of development of the soil profile plans which are submitted with the Final Geotechnical Engineering Report (GER) and Construction Plans for the project.

The following work elements are required for the successful completion of this task:

1. Coordinate the effort with the District Geotechnical Engineer and the other engineering disciplines involved. Perform QA/QC on the plans prior to delivery.
2. Gather the information and materials necessary to assemble the plan. Obtain plan and profile sheets for the approved alignment from the design team. Collate logs for the roadway borings. Tabulate soil test results. Obtain approval of the proposed graphics layout, scales and symbology.
3. Prepare the cover sheet and index sheet.
4. Develop graphic logs of the borings.
5. Prepare the profile sheets, showing the graphic boring logs and test results.
6. Assemble the cover, index and profile sheets and submit a copy for review and approval. This typically is included as part of the draft GER submission.
7. Upon approval, sign and seal the Soil Profile Plans as required, retain one half-sized set for submission with the Final GER, and forward the originals to the project engineer for inclusion with the PS&E Submission.

**Detail:**

Borings must be performed by an approved drilling contractor. Installation of field instrumentation may be included with that contract. The engineer should review the environmental documents to determine if a Health and Safety Plan (HASP) is required as part of the drilling contract. The District should alert the engineer if other environmental constraints potentially could impact field operations.

Maintenance and protection of traffic for the drilling program should be in accordance with Publication 203M.

The District should determine if a formal Traffic Control Plan (TCP) is required, if it is necessary to notify the affected public prior to performing the work, or any other special requirements are necessary.

The amount of boring in the drilling contract often varies from that assumed during earlier phases of design. The District should verify the adequacy of committed funds prior to approval of the contract.

Laboratory soil testing must be performed by an AMRL-accredited facility, and should not be a part of the drilling subcontract.

Emphasis is on modifications to geotechnical roadway recommendations resulting from changes during final design, implementation of design guidance, and finalization of special provisions and details for construction.

The Soil Profile is an appendix to this report.

Soil Profiles should be performed in conjunction with the "Final Geotechnical Engineering Report" task, which includes performance of the subsurface investigation for final design.

Although Design Manual Part 3 has standards for graphic layout, scales, and symbology, variation is allowed upon approval by the DGE. This approval normally is given upon request and typically depends on the size and complexity of the project. The profile may also include selected cross sections and selected structure borings if directed by the DGE.

**WBS  
Objective:**

**2.5.4 Description: Structure Boring**

This task is the performance of core borings for structures by an approved test boring contractor in accordance with Publication 15M, Design Manual Part 4, Publication 293 and Publication 222M.

**SOW:**

The following work elements are required for completion of this task:

1. Coordinate the effort with the District Geotechnical Engineer (DGE), District Bridge Engineer, BOD Bridge Quality Assurance Division (BQAD), and the other engineering disciplines involved. Perform QA/QC on work processes and products. Verify that roadway alignment and structure TS&L have not changed since approval of the Reconnaissance Soils and Geological Engineering Report (RSGER).
2. Advertise and receive bids on a contract for performance of the test borings in accordance with Publication 222M, based on the boring program in the approved TS&L for the structure.
3. Submit a summary of the bids to the District for approval to award the contract and proceed with the work.
4. Upon notice to proceed, notify the affected public, and award and administer the test boring contract in accordance with Publication 222M.
5. Provide PennDOT-certified inspectors to oversee the field operations and to prepare the field logs of the borings as they are drilled.
6. Prepare water testing required to allow analysis of foundation conditions. Tabulate the results of the testing
7. Upon completion of the field work, verify contract terms have been met, close out the subcontract, and prepare and submit the subcontractor evaluation form.
8. Prepare a record copy of the engineer's logs for the borings for submission with the Foundation Report for the structure.

**Detail:**

Normally, TS&L approval is required for bridges and culverts prior to performance of this task. If the project includes more than one structure, all structures should be drilled under one contract. This will require coordination with the drilling contractor, as not all structure approvals will be issued simultaneously.

The engineer should review the environmental documents to determine if a Health and Safety Plan (HASP) is required as part of the drilling contract. The District should alert the engineer if other environmental constraints potentially could impact field operations.

Maintenance and protection of traffic should be in accordance with Publication 203M. The District should determine if a formal Traffic Control Plan (TCP) is required, if it is necessary to notify the affected public prior to performing the work, or any other special requirements are necessary.

The amount of boring in the drilling contract often varies from that assumed during earlier phases of



design. The District should verify the adequacy of committed funds prior to approval of the contract.

The District should ensure that the right amount and type of rock and soil tests are included in the contract.

**WBS  
Objective:**

**2.5.5 Description: Final Structure Foundation Report**

This task includes all items necessary to prepare the Final Structure Foundation Report in accordance with Publication 15M, Design Manual Part 4.

**SOW:**

This task consists of the development of a Final Structure Foundation Report for each structure in the project. The report presents recommendations for design and construction of the structure foundations, and provides geotechnical data in support of the recommendations.

The following work elements are required for completion of this task:

1. Coordinate the effort with the District Geotechnical Engineer (DGE), District Bridge Engineer, BOD Bridge Quality Assurance Division (BQAD), and the other engineering disciplines involved. Perform QA/QC on work processes and products.
2. Perform an office investigation, reviewing available geotechnical reports for the project including the Reconnaissance Soils and Geological Engineering Report (RSGER) for the specific structure. Review the Preliminary Foundation Report. Obtain the record copy of the engineer's logs for the borings drilled for the structure.
3. Perform the soil, rock, and water testing required to allow analysis of foundation conditions. Tabulate the results of the testing.
4. Perform analyses to determine the preferred foundation for the structure, and document the rationale for the preference. Include cost comparisons for foundation alternatives. Prepare a tabular summary of the site conditions and foundation recommendations at each substructure location.
5. Identify and address special site conditions through appropriate design. Develop foundation notes, construction details, and special provisions as warranted.
6. Prepare plotted boring log sheets for the core borings used in foundation analysis and design.
7. Prepare the Final Foundation Report for the structure, presenting the information required in Design Manual Part 4, with the tabular summary of foundation recommendations, foundation notes, construction details, special provisions, and plotted boring log sheets appended. Submit the report, with the other documentation required by Design Manual Part 4, for approval.
8. Prepare quality assurance (QA) form for foundations.

**2.5.5.1 Preliminary Structure Foundation Report**

The following work elements are required for completion of this task:

1. Coordinate the effort with the District Geotechnical Engineer (DGE), District Bridge Engineer, BOD Bridge Quality Assurance Division (BQAD), and the other engineering disciplines involved. Perform QA/QC on work processes and products.
2. Perform an office investigation, reviewing available geotechnical reports for the project including the Reconnaissance Soils and Geological Engineering Report (RSGER) for the specific structure. Obtain the record copy of the engineer's logs for the borings drilled for the structure.
3. Perform the soil and rock testing required to allow analysis of foundation conditions. Tabulate the results of the testing.
4. Perform analyses to determine the preferred foundation for the structure, and document the rationale for the preference. Include cost comparisons for foundation alternatives. Prepare a tabular summary of the site conditions and foundation recommendations at each substructure location.
5. Identify and address special site conditions through appropriate design. Develop foundation notes, construction details, and special provisions as warranted.

6. Prepare plotted boring log sheets for the core borings used in foundation analysis and design.
7. Prepare the Preliminary Foundation Report for the structure, presenting the information required in Design Manual Part 4, with the tabular summary of foundation recommendations, foundation notes, construction details, special provisions, and plotted boring log sheets appended. Submit the report, with the other documentation required by Design Manual Part 4, for approval.

**Detail:** Structure Boring Task must be completed prior to this task, unless the District determines sufficient information is available from the RSGER to determine the structure foundation.

Subsurface profiles and cross sections are required in complex conditions and when requested by the District.

The plotted structure boring log sheets become part of the structure plans after approval.

**WBS**  
**Objective:**

**2.5.99 Description: Other Geotechnical Activities**

This includes any other necessary PennDOT geotechnical activities for the project which are not otherwise covered under the standard geotechnical tasks.

**SOW:**  
**Detail:**

Provide work as detailed by the Department. See Below.

**WBS**  
**Objective:**  
**SOW:**

**2.6.1 Description: Preliminary ROW Activities**

This task includes the requirements as stipulated under Publication 14M, Design Manual Part 3. A preliminary right-of-way plan will be prepared for all Department projects where the construction activities require property acquisition beyond the footprint of existing Department of transportation property. The right-of-way plan shall be prepared in accordance with the requirements and contents as stipulated in Design Manual Part 3.

The right-of-way plan(s) is/are subject to a plan check review by the District Right-of Way Unit, Chief of Surveys and the Central Office Bureau of Design, Field Liaison Engineer, Highway Quality Control Division. The plan and all supporting data shall be submitted to the District in advance of the scheduled plan check review meeting. The person(s) responsible for the plan preparation will attend the review meeting. Departments and comments stemming from the plan review shall be addressed and incorporated in the subsequent right-of-way plan submission.

The right-of-way plan will be prepared on mylar with appropriate Pennsylvania professional engineer and surveyor seals affixed.

Until NEPA clearance has been obtained, the Department may not perform final negotiations and acquisitions of property.

A right-of-way certificate is issued when the Department has adequately acquired right-of-way to allow project construction.

**2.6.1.1 Right-of-Way and Deed Research**

All public legal right-of-way and private right-of-way within the project area shall be determined from plans and documents recorded in the County Courthouse, or on file in the offices of: PennDOT District, Municipality and involved agency. Copies of all right-of-way record data will be obtained, where available, and included with the R/W plan submission to the District.

The existing public and private right-of-way corridors shall be delineated and labeled on the highway plans. A description of, and the establishment record data for right-of-way, shall be included in the project General Notes for all involved public highways. When recorded subdivision plans exhibit public right-of-way corridors, determinations must include whether the local municipality has, or has not, adopted them.

Property owner research is generally initiated by reviewing the tax maps and records at the County Tax Assessors' Office. Once the highway project location is identified on the tax map(s), the anticipated property involvement's can be listed by tax map and parcel numbers. With this information, the tax assessment files can be researched to provide: Owners name and address, Deed Book and Page Number, parcel area, list of property improvements, and the assessed value of the property. Copies of the tax maps and assessment records may be purchased for subsequent use by the designer, and inclusion as backup data to the R/W plan submissions.

Based on the obtained tax record information, the records in the Recorder of Deeds office shall be researched to verify, or update, the involved property(s) ownership, deed book and page number. Upon verification of property ownership, property investigation shall continue to ascertain if any exceptions, adverse conveyances, easement rights, sale agreements, or subdivision plans associated with property are recorded. When the property research reaches a point that exhibits the best available records available, copies of the involved deeds will be purchased from the Recorder of Deeds for plotting and project property matrix map compilation.

When metes and bounds descriptions of the deed are vague, or lacking information, prior chain of title deed descriptions shall be reviewed and copied when their descriptions provided better clarification for boundary plotting purposes. If overlaps, or gaps, result on the property matrix map due to deed metes and bounds descriptions plots, the District Right-of-Way Administrator should be notified of these conditions, and to solicit his/her direction in resolving these issues.

#### **2.6.1.2 Property Plats**

Individual property plats will be prepared for all parcels with takes on highway projects, unless otherwise directed by the District.

The property plat shall contain all information necessary to provide a clear understanding, by all parties, of the existing conditions and the highway's taking requirements for the parcel, in accordance with Design Manual Part 3, Guidelines and Stipulations.

The proposed highway affects on the individual property plat must be consistent with those shown on the highway right-of-way plan sheet, however, the showing of details and labels beyond the boundary lines of parcel shall be avoided when practical.

**Detail:**

The following are considered as special requirements beyond the standard Scope of Work for Right-of-Way Plan preparations. The situations will be specific to only certain projects, as required and directed by District.

- \* Individual Property Boundary Surveys
- \* Preparation of Property Plats for Board of Viewer's Actions ( except Philadelphia County)
- \* Combination City of Philadelphia Board of View Plans and Right-of-Way Plans
- \* Preparation of Property Boundary Legal Description
- \* Right-of-Way Plan Revision

The following are considered as special requirements beyond the standard Scope of Work for Right-of-Way Plan preparations. The situations will be specific to only certain projects as required and directed by the District.

- \* Legal Right-of-Way Record data unavailable.
- \* Deed Unrecorded.

The following are considered as special requirements beyond the standard Scope of Work for Right-of-Way Plan preparations. The situations will be specific to only certain projects, as required and directed by District.

- \* Individual Property Boundary Surveys
- \* Preparation of Property Plats for Board of Viewer's Actions ( except Philadelphia County)
- \* Combination City of Philadelphia Board of View Plans and Right-of-Way Plans
- \* Preparation of Property Boundary Legal Description
- \* Right-of-Way Plan Revision

**WBS**

**Objective:**

**SOW:**

#### **2.6.2 Description: Gap ROW Plan**

This task is the preparation of a right-of way plan to expedite early acquisition of certain properties within a project's overall required right-of-way corridor.

When determined that the projects' property takings will require relocation of people, or businesses, or hardship circumstances, the Department may direct the preparation of a GAP Right-of-Way Plan. A GAP Right-of-Way Plan provides authorization to acquire right-of-way to allow the Department to expedite claim settlement and facilitate early relocations of owners, tenants, and/or businesses.

The GAP Right-of-Way Plan will be prepared in the same format and content requirements of a Final Right-of-Way Plan, except that the plans and profiles sheet coverage and property plots, when directed by the District, need only to be included for the area(s) where the GAP Plan taking

claim(s) are applicable.

**Detail:** The following are considered as special requirements beyond the standard Scope of Work for Right-of-Way Plan preparations. The situations will be specific to only certain projects, as required and directed by District.

- \* Individual Property Boundary Surveys
- \* Preparation of Property Plats for Board of Viewer's Actions ( except Philadelphia County)
- \* Combination City of Philadelphia Board of View Plans and Right-of-Way Plans
- \* Preparation of Property Boundary Legal Description
- \* Right-of-Way Plan Revision

**WBS** **2.6.3 Description: Right-of-Way Appraisals**

**Objective:** This task is the determination of property value appraisal for involved parcel takings and claim offers. This work is performed by the Department's in-house staff, or by contract with certified appraisal agency.

**SOW:** Upon the identification that a property will be involved in "takings" for a highway project, a copy of the deed of record and the tax assessment record will be obtained for reference. A preliminary site reconnaissance shall be made for the property to obtain: photographs, record conditions of topography and improvements, contact property owner and inform him/her of anticipated highway/property involvements, and to solicit his/her pertinent information relative to conditions or issues that may affect the current property assessment value.

Develop appraisal problem analyses (APAs).

Current/recent property sales within the locale of the anticipated property takings are examined to establish benchmark values for land, buildings and other improvements, by types and conditions. A fair market value estimate of the property's current conditions is prepared based upon collected data and standard appraisal practices.

Based upon the property's "take" requirements as exhibited on the project's right-of-way plan, individual property plat, and the right-of-way claim block information, prepare a fair market value appraisal estimate for the involved taking(s).

A report is submitted to the District Right-of-Way Administrator which contains: property research report, basis for established fair market values, appraisal value of current property, and appraisal value of taking(s), by types of, and report of resulting property conditions, subject to affects of taking(s).

**Detail:** The following are considered as special requirements beyond the standard Scope of Work for Right-of-Way Plan preparations. The situations will be specific to only certain projects, as required and directed by District.

- \* Property Owner undetermined
- \* Property Owner has out-of-state residency
- \* Property Owner uncooperative

Add on claims involving relocations, relocation assistance interviews and inventory of improvement must be completed first.

**WBS** **2.6.99 Description: Other Preliminary ROW Activities**

**Objective:** This includes any other necessary PennDOT preliminary right-of-way activities for the project which are not otherwise covered under the standard preliminary right-of-way tasks.

**SOW:** Provide work as detailed by the Department. See Below.

**Detail:**

**WBS** **2.7.1 Description: Hydrologic and Hydraulic Report**

**Objective:** This task consists of the preparation of Hydrologic and Hydraulic reports for all bridges, culverts and longitudinal encroachments to size waterway openings properly and to satisfy permitting requirements. Publication 13M, Design Manual Part 2; Publication 15M, Design Manual Part 4; and PADEP Chapter 105 apply to this task.

**SOW:** A separate Hydrologic and Hydraulic Report is required for each hydraulic structure. However, dual structures or structures located within the same hydraulic system should be combined into one report.

The following work elements are required for the successful completion of this task:

1. Gather existing information to be used in the development of the hydrologic and hydraulic analyses and in the preparation of the H&H Report.
2. Perform a hydrologic analysis of the watershed at each proposed crossing using one or more of the Department approved methodologies. The use of a particular model shall be justified as valid for the situation in which it is being used. All assumptions and/or limitations of each model shall be clearly identified and referenced. Multiple hydrologic models are recommended to assist in validating the selected approach. An analysis of the flood history according to the guidelines contained in Design Manual Part 2 should also be considered.
3. Perform a hydraulic analysis for each proposed crossing including alternatives, if necessary, using one or more of the Department approved hydraulic models. The use of a particular model shall be justified as valid for the situation in which it is being used. All assumptions and/or limitations of each model shall be clearly identified and referenced. Where a Flood Insurance Study has been established by FEMA, the hydraulic data included in the study should be utilized to the maximum extent deemed appropriate. Each proposed alternative shall be modeled to assist in the justification for the selected alternative. The hydraulic model shall extend a sufficient distance upstream and downstream to adequately evaluate the potential impacts due to the proposed construction. The hydraulic model should be used to compare existing and proposed conditions with respect to water surface elevations and channel velocities for the design discharge rate(s), including the 500-year event for the scour evaluation and the "overtopping event" for the risk assessment.
4. Evaluate the scour potential at bridge abutments and piers in accordance with Design Manual Part 4. Evaluate the erosion potential at culvert outlets in accordance with HEC-14.
5. Evaluate the channel stability and design countermeasures, if needed.
6. Perform a risk assessment or analysis for each applicable waterway structure or encroachment alternative.
7. Evaluate the hydraulic impacts as a result of temporary encroachments and/or permanent bank protection, if applicable.
8. Prepare the Hydrologic and Hydraulic Report following the general outline described in Design Manual Part 2.
9. If applicable, prepare a Conditional Letter of Map Revision (CLOMR) in accordance with FEMA regulations. The scope of work for the preparation of the CLOMR is not included herein and should be developed prior to initiating the work.

**Detail:** The following items may require an adjustment to the length of time it takes to complete this task.

- \* Involvement with the federal and state resource agencies.
- \* Involvements with Municipal Officials and Local Public Interest
- \* Involvement with the regional River Basin Commissions.
- \* Involvement with FEMA, relative to existing floodway data.

**WBS**

**Objective:**

**2.7.2 Description: Preliminary Type, Size and Location (TS&L)**

This task consists of the assembly of Type, Size and Location studies and development of recommendations for proposed structures within the project. Publication 15M, Design Manual Part 4 apply to this task.

**SOW:**

Review any previous studies or preliminary designs with respect to the selection of structure type, span arrangements, horizontal and vertical clearances, design controls and type section. Coordinate with the District on the logical selection of span arrangements, types of piers, and structure types suitable at each location.

The preliminary structure designs will be performed at a stage when the highway alignment and profile are well defined. Review structure requirements with the District prior to Design Field View (Line and Grade) submission and approval.

The work elements are required for the successful completion of this task:

1. Develop a location plan showing the feature to be crossed or retained, design controls and regulated areas
2. Identify possible pier and abutment locations

3. Evaluate geotechnical conditions to identify potential foundation types
4. Recommend locations for structure foundation borings
5. Evaluate constructability, vertical and horizontal clearances and site constraint issues in determining the most suitable structure design for the particular location
6. Prepare cost estimates for alternative structure designs
7. Prepare justification for recommended alternative
8. Prepare transmittal letter, plans and report for TS&L submission

**Detail:** The following items may require an amendment to the standard statement of work:

- Request for Pre-TS&L submission(s)
- Number of Bridges, Culverts, Retaining Walls, Sound Walls, etc., in the project
- Number of alternatives to be studied for each structure

**WBS**

**Objective:**

**2.7.3 Description: Final Type, Size & Location (TS&L) Report**

This task consists of the assembly of Type, Size and Location studies and development of recommendations for proposed structures within the project. Publication 15M, Design Manual Part 4 apply to this task.

**SOW:**

Review any previous studies or preliminary designs with respect to the selection of structure type, span arrangements, horizontal and vertical clearances, design controls and typical section. Coordinate with the District on the logical selection of span arrangements, types of piers, and structure types suitable at each location.

The preliminary structure designs will be performed at a stage when the highway alignment and profile are well defined. Review structure requirements with the District prior to Design Field View (Line and Grade) submission and approval.

The following work elements are required for the successful completion of this task:

1. Develop a location plan showing the feature to be crossed or retained, design controls and regulated areas
2. Identify possible pier and abutment locations
3. Evaluate geotechnical conditions to identify potential foundation types
4. Recommend locations for structure foundation borings
5. Evaluate constructability, vertical and horizontal clearances and site constraint issues in determining the most suitable structure design for the particular location
6. Prepare cost estimates for alternative structure designs
7. Prepare justification for recommended alternative
8. Prepare transmittal letter, plans and report for TS&L Submission

**Detail:**

Suggested Items:

- Number of Bridges, Culverts, Retaining Walls, Sound Walls, etc. in the project
- Number of alternatives to be studied for each structure

**WBS**

**Objective:**

**2.7.4 Description: Waterway Permits**

This task is the coordination with the appropriate environmental agencies and the preparation of permit applications.

**SOW:**

**2.7.4.1 105 Permit Application/401 Water Quality Certification (WQC)**

1. Coordinate with the PADEP to present the water obstructions and encroachments associated with the project. Determine any specific information requirements that will be needed for the Chapter 105 permit review.

2. Prepare a summary of the information requirements needed for the permit review.

3. Prepare the Chapter 105 Permit Application package. This will include, but not limited to: the General Information Form, Chapter 105 Application (signed and notarized), location map, Act 14 Notification Letters with return receipts, floodplain and stormwater management consistency letters, Environmental Assessment Form, H&H reports, E&S approval letter, etc.

4. Provide written responses to any PADEP comments received on the permit package.

**2.7.4.2 105 Permit Approval**

Coordinate any additional information requirements with the PADEP and PennDOT. The 401 WQC will be issued by the PADEP with the Chapter 105 Permit.

**2.7.4.3 404 Permit Application**

Coordinate the information requirements with the USACE and PADEP for the Section 404 Permit during NEPA/404 Projects. Non-NEPA projects do not require a separate Section 404 Permit, as



the PADEP Chapter 105 Joint Permit includes a simultaneous submission for the Section 404 Permit. For the NEPA/404 project, prepare a written request for the 401 WQC. The project EIS or EA will be the supporting document for this request.

Complete the Environmental Assessment Form contained in the PADEP Chapter 105 Application in order to obtain the 401 WQC. The section 404 Permit is not valid until the WQC is granted.

#### **2.7.4.4 404 Permit Approval**

Coordinate with the USACE to obtain the Section 404 Permit. Provide any additional information requirements needed for review by the USACE

**Detail:**

Determine the information requirements for the Chapter 105 Application. Coordinate with the PADEP. coordinate with PennDOT and the agencies to determine the permit strategy to be employed. Prepare the information requirements for the 401 WQC, Section 404 Permit and the Environmental Assessment Form.

Submit a request for the 401 WQC.

**WBS**

**Objective:**

**SOW:**

#### **2.7.5 Description: Bridge Inspection**

Inspect, load rate, appraise and inventory all types of structures and perform follow-up work as directed.

##### **I. GENERAL**

**A. References:** All work is to be in accordance with these guidelines and the following references:

1. National Bridge Inspection Standards (NBIS).
2. AASHTO Manual for Maintenance Inspection of Bridges 1983, including the 1990 revision.
3. FHWA Publications:
  - a. Bridge Inspector's Training Manual 90, July 91, 1995 revision, and its updates.
  - b. Culvert Inspection Manual, Report No. FHWA-IP-86-2.
  - c. Inspection of Fracture Critical Bridge Members, Report No. FHWA-IP-86-26.
  - d. Recording and Coding Guide for the Structure Inventory and Appraisal of Nation's Bridges, Report No. FHWA-PD-96-001, December 95.
  - e. Bridge Inspector's Manual for Movable Bridges, FHWA-IP-77-10.
4. Department Publications and Policy:
  - a. Bridge Management System (BMS) Coding Manual, Department Publications 100A October 93, and its updates.
  - b. Manual for Inspecting Bridge for Fatigue Damage Conditions, Research Project No. 85-02.
  - c. Bridge Safety Inspection Manual, Policies and Procedures, Publication 238 January 1989, and its updates.
  - d. Design Manual, Part 4, Structures, August 1996 and its updates.
  - e. Active Bureau of Design Strike-off Letters.
5. Department Inspection and BMS Forms:
  - a. BMS Coding Forms D-491 and their updates or a printout of the individual structure records from BMS.
  - b. BMS Inspection Forms D-450 Series and their updates.

## **II. TYPES OF SAFETY INSPECTION WORK**

### **A. Initial (NBIS) Inventory and Inspection**

Insufficient or no data is available in BMS. An inspection fulfilling NBIS requirements has never been performed. For bridges carrying highway traffic, a separate Bridge Load Rating work item must also be done and its results incorporated into this initial inspection report. See section III.E.

### **B. Periodic (Routine) NBIS Inspection**



An NBIS Inspection has been previously completed within the last two (2) years and that inspection report and/or documentation is available.

**C. Partial (Interim) Inspection** A NBIS Inspection has been previously completed. The structure is included in the BMS and the previous inspection report is available. Perform an inspection that is usually limited to portion(s) of the structure which require increased frequency of inspections.

**D. Supplemental (Follow-up) Inspection**

Perform in-depth work beyond the scope of periodic inspections, focusing on the entire structure or specific components as authorized by the Department. In-depth tasks may include the following: Non-Destructive Testing (except dye penetrant), Laboratory Analysis, Geotechnical sampling and testing, structure instrumentation, and underwater inspection. The scope of work authorizing a Supplemental Inspection should have provisions for these tasks if applicable.

**E. Bridge Load Rating**

Perform a structural analysis and load rating of the structure to determine its ability to carry PA's legal loads.

**F. Critical Deficiency Meetings**

Coordinate and conduct a meeting with local bridge owners to discuss critical structure deficiencies found during the recent inspections.

**III. INSPECTION REQUIREMENTS**

**A. Initial NBIS Inventory and Inspection**

1. Conduct a complete inventory and field inspection.
2. Complete BMS Inventory Coding Forms D-491 and Inspection Forms D-450 Series.
3. If structure carries highway traffic, incorporate the Bridge Load Rating performed under separate work item into the initial inspection report. Evaluate bridge for posting needs.
4. Prepare an Inspection Report.

**B. Periodic (Routine) NBIS Inspection**

1. **All bridges, except closed structures.**
  - a. Conduct a complete field inspection utilizing Forms D-450.
  - b. Update/supplement the evaluation for posting needs for the structure's current condition. Determine if re-rating is warranted by comparing new vs. existing section loss measurements. If structure is to be re-rated, use the new load rating summary.
  - c. Update/amend the Inspection File providing new photographic documentation or sketches as needed.
  - d. Update and/or complete the required minimum BMS inventory and inspection items on the printout of the BMS records. See Item IV. C for minimum BMS items required.
  - e. Incorporate the results of previous or new load ratings into the report.
  - f. Prepare an Inspection Report to document all work and findings with repair costs.
2. **Closed Bridges**
  - a. Inspect bridges closed to highway traffic to assure that the physical barriers are maintained and that the public safety is not jeopardized. Assess the physical integrity of the structure and any potential hazards to the public on or beneath the structure, especially if pedestrian use is to be allowed.
  - b. Use PDT Inspection Forms D-450 for field notes. Include a minimum of 2 photos showing bridge with in-place barriers.
  - c. Prepare an Inspection Report to document all findings.
3. **Partially Closed Bridges**
  - a. Inspect bridges partially closed for staged construction as outlined under III.B.1.
  - b. Prepare an Inspection Report to document all findings.

**C. Partial (Interim) Inspection**

1. Inspect the specified portion(s) of the structure as authorized by the District Bridge Engineer. Use PDT inspection forms D-450.
2. Update/supplement the posting evaluation of the portion inspected.
3. Update/amend the portion of the Inspection Report dealing with the portion inspected.
4. Update and/or complete the required minimum BMS inventory and inspection items on the printout of the BMS records dealing with the portion inspected.
5. Prepare an Inspection Report to document all work and findings.

**D. Supplemental (Follow-up) Inspection**

1. Conduct inspection of structure as directed by the Department.
2. Perform follow-up sampling and testing as specified.
3. Update/amend the portion of the Inspection Report dealing with the portion inspected.
4. Update and/or complete the required minimum BMS inventory and inspection items on the printout of the BMS records dealing with the Supplemental Inspection.
5. Prepare an Inspection Report to document all work and findings.

**E. Bridge Load Rating**

1. Perform or update the structural analysis and load ratings using the latest specification and programs.
2. Identify the structural components or members that govern the ratings.
3. Prepare a load rating summary table and/or stress table for the Inspection Report. Reference calculation page number for ratings.

**F. Critical Deficiency Meetings**

1. If requested by the local owner, arrange and conduct a meeting with local bridge owners to discuss critical deficiencies found during the inspection.
2. Prepare informal meeting minutes.

**IV. BMS INVENTORY AND INSPECTION DATA**

**A. Department Structures:** Complete and/or update all applicable portions of the coding Forms D-491 or the BMS file printout unless otherwise instructed. Complete new forms for new bridges.

**B. Local Government Bridges and Others:** Provide complete data as in Item IV.A unless otherwise directed to provide only minimum data.

**C. MINIMUM REQUIRED INVENTORY AND INSPECTION DATA:** Minimum data includes all BMS Items identified with an asterisk (\*) on Form D-491 and the following BMS Items:

	Co. Munc. Boundary Code	E01	Next Insp. Frequency
A10	School Bus Indicator	E02	Next Insp By
A18	Public Transportation	E07	Type of Inspection
A19	Approach Pavement Width	E08	(Current) Inspection By
A29	# Electrified Tracks	E09	Inspection Manhours
B12	Service Status of RR	E10	Crane Hours
B13	AAR Number	E11	Inspection Cost
B14	Railroad Milepost	E12	Consultant Name
B15	Hwy. System	E13	Agency Hiring Consult.
B17	State Network	E14	Approach Slab Cond.
B19	Vert. Clearance Sign	E15	Approach Road. Cond.
B31	Cum. Tk Traff for Fat.	E16	Dk. Wearing Surf. Cond.
C02	Damage Length of Culvert	E19	Paint Condition
C06	Bridge Deck Type	E32	[Load] Rating Method
C09	Spans, Number & Length	E33	IR Controlling Member
C17	e Crit. Group #	E34	Fat.Cat. Control. Memb
C18	FCM Crit Rating Factor	E35	Fat. Control. Load Type
C18A	Abutment Type	E36	Fatigue Stress Range
C37	Abutment Foundation Type	E37	AASHTO Specs. Year
C38	Pier Type	E38	AASHTO Manual Year
C39	FracturPier Foundation Type	F06	Width of Prop. Bridge
C40	Name of Stream	F10	Future ADT
D06	Spec Restrictive Posting	F11	Year of Future ADT
D14	Posted Load Limits	AH	Items H01-H08
D15	1st and Last Date Posted	AJ	Items J01-J12
D16	Date of Bridge Closure	AW	All AW Items, except W11-D and
D17	Reason for Posting...		W11-E
D18			

Note: Only applicable items need be coded. All data submitted will be stored in BMS. Owners are encouraged to collect and submit all inventory and inspection information they have available.

**V. FIELD INSPECTION**

A. Completely inspect all bridge elements including the foundations that support the substructure elements. Clean members as needed to assess condition. For a Partial Inspection, inspect only the specified areas/members. However, report any public safety threatening deficiencies that are observed elsewhere on the bridge. Include inspection of any sign structures attached to the bridge.

B. Clearly record all inspection field notes on Inspection Form D-450 Series. Provide sufficient written comments on the inspection forms to outline the bridge's condition and to justify all condition and appraisal ratings.

Precisely locate and describe deterioration and all areas of section loss. Perform dye penetrant testing if needed. Determine if current conditions warrant a re-rating for load capacity. Determine if current load posting status is appropriate. Prepare sketches and obtain photographic documentation.

C. Inspect all substructure units and culverts (e.g. abutments, piers, footings, etc.) visually or by feel (e.g. probing) for condition, scour, integrity, safe load capacity, etc. Use inspection form D-450 to record findings.

Conduct evaluation of the site and structure to determine the risk from scour. Investigate the scour potential and determine structure stability. Determine channel condition and waterway adequacy. Propose countermeasures appropriate for conditions. Determine the need for an underwater inspection by a professional diver and record reasons in the Recommendation section of the report.

Provide/update plan view sketch of bridge and stream to denote channel changes, scour deposition etc. Provide/update waterway opening sketch to denote bottom of stream, superstructure and substructure units. Measurements from permanent marker, should be in table form to compare with previous inspections.

D. Identify locations and provide description of Fracture Critical Members (FCM). Use Form 491J and/or BMS AJ Screen printout to record findings. Discuss future inspection frequency and procedures for these FC members.

E. Identify and record all maintenance needs utilizing Inspection Form D-450

F. Provide emergency retrofit schemes, as directed, to any critical conditions uncovered.

G. Arrange for rigging, inspection cranes, platform lift trucks, ladders, boats, etc. The use of safety boats or skiffs should be considered when working over water and the risk of falling is high. Arrange for any needed Traffic Control. Insure the safety of inspectors and public at all times.

H. For highway bridges over railroads, coordinate with the railroad to arrange access for inspect of portions of bridges affected by railroad electrification and for railroad protective services while working in the track area and as required by the railroad. Obtain necessary permits and insurance.

**VI. STRUCTURAL ANALYSIS, LOAD RATING, and POSTING EVALUATION**

A. Perform or update the structural analysis and load ratings using Load Factor methodology where applicable. Where Load Factor is not applicable, rate bridge using a method acceptable to AASHTO and the Department. Load rate all bridges at Inventory and Operating levels for AASHTO H, AASHTO HS, and PA's ML-80 vehicle configurations. In addition, rate bridges on State highways for P82 Permit vehicle at Operating Rating only.

B. Use conventional methods of analysis unless more complex and refined methods are specified, or warranted and specifically authorized by the Department. (Refer to Item B.4.C in Section I, General).

C. Identify the structural components or members that govern the ratings. Define any section losses and/or other deficiencies on these members. Provide or reference typical cross-sections and/or framing plans. Include a table of stresses and a rating summary in the report. Reference calculation page number for values in rating summary.

D. Calculate the load ratings using data available from inspection files and report, supplemental field information and testing data. When no data or drawings (or sketches) are available, field measure members and calculate load ratings.

E. Ensure that all computations are in accordance with current Department and AASHTO Specifications. Update existing computations accordingly.

When computer analysis is used, provide program input and output, calculations to prepare input, documentation of all assumptions, and any other post-processing calculations. Index computations so key data is readily available.

F. Use the Department's latest version of the appropriate bridge software for analysis and rating, if applicable.

G. Perform a structural analysis of the substructure only if its structural adequacy is at risk due to scour or section loss as a result of the field inspection findings or its unusual component makeup.

H. Evaluate each bridge to determine its capacity in its current condition relative to the three vehicle configurations (H, HS, ML-80) used to represent PA's legal loads and the need for a weight restriction and the level of posting.

For those situations where the Load Factor method results in lower ratings, a second rating utilizing an accepted method may be used to establish the posting levels.

## **VII. DRAWINGS**

A. Update existing drawings or sketches whenever possible, rather than preparing new drawings. Use the Department's design drawing revision procedure to note changes since original drawing preparation.

B. If no plans are available, prepare sufficient drawings to document the makeup of the structure. Include data and view as follow:

1. General plan and elevation.
2. Cross sections.
3. Framing plan.
4. Sketches of structural members (including dimensions).
5. Stress sheets.
6. Results of field inspection, analysis and historical data, when appropriate.
7. Streambed cross sections, profile and soundings including areas of bed and bank scour.
8. Structural details, including all fracture critical members unless adequately documented by photographs.

C. For small and/or simple structures, sketches of 8½" X 11" format are acceptable. Prepare sketches using straight edges etc.

D. When retrofit schemes are requested, provide full size plan sheets (22" x 36").

## **VIII. PHOTOGRAPHS**

Provide 35mm color photographs (approx. 3.5" X 5") to supplement field inspection notes and drawings and to document conditions. Provide photographs sufficiently clear, properly identified, dated and indexed. Include views of the overall bridge plus its side elevation, the approach roadway and its alignment, any defects and structural details.

All photographs must be in full color. Xerographic/laser copies of photographs, scanned prints, and prints from a digital electronic cameras may be used as substitutes for report photographs if resolution and quality is acceptable to the District.

## IX. INSPECTION REPORT

A. Prepare a report to document the inspection, the bridge, its condition, the structural analysis, load rating, posting evaluation and recommendations. The report must be 8½" x 11" in size and copied on one side only.

B. A general outline of the report is as follows:

1. Title page (Structure ID Number, bridge name, location, inspection dates, inspector names, prepared for and by, and P.E. seal, signature and date). Label bridges with Fracture Critical components as "Fracture Critical" on title page, and also label Posted bridges as "Posted", "New Posting", or "Posting Change". This label should also be noted on title page.
2. Table of contents.
3. Location map(s). Map(s) must be of sufficient detail to locate structure.
4. General description and sketches and/or photographs of the overall structure. Bridge with Fracture Critical members must include a sketch and/or photographs of Fracture Critical member.
5. Field inspection findings (completed Inspection Forms, plus photographs and supplemental narrative to document findings).
6. References, list plans, previous reports, etc. used in the preparation of the report.
7. Load rating summary and posting evaluation
8. Recommendations
9. Appendices:
  - a. Inventory Data: Marked-up copy of BMS file printout or completed copy of coding Forms D-491
  - b. Inspection Data: Completed inspection forms D-450.
  - c. Structural analysis and load rating computations and a table of stresses.

C. Include the following in the report Narrative:

- o General description of the structure condition.
- o Summary of inspection findings and comparison with those of previous inspection.
- o Structural adequacy and safety of the structure, the roadway approaches, the bridge railing, the approach guiderail, waterway, and channel. Discuss findings on Fracture Critical items and scour, where applicable.
- o Discuss relevant historical data.

D. Include the following in the Recommendations section:

- o Need for Interim Inspection and/or Supplemental Inspections.
- o Need for new or revised bridge weight restrictions
- o Signing needs: Vertical clearance, narrow bridge, etc.
- o An estimate of the remaining life.
- o A prioritized and time scheduled listing (with costs) of immediate, short and long term improvement needs for:
  - o Maintenance Complete D-450M
  - o Rehabilitation Complete D-450M or D491F
  - o Replacement Complete D-450M or D491F

Recommendations in report should be in "plain English" and be consistent with the costs indicated on above forms.

E. Other Report Requirements

1. Periodic NBIS Inspections without re-rating:

The complete detailed structural analysis and load rating computations (Item IX.B.9.c) from previous inspection/rating need not be included, unless otherwise specified. The load rating summary must still be included with the posting evaluation.

Review/perform the posting evaluation for each bridge to ensure its posting status is appropriate for its just inspected condition.

2. Periodic NBIS Inspections for Closed or Partially Closed Bridges:

A letter report stating date of inspection, status of closure with photo, Inspection Forms 450, other pertinent information will suffice, unless otherwise specified.

3. Partial (Interim) and Supplemental Inspections:

The report format and contents are to be agreed upon at the time of authorization for each structure.

**X. MEETINGS TO DISCUSS CRITICAL DEFICIENCIES WITH LOCAL OWNERS**

Meetings to discuss critical deficiencies may be requested by the local bridge owners and must be authorized by the District Bridge Engineer.

Discuss all critical structural and safety-related deficiencies, including posting/repair/maintenance recommendations and alternatives contained in the current inspection report with the bridge Owner at a formal meeting. For County bridges, a Commissioners' meeting is appropriate. For Municipalities, arrange for appropriate officials to be present. The contracting agency (such as the County, if applicable) may also attend.

Place emphasis of discussion of uncorrected critical and other deficiencies brought forward from the previous inspection report. Ensure these deficiencies are highlighted in the current inspection report. Prepare informal minutes of the meeting that include attendance, issues discussed, proposed solutions, and needed follow-up items for the deficiencies.

This meeting may also be held to discuss inspection findings, general bridge condition and maintenance needs if requested by bridge owner and authorized by the District Bridge Engineer.

**XI. EMERGENCY REPORTING**

Notify the bridge owner (if applicable) and the District Bridge Engineer immediately whenever a potentially perilous or hazardous condition is observed. Provide written notification to the owner and the District Bridge Engineer within 24 hours. This task is incidental to inspection work. Examples of such situations could include:

- o Distress in primary members to the point where there is doubt that the members can safely carry the loads for which they are subjected and partial or complete failure of the bridge is a possibility.
- o Scour at or under the pier of a stream bridge is such that significant movement is likely which could cause the bridge to collapse.
- o Abutment movement or distress which is so excessive that there is a clear possibility that it may not be capable of supporting the superstructure and partial or complete failure is a possibility.
- o Suspected cracks in pins or hangers of two girder/truss bridges.
- o Missing weight restriction signs or vertical clearance signs.
- o Any situation where the structural integrity of the bridge is such that its safety is in question.

**XII. MATERIAL SAMPLING AND TESTING OR BRIDGE INSTRUMENTATION**

Structural materials evaluation, Non-Destructive Testing (except dye penetrant tests) and bridge instrumentation are not a routine part of a bridge inspection. They are to be conducted only when required to eliminate unacceptable engineering uncertainties or to more accurately assess the structure's load carrying capacity.

Justify the use and obtain the District Bridge Engineer authorization before initiating any materials sampling and testing and/or instrumentation program.

**XIII. EXISTING RECORDS AND DATA**

The Department will furnish a copy of the BMS printout for bridges to be inspected if available.

The Department and Owner, if requested, will give the Consultant access to any available pertinent information for short term use and copying. This information could include existing bridge drawings, load capacity analysis and design computations, inspection reports and other pertinent information. This data might be available only on microfilm.



After inspection data is entered into BMS, the Department will furnish the updated printouts for all BMS screens, if requested, which can be incorporated into Final Report.

**XIV. QUALIFICATIONS OF PERSONNEL**

Personnel assigned to the Inspection Project by consultant shall meet the requirements set forth in the National Bridge Inspection Standards for all work levels.

For State bridges, inspection personnel must hold a valid certification as "Bridge Safety Inspector" issued by the Department.

**XV. TRAFFIC CONTROL**

Provide any needed traffic control. Comply with the Department's Publication #203, "Work Zone Traffic Control, April 94 and its updates.

**XVII. RELEASE OF INFORMATION**

Do not release or distribute inspection information to any outside agencies without the written permission of the District Bridge Engineer for State bridges or the bridge owner.

**XVIII. SUBMISSIONS**

**A. Work Schedule and Status:** Submit a horizontal bar graph type work schedule within two weeks of notice to proceed. Submit monthly schedules and progress updates to the District Bridge Engineer and contracting agency.

**B. Personnel Qualifications:** Thirty (30) days prior to beginning work, submit the list of names and qualifications of inspection personnel to the District Bridge Engineer.

**C. Field Inspection Data:** Submit one (1) copy of BMS Printout marked with revisions and/or Form D491 and/or Form D450 within ten days of the completion of each field inspection.

**D. Draft Inspection Reports:** Submit one (1) copy of the draft report within four weeks of the completion of each field inspection for review. Space submissions at frequent intervals to facilitate reviews.

**E. Final Inspection Reports:** For State bridges, submit 2 copies of Final Report to the District. For Local bridges, submit 3 copies to the Districts. All Final Reports are to be bound with non-exposed fasteners.

**F. Minutes of Critical Deficiency Meetings With Owners:** Submit one copy each to District Bridge Engineer, Owner, and contracting agency within 7 days of meeting.

**XIX. AUTHORIZATION OF WORK AND DEADLINES**

A. Be prepared to start work immediately upon receiving Notice to Proceed. Complete all work including the final report submission expeditiously. Perform inspections to maintain the 24 month inspection frequency or other frequency as specified during the Scope of Work meeting.

B. Upon receipt of Notice to Proceed, start work on all Initial Inventory and Inspection safety inspections and Periodic (Routine) NBIS Inspections as they come due.

C. The following work items require the prior authorization by the District Bridge Engineer before work can begin:

- o Load Rating (or Re-rating) of Bridges
- o Partial (Interim) Inspections
- o Supplemental Inspections
- o Critical Deficiency Meetings
- o Material Sampling and Testing
- o Bridge Instrumentation

Request authorization for work involving these items by submitting appropriate justification to the Department. Outline the proposed scope of work for task on each bridge in the

justification. Do not proceed with these tasks until written authorization from the District Bridge Engineer is received.

## XX. LIST OF BRIDGES AND SPECIAL REQUIREMENTS

### A. LIST OF BRIDGES - See EXHIBIT 1.

(List of bridges and scope of work for each bridge is to be listed on Exhibit 1. Sample Exhibit 1 is attached.)

### B. Special Requirements

(To be added by the District and/or Contracting Agency)

**Detail:**

The following guidelines are to assist in the development of agreements using the General Scope of Work for Safety Inspection of State and Local Bridges (January 1997).

### A. ESTIMATED COSTS

[ This section was formerly located in the body of the previous Scope of Work, but is more appropriate here.]

1. The estimated costs of the work consists of field costs and office costs. Break each down by major task, then subdivide into man-hours and rate of pay by classification of personnel, where applicable.
2. Field costs include any required cleaning and gaging of members, engineering and any other incidental items. Office costs include structural analysis, preparation of drawings and reports, and any other incidental items.
3. If a bridge consists of more than one structure type (i.e. main span truss, approach spans-multi-stringer system), show costs for each structure type.
4. For non-professional services include items such as core borings, rigging, crane rental, traffic control and laboratory testing follow the procedures in PDT Pub.93, ?Procedures for the Administration of Consultant Agreements? dated December 1996.
5. For professional services, such as, materials sampling and testing, etc. include copies of the proposals from sub-consultant, with the prime proposal.

(For more details, refer to Department Guide for Preparation of Proposals for Engineering Agreements.)

### B. Categories of Work Agreements

1. An example of Work Categories is shown on attached:  
Table 1: Initial ,Periodic, and Closed Bridge Inspections  
Load Ratings  
Table 2: Partial/Interim Inspections  
Table 3: Critical Deficiency Meetings  
Table 4: Supplemental Inspections

The former SOW categories of work based upon inspection type, structure type and length have been retained, but have been re-labeled. (Exception - open spandral arches were added to same category as Girder/Floorbeam bridges).

For Closed Bridge Inspections, only one Work Category was established for each type of bridge. Similarly, only one was established for Critical Deficiency Meetings. For Supplemental Inspections a new category Sn was developed to track individual bridges.

For the following Types of Inspection Work, Initial Inspections, Periodic Inspections, Closed Bridge Inspections and Load Ratings, use the standardized categories of work as shown on Table 1 of these Guidelines. The standardized categories are to be used on all agreements to assist in review of agreements and for inspection programming.

The Districts may further subdivide these standard work categories if desired. Examples could include A1s to indicate steel stringers, A1P for prestressed girders. However, the first two digits of standard categories must be maintained.

For Partial/Interim inspections, see next section.

### C. Partial/Interim Inspections

1. If Method of Payment is **Cost Per Unit of Work** (CPUW), the following mechanism to allow quick agreement on the work required and basis of payment:
  - a. Establish a series of interim inspection types in the Agreement with work categories with a specified number of man-hours to be paid. For example:

Partial/Interim Inspections

Work Category 11 - 2 man-hours  
Work Category 12 - 4 man-hours  
Work Category 13 - 6 man-hours  
Work Category 14 - 8 man-hours  
Work Category 15 - 10 man-hours  
Work Category 16 - 12 man-hours  
Work Category 17 - 14 man-hours

(The above types are for example only and should be tailored for the specific bridges in your Agreement. When developing the cost for Partial/Interim inspections the Profit shall be limited to 10% of the direct and indirect Payroll costs.)

b. When an interim inspection is needed, the District and Consultant must first reach agreement on the Scope of Work for that inspection. Then, the Work Category appropriate to that inspection is agreed upon and the work authorized.

In his request letter, the consultant outlines the scope for the interim inspection work at each bridge along with the appropriate work category for District review and authorization.

2. If **COST PLUS FIXED FEE** method of payment is used, a number of Partial/Interim inspections may be set aside in a separate part of the agreement for the purpose of Partial/Interim inspections. Again, the consultant would request authorization via letter and the District would issue the Notice to Proceed for the agreed upon Partial/Interim inspections.

3. Note:

1. The interim inspections must always be recorded on inspection forms and the data entered into BMS. Ensure that the report format and requirements are established before authorization.

2. Partial/interim inspections where data need not be recorded in BMS or those that require less than 2 man-hours probably fall under the category of owner's responsibilities and not the NBIS program.

3. For bridges where interim inspections are routine and uncomplicated (such as for a posted stringer bridge) are needed, and if the scope and work category can be established easily, the authorization can be requested and granted through the agreement scope of work and list of inspections.

4. More extensive inspections than those above may be better handled under Periodic NBIS inspections or Supplemental Inspections.

5. Partial/Interim inspections can be used for flood inspections. Common sense must be used to avoid mis-use of federal funding. Mere "water depth checks" and other cursory inspections do not fall under NBIS.

**D. Supplemental Inspections**

For both CPUW and Cost Plus Fixed Fee agreements, the scope and man-hours for Supplemental Inspections need to be established at time of SOW or must be accomplished through a supplemental engineering agreement.

**E. List of Bridges and Special Requirements**

1. Provide list of bridges by BMS # with scope/category of work for each bridge.

A sample of such a list for a C.P.U.W. agreement is attached. Please note that, on the sample, authorization has been requested for interim inspections on certain bridges and for critical deficiency meetings. Interims/meetings may also be added later on an "as needed" basis. Specify a list format to meet your needs.

2. Add special instructions for work requirements, project management, emergency communications, M&P Traffic, etc. here. The intent of the Scope of Work should not be altered, but the means/methods of accomplishing that work be may be tailored to suit the needs of the various parties.

**WBS**  
**Objective:**

**SOW:**  
**Detail:**

**2.7.99 Description: Other Structures Activities**

This includes any other necessary PennDOT structure activities for the project which are not otherwise covered under the standard structure tasks.  
Provide work as detailed by the Department. See Below.

<b>WBS Objective:</b>	<b>2.8.1 Description: Data Collection and Analysis</b>
<b>SOW:</b>	<p>This task consists of collecting and analyzing traffic data to provide the basis for selecting types of roadways, intersections or interchanges, warranting of traffic signals, and determination of number of lanes and other project geometric design criteria.</p> <p>Document existing and future traffic conditions to analyze and traffic operations for preliminary design. Existing traffic conditions will be evaluated by assembling available current traffic counts from respective agencies or performing traffic volumes studies at locations where data is not available. Future traffic conditions will be developed through coordination with the appropriate Metropolitan Planning Organization (MPO) or planning agency.</p> <p>Perform a traffic engineering analysis of roadway components under existing and proposed traffic conditions for each design alternative. The performance of each roadway component will be evaluated by performing a level of service analysis to establish the required roadway geometry and determine the need for the appropriate traffic control devices to insure the facility operates at an acceptable level of service.</p> <p>Mainline ADT volumes and turning movement volumes for all critical intersections will be determined for the AM and PM peak hours. Volumes will be collected in accordance with Publication 201M.</p> <p>The effectiveness of traffic control devices will be evaluated for each approach of the intersection. Traffic signal warrant analysis will be conducted in accordance with Publication 201M to determine the need for traffic signals.</p> <p>The number of lanes and corresponding turning lanes storage areas will be determined for all roadways to operate at an acceptable level of service.</p> <p>An analysis of the volume and capacity of the roadways and intersections will be conducted utilizing the most current Highway Capacity Manual procedures. All Highway Capacity evaluations are to consider overall level of service, and delay to each movement and intersection approach.</p>
<b>Detail:</b>	<p>If needed, perform an origin and destination study for the project.</p> <ul style="list-style-type: none"><li>- Levels of service criteria will be established by the respective governing agencies.</li><li>- Availability of Historic and current traffic data.</li></ul>
<b>WBS Objective:</b>	<b>2.8.2 Description: Preliminary Maintenance and Protection of Traffic</b>
<b>SOW:</b>	<p>This task consists of developing preliminary maintenance and protection of traffic plans in accordance with Publication 14M, Design Manual Part 3, the Manual on Uniform Traffic Control Devices and Publication 203M, Work Zone Traffic Control to maintain safe and efficient traffic operations through the construction work zone.</p> <p>Prepare a preliminary Maintenance and Protection of Traffic plan for anticipated work areas involving existing roads. The plans will include a conceptual sequence of operations and identify the type of traffic control needed for each roadway impacted by the anticipated work zones.</p> <p>Plans will be developed at an appropriate scale.</p> <p>Drawings will show the work areas and note the traffic control requirements for each area.</p> <p>A conceptual sequence of operations will be developed identifying the anticipated phases and stages of work necessary to control traffic during hours of construction and at all other times during construction. Illustration of traffic control signs and devices, temporary pavement markings, temporary roads, detours, and other necessary details will not be developed.</p> <p>The plans will include a title sheet with index map and general notes, and a listing of anticipated traffic control devices without quantities. The plan will also include the sequence of operations and plans sheets depicting the work areas.</p>
<b>Detail:</b>	<ul style="list-style-type: none"><li>- Any unique scale of signing preferences should be determined</li></ul>
<b>WBS Objective:</b>	<b>2.8.3 Description: Preliminary Traffic Signal Design</b>
<b>SOW:</b>	<p>This task consists of developing preliminary traffic signal designs in accordance with Publication 10A, Design Manual Part 1A, Publication 14M, Design Manual Part 3, Traffic Standards (TC 7800 Series) and Publication 149, Traffic Signal Design Handbook.</p> <p>Conceptual signal plans will be developed for those intersections meeting signal warrants.</p>

The plans will illustrate the signal layout including type of signal supports (strain pole or mast arm) and location of signal equipment including signal heads, controller, detector types and locations, signing requirements, and pedestrian accommodations as required. The traffic signal plans will include complimentary pavement markings such as stop bars, crosswalks, and lane lines which will be coordinated with the pavement marking and delineator plans.

Plans will be developed at an appropriate scale.

Phasing diagrams will be developed depicting the proposed operation of the traffic signal. No timings or other controller settings will be determined.

Electrical details such as wiring diagrams, conduit and junction box locations, will not be included.

The plan will consist of the signal plan layout, signing table, depiction of the number and types of signal heads, and a phasing diagram.

**Detail:**

- Preferences to strain poles vs. mast arms needs to be disclosed
- Preferences to timings (all read lengths, pedestrian speeds, and use of protective/permissive phasing) needs to be disclosed.

**WBS Objective:**

**2.8.4 Description: Preliminary Pavement Marking Plan**

This task consists of developing preliminary pavement marking plans in accordance with Publication 14M, Design Manual Part 3, the Manual on Uniform Traffic Control Devices, Traffic Standards (TC 7600 Series), and Publication 68 with guidance from the Pavement Marking Handbook.

**SOW:**

Preliminary pavement marking plans will be developed depicting longitudinal lane lines and delineators on roadway sections. For interchange areas, pavement markings and delineators will be indicated for gore areas, islands, and other miscellaneous special markings. For intersections, the locations of stop bars, legends, and crosswalks will be indicated.

Plans will be prepared at an appropriate scale. The type, size, and color of pavement markings and delineators will be noted on the plans.

Specific details will not be developed.

The plan will include a title sheet with general notes and index map, blank tabulation sheets, and plan sheets for all roadway sections within the limits of work. Where roadway sections are consistent and repetitive, typical details may be developed to eliminate unnecessary and repetitive design sheets.

**Detail:**

- The pavement marking and delineation plan may be combined with the signing plan if sufficient detail can be shown on a combined plan without significant clutter.

**WBS Objective:**

**2.8.5 Description: Preliminary Signing and Sign Lighting**

This task consists of developing preliminary sign and sign lighting plans in accordance with Publication 14M, Design Manual Part 3, the Manual on Uniform Traffic Control Devices, Publication 236M, Handbook of Approved Signs, Traffic Standards (TC7600 and 8700 series), and Publication 108, Sign Foreman's Manual.

**SOW:**

Preliminary signing and sign lighting plans will be developed for all roadways sections within the limits of work.

The plans will depict destination, regulatory, warning, and information, and guide signs necessary to control and maintain traffic upon completion of construction. The plans will depict the approximate locations of signs, sign types, and sign messages. The location of sign structures will be indicated and noted if sign lighting is required.

Plans will be prepared at an appropriate scale. Areas requiring more detail, (such as intersections, merges, and diverges) may require a larger scale.

The plans will consists of a title sheet with an index map and general notes, blank tabulation sheets, and plan sheets showing sign types and locations.

Sign sizes, sign structure and sign lighting details, and sign fabrication details, will not be included.

**Detail:**

- Unique preferences by the District. (type of sign supports, changes to standard lettering sizes, etc.) should be known.

- WBS Objective:** **2.8.6 Description: Point of Access Study**  
This task consists of preparing a study assessing the need for and traffic impacts of adding a new point of access to a controlled or limited access highway in accordance with Publication 10A, Design Manual Part 1A.
- SOW:**
1. Obtain from secondary sources or from work performed under other tasks, traffic information for the transportation network that will be influenced by the proposed access. This information will include:
    - \* An origin / destination survey
    - \* Peak hour turning movement counts of major intersections
    - \* 24-hour automatic traffic records for major roadways, pedestrian movements, and
    - \* Physical inventory of the lane movements at intersection, distances between intersections and interchanges, signal timings at signalized intersections.
  2. Evaluate the current access with respect to the proposed access in terms of mileage and time savings
  3. Evaluation of the current traffic network operations with respect to the proposed operations in terms of level of service by using the Highway Capacity Manual and related software.
  4. Develop a Preliminary Justification Report that includes: a statement of purpose for the access, verification that the new access is not in conflict with future plans, a description of the communities or traffic generators in close proximity, and methodology and results of evaluations.
  5. Submit to District and Central Office for review.
  6. Revise as necessary for approval and resubmit.
- Detail:** The level of effort for the evaluation is dependant on the density of population and the presence of roadway network with in the study area. Rural areas would not require as detailed of a study as an urban setting that has alternative interchanges in close proximity.
- WBS Objective:** **2.8.7 Description: Safety Review/Audit**  
This task consists of the time required for the Safety Review Committee to review the preliminary plans and the Project Design Criteria Report.
- SOW:**
1. Conduct the safety review/audit as early in the design process as possible.
  2. Identify all applicable items on the Safety Review Checklist (see Publication 10A, Design Manual Part 1A). Add any additional items based on engineering judgement and experience.
  3. Detect safety deficiencies in the design.
  4. Recommend safety enhancements.
  5. Prepare the Safety Review Submission (two copies) at least two weeks before the design field view (if applicable). Include the following:
    - \* Color coded plans
    - \* Profiles
    - \* Typical sections
    - \* Project Design Criteria Report (see Design Manual 1A for details)
- 2.8.7.1 Safety Review Letter**  
Prepare a memo concerning the following:
1. Approval/disapproval of safety features
  2. Safety recommendations
  3. Approval/rejection of Design Exceptions
- 2.8.7.2 Accident Analysis**
1. Review and evaluate root causes of crashes at a given location or area along a highway.
  2. Prepare collision diagrams (if applicable) in accordance with the Manual of Transportation Engineering Studies. Consider the following per PennDOT Publication 201 Engineering and Traffic Studies:

- \* Total number of crashes during last 5 years
- \* Number of crashes by type or causation factor
- \* Vehicle type involved
- \* Pedestrian involvement
- \* Type of traffic control present
- \* Roadway or intersection geometric
- \* Cause of crash
- \* Time of crash
- \* Environmental conditions

**Detail:** The following items may require an adjustment to the length of time it takes to complete this task:

1. Size of the project.
2. Type of project.

**WBS Objective:**

**2.8.99 Description: Other Preliminary Traffic Activities**

This includes any other necessary PennDOT preliminary traffic activities for the project which are not otherwise covered under the standard preliminary traffic tasks.

**SOW: Detail:**

Provide work as detailed by the Department. See Below.

**WBS Objective:**

**2.9.1 Description: Utilities**

This task involves project specific work requirements in accordance with Publication 16M, Design Manual Part 5.

**SOW:**

PADOT projects which involve public utilities must include all necessary provisions for the safety and protection of both existing and any required relocation of utilities.

Subsequent to the preparation of the existing utility location plan for the project, the plan will be submitted to each of the involved utility company for their verification of the type, size and location of the facility.

Coordination efforts will be maintained with the utility throughout the project design process to allow amicable solutions for known and potential utility/highway project conflicts.

When directed, utility relocation engineering, either by the project design consultant, or by others, shall be incorporated into the project construction contract documents.

When circumstances require, the design consultant shall provide all information and prepare application forms necessary to secure agreements and permits associated with the utility on the project, in accordance with policies and procedures outlined in Design Manual Part 5.

Once the involvements for each utility has been defined for the project, the utility clearance Form D-419 will be prepared to indicate the nature and the work, the days required to perform the work, work to be performed: prior, or concurrent, or restrictive of the highway work. This information shall be included in the contract bid proposal packages and will also serve as a tool for the development of the projects construction schedule.

**2.9.1.1 Utility Location Verification**

It is the responsibility of the designer to prepare project base mapping showing all existing utility facilities.

Aerial and surface utility data may be obtained by either aerial photography and/or conventional survey.

Underground utility data may be obtained from utility owner as-built plans and maps and/or test pits or non-destructive probe methods.

The existing utility location plan compilation will include the appropriate label and number, as applicable, for each facility. For all existing underground utility installation, the locations will be supplemented with profiles and/or cross sections.

Once the utility location plan is compiled, the designer will submit copies of the plan to each utility owner on the project with a formal request for their verification of the facilities data depicted.

The designer will incorporate all revisions, additions, or deletions resulting from the verification comments received from the owners.



### **2.9.1.2 One Call**

The requirements of Act 287 and the PA One-Call system will be adhered to for all Department projects.

A list of involved utilities must be obtained by the designer from the county courthouse records.

The project designer, and/or survey party chief shall contact the PA One-Call toll free telephone number 1-800-242-1776 to request underground utility line delineations by the utility owner prior to making field survey acquisitions of utility locations.

The PA One-Call telephone number and the PA One-Call serial numbers will be delineated on the project right-of-way plan and the construction plan. The design firm will be responsible for verifying the utility serial numbers at least 9 to 10 days prior to the actual final P.S. & E. submission to the District.

### **2.9.1.3 Existing Utility Location Plan**

The design engineer will prepare a master Existing Utility Location Plan using as a base the construction plan sheets. Proposed relocations will also be shown along with the status of the original facility such as abandoned in place, removed by company, or removed by the contractor.

Preparation of this plan is based on project mapping including field data and the verified facility location as received from the utility companies.

### **2.9.1.4 Preliminary Utility Impact Assessment**

When the existing utility location plan has been developed and verified, the proposed project preliminary designs shall be investigated for utility impact potentials.

Where utility hits are discovered, or other utility problems are anticipated on the project, a preliminary impact assessment study and report will be completed by the project designer, with coordination efforts from the utility owner.

The impact assessment shall be prepared in text and to clearly indicate the location and nature of the conflicts.

The assessment report will include preliminary cost comparisons, conclusions and recommendations for the relocation of the utility facility versus possible project design modifications which would allow the facility to remain at its existing location.

The preliminary utility impact assessment report will be submitted to the Department for review, approval and/or conflict resolution decision.

### **2.9.1.5 Utility Coordination**

Coordination with public utility company representatives shall be maintained throughout the project design duration. Utility coordination begins with the issuance of the project notification letter to the utilities and ends when all utility involvement issues have been adequately settled to allow project construction.

The requirements for utility coordination include, but may not be limited to, the following:

1. Initial contact by project notification letter.
2. Document and distribute all meeting minutes, correspondence, memorandums and telephone conversations regarding project related utility issues.
3. Formally solicit copies of existing facility location record information for underground installations from the utility company.
4. Subsequent to preparing the existing utility location plan, submit plan copies to each company and request their verification, or revision, of the type, size, and location of their facilities.
5. Transmit Form D4181X with supporting information to each utility and request their intent for bridge occupancy on the project structure(s).



6. Schedule and conduct an initial project utility meeting to explain the project improvement goals, schedules, and targeted utility clearance dates.
7. Provide authorizations to perform utility relocation engineering and estimates, when formally requested by the utility company and approved by the Department.
8. Invite utility representatives to the project Design Field View meeting. Solicit utility company input relative to project design/utility conflicts, and potential need for substitute right-of-way corridors for utility relocations.
9. Transmit copies of project preliminary design plans, profile and cross sections to the utility companies for their relocation engineering design, cost estimate and reimbursement agreement application package preparation.
10. Keep utility companies informed of all design changes made during the final right-of-way plan and final construction plan preparations which could impact existing or planned utility facilities.
11. Incorporate utility relocation, abandonment and removal information onto the roadway construction plans, based on plans and information received from the utility company.
12. Schedule and conduct a utility meeting to review the proposed utility route matrix, and to resolve any outstanding design, conflict or schedule problem issues.
13. Incorporate utility work to be performed by the PADOT contractor into the project construction package.
14. Obtain utility working day schedules and complete form D-419, Utility Clearance.
15. Complete and execute all utility related permits.
16. Solicit utility representative attendance at the pre-bid, pre-construction, and all construction status

**Detail:**

The following items may require an adjustment to the length of time it takes to complete this task:

- \* Utility's Refusal to cooperate
- \* Requirement for an independent firm to provide existing utilities type, size and location information.
- \* Requirement to provide field survey measurements from the project centerline/baseline to the points of the utilities.

The following items may require an adjustment to the length of time it takes to complete Preliminary Utility Impact Assessment and Utility Coordination:

- \* Federal Participation Funded Projects
- \* Local Funded Projects
- \* 100% State Funded Projects
- \* Reimbursable Design and/or construction Utility Relocations
- \* Non-reimbursable Design and/or Construction Utility Relocations
- \* Utility's workload
- \* Requirement for an independent firm to provide existing utilities type, size and location information.
- \* Requirement to have the Consultant prepare the Utility Relocation Plans Estimates and Specification
- \* Requirement to provide field survey measurements from the project centerline/baseline to the points of the utilities information needs

**WBS  
Objective:**

**2.9.2 Description: Grade Crossing Activities**

This task includes the coordination, procurement of information and the preparation of plans and data for highway/railroad crossings, in accordance with Publication 10A, Design Manual Part 1A.

**SOW:**

Grade crossing activities will be implemented on a project when a railroad crosses the highway, above grade, at grade, or below grade.

When a railroad is involved in the project, the owner shall be issued a formal project notification letter, with a project location map attached.

Copies of existing railroad track and valuation maps that will show the railroad and right-of-way within the project area may be obtained from the railroad company, when available.

Form D-4279, Railroad Crossing Data for Design, and Form D-4279A, Railroad Crossing Data for Contractor will be submitted to the railroad with the request for the completion, and return of the forms to the project designer.

Copies of all forms, correspondence, etc. relating to railroad grade crossing activities will be distributed, and made part of applicable submissions to the District.

#### **2.9.2.1 RR Coordination**

On projects involving railroad activities it is important to maintain close coordination with the railroad company representatives to assure that the railroad's safety policies are adhered to and the railroad's standard design requirements are followed.

The railroad company shall be contacted as early as possible in the project design process, and advised of the potential involvements of their facilities.

Preliminary design plans for the project shall be submitted to the railroad for their information and review, and railroad representative should be invited to attend the Design Field View meeting to allow their input, relative to the railroad/highway designs proposed.

Meetings shall be conducted with the railroad representatives to resolve design issues such as: horizontal and vertical clearances, traffic control, both during and after project construction, traffic signal pre-emption systems, at grade crossing improvements and controls, temporary at-grade crossings, ability of the railroad to provide flagmen and inspectors, in house work force, material supplies, and schedule to perform railroad related work.

All railroad coordination efforts shall be documented and distributed for project record filing.

#### **2.9.2.2 Filing of PUC Application**

Projects involving railroads, whether crossing a highway at grade, above grade or below grade, require permission from the Public Utility Commission. The commission according to law, is vested with exclusive power to appropriate property for any such crossing, and to determine and prescribe, by regulation or order, the points of which, and the manner in which, such crossing may be constructed, altered, relocated or abolished.

Additionally, it may dictate the manner and conditions in or under which such crossings shall be maintained, operated and protected in order to prevent accidents and promote public safety.

In order for the PUC to fulfill its responsibilities, specific clear cut information is required. The information shall be provided in three basic stages described as follows:

- Stage 1: Preparation of pertinent data for the railroad crossing
- Stage 2: Preparation for the application to PUC and the PUC field conference.
- Stage 3: Formal Hearing

Development of any type agreement between the department and a railroad company requires that the Chief Utility Engineer be informed of any meetings with the railroad to discuss the agreement.

A full description of the plans and details required for each stage are fully described in Design Manual, Part 1A.

#### **2.9.2.3 Field Conference**

Once the PUC submission is made, the PUC will schedule a field conference. This conference is held to acquaint the interested parties and the PUC with the actual field conditions as they exist and to provide an opportunity for all parties concerned to make comments regarding the proposed crossing or railroad involvement .

#### **Detail:**

The Public Utility Commission (P.U.C.) has jurisdiction over public highway railroad crossing. Therefore, application will be made to the P.U.C. for approval of the proposed Construction and the appropriation of property within the crossing.

A request shall be made of the railroad to provide its requirements for entrance on railroad property during the project design process for surveys, borings, etc. and their requirements regarding insurance permits, etc. will be met. The railroad shall be notified prior to entrance on the railroad property by members of the project design team.

The following items may require an adjustment to the length of time it takes to complete this task:

- Project requires temporary track relocation.
- Project requires permanent track relocation.
- Railroad crossing requires preemption signalization.
- Railroad flagmen and inspectors' availability as required for project engineering and construction tasks.
- Project involves more than one railroad company.
- Abolition of an existing crossing requirement.

**WBS**  
**Objective:**

**2.9.99 Description: Other Preliminary Utilities Activities**

This includes any other necessary PennDOT preliminary utility activities for the project which are not otherwise covered under the standard preliminary utility tasks.

Provide work as detailed by the Department. See Below.

**SOW:**  
**Detail:**

**WBS**  
**Objective:**

**2.10.1 Description: Environmental Activities**

These tasks include any and all work necessary to incorporate commitments made during Preliminary Design, Mitigation Activities and Re-Evaluation but does not include actual plan preparation.

**SOW:**

**2.10.1.1 Mitigation Activities**

Perform the following tasks:

1. Mitigation measures identified during the environmental clearance process shall be tracked throughout final design and addressed in the construction bid package. In the case of an EA, a Mitigation Memorandum must be completed and distributed. In the case of an EIS, the Mitigation Report that was prepared at the time of receiving the ROD, will be used to monitor the mitigation measures throughout final design.

2. If changes to the original mitigation measures are necessary, written approval will be obtained from the Environmental Manager, FHWA and the environmental agencies.

**2.10.1.2 Other Documents/Approvals**

Prepare all necessary documents and/or obtain approvals to commence the project bidding process.

**2.10.1.3 Environmental Re-Evaluation**

Perform the following tasks:

1. Depending upon the time elapsed since issuance of a CE approval, FONSI, or ROD and, the magnitude of anticipated changes to the environmental impacts, an environmental re-evaluation may be required when requesting a major approval from FHWA. A meeting should be scheduled with FHWA and the Department to determine the appropriate documentation.

2. Prepare the appropriate document and submit to the BOD for review. Revise if necessary and send the standard Re-Evaluation Transmittal Form along with the NEPA document to BOD for forwarding to FHWA, if a re-evaluation is deemed appropriate, or prepare a SEIS (same process and format as an original EIS minus scooping).

**Detail:**

Refer to Individual Wetland Mitigation Site Plan, Section 4(f) Mitigation Plan, Noise Mitigation Plan and all other mitigation plan tasks for the preparation of the individual plans.

Environmental Re-evaluation requires close coordination with BOD and FHWA to determine the appropriate documentation.

**WBS**  
**Objective:**

**2.10.2 Description: Roadway**

This task includes survey, roadway, pavement and drainage design, plans, cross sections, soil profile, final design office meeting, draft special provisions and final design field view.

**SOW:**

**2.10.2.1 Final Drainage Design**

One copy of the plan depicting the drainage design and the hydraulic design computations

for roadway drainage structures shall be submitted to the appropriate District Office for review and comment by the Project Manager or designated drainage engineer. As directed by the District, one additional copy of the drainage submission shall be sent to Central Office, Bureau of Design for quality assurance review.

The following work elements are required for the successful completion of this task:

1. Develop a drainage design that provides the proper capacity, spacing, size and type of drainage facility (existing and proposed) for each drainage area, location, fill height, roadway type and environmental condition including all inlets, pipes, culverts, ditches and base drains.
2. Prepare hydraulic design computations using appropriate methodologies for all roadway drainage structures. Include energy grade line and hydraulic grade line computations for existing and proposed systems.
3. Develop alternate pipe designs as required with corresponding hydraulic computations for each alternate. Provide "For Information Only" quantities for each pipe type and alternate as well as minimum and maximum fill heights as required.
4. Verify that downstream drainage capacity is sufficient for the proposed design. Conform to local municipal storm water requirements, if a local storm water ordinance exists.
5. Show all existing and proposed drainage facilities on construction cross sections and profiles.
6. Prepare transmittal letter to include, plans showing drainage design and hydraulic design computations.

Provide PE seal on all plans and computations.

#### **2.10.2.2 Final Pavement Design**

Follow Publication 13M, Design Manual Part 2, which refers to Publication 242, Pavement Policy Manual for the preparation of final pavement design.

#### **2.10.2.3 Roadway Plan**

The submission will include the completion of the following work items:

1. Interchange Design
2. Intersection Design - Prepare pavement elevation plans to describe the horizontal and vertical geometry that cross sections cannot describe.
3. Airport Clearances - Review Part 77 of the Federal Aviation Regulations and adjust the design accordingly when the project is within 2 (3.2 km) miles of an operating airport. If the project is within 2 (3.2 km) miles of an operating airport, an Airport Clearance Submission to the FAA is required.

Prepare all the following work elements:

(Note: Plans listed below are highway design plans only and do not include also plans.)

1. Title sheet
2. Index/General Note Sheet
3. Typical Section Sheet (Location Map and General Notes)
4. Summary of Quantities Sheets
5. Tabulation of Quantities Sheets
6. Detail Plan Sheets
7. Profile Sheets
8. Contour, Grading, and Drainage Plans
9. Landscaping Plans
10. Cross Sections
11. Special Detail Sheets
12. Required Forms, Special Provisions and Estimates

#### **2.10.2.4 Final Design Office Meeting**

1. Conduct the Final Design Office Meeting as early as possible and always prior to the final construction plan check.

2. The Final Design Office Meeting should be held when the following conditions are met:
  - \* Approvals are obtained as indicated in Design Manual Part 1A
  - \* Planning and coordination is completed for all major utility relocations as defined in Publication 16M, Design Manual Part 5.
  - \* TS&L drawings are approved according to Design Manual Part 1A.
  - \* A draft of all major special provisions describing their intended purpose.
3. A report on required agreements with municipalities or other local political subdivisions is required for the Final Design Office Meeting.
4. Two (2) sets of prints are required showing all corrections made based on comments received with appropriate approvals from the project's Safety Review and indicating FHWA's participation limits, if applicable.
5. District transmits copies of meeting minutes to those in attendance.
6. Bureau of Design transmits the official meeting minutes to FHWA, if applicable.

#### **2.10.2.4.1 Plans**

The Engineer will submit 90% plans and specifications for review by the District, Central Office and FHWA. The final design office review must be performed prior to the final plan check.

The Final Design Office Meeting is held to review project development after the following design issues are approved and the plan has been developed to a 90% level of completion:

- Typical sections
- Pavement design
- Service road justification
- Interchange geometrics
- Hydraulic computations
- Addenda (if required) to the draft Soils and Geological Engineering Report
- Final Traffic Control Plan (TCP)
- Erosion and Sedimentation (E&S) Control Plan
- Hydraulic design of structures
- Final Lighting Plans
- Final Signing Plans
- Final Traffic Signal Plans
- Special Provisions
- Planning and coordination of all major utility relocations
- Structural drawings

#### **2.10.2.4.2 Draft Special Provisions**

1. If changes are necessary to a standard special provision then write an individual special provision.
2. Obtain review and approval of proprietary and experimental items in special provisions.
3. Make special provisions available for review by Department offices, municipalities, utilities and others in authority as appropriate.
4. All reviews and issues are to be resolved prior to the PS&E

#### **2.10.2.5 Final Design Field View**

1. Conduct final design field view early in final design (about 35% completion level).
2. Evaluate the proposed design under field conditions.
3. Solicit comments from review agencies for further project development
4. Obtain acceptance of the Final Design Field View Submission and approval to proceed with final design.
5. Prepare the Final Design Field View Submission (two copies) for reviewing agencies at least several weeks prior to the Final Design Field View. Include the following:
  - \* Plans
  - \* Profiles
  - \* Typical Sections
  - \* Cross Sections

6. Prepare Final Design Field View Minutes which serve as official record of key decisions. Include the following:

- \* Project Index Map
- \* Location Map
- \* Typical Section
- \* Updated Cost Estimate

**2.10.2.6 Permit Approvals**

This task is the time required to receive permits for NPDES, Waste/Borrow, Coast Guard and other permits not received during Preliminary Design

**2.10.2.6.1 Waste/Borrow Areas**

Perform the following tasks:

1. Identify areas to be used for excess excavation or to obtain borrow material, as needed.
2. Meet to discuss the sites identified and evaluate which sites are appropriate to carry forward for nvironmental clearance.
3. Conduct the appropriate environmental studies to obtain environmental clearance for the selected site(s).
4. Prepare environmental document and submit for review/approval.

**2.10.2.6.2 Coast Guard**

Perform the following tasks:

1. Coordinate with the U.S. Coast Guard to determine the navigable status of a waterway. Determine if the project will require a permit under Section 10 of the Rivers and Harbors Act of 1899.
2. Determine the specific information requirements for the Section 10 Permit.
3. Prepare Section 10 Application package. The application must include the following information: name and address of the applicant; the waterway and location of the bridge; citation to the act of Congress or the State legislature authorizing the bridge; a map of the location and plans of the bridge showing the features which affect navigation; and papers to establish the identity of the applicant. Four sets of plans must be submitted with the application.
4. Submit application to PennDOT for review. Revise if necessary. Submit permit application with plans to the U.S. Coast Guard. Upon receipt of permit, the U.S. Coast Guard will schedule a hearing, if applicable, hold meetings with the permit tee to clarify issues and, prepare their report with recommendations and issue the permit.
5. Attend public hearing, if applicable. A public hearing will only be held when there are substantial issues concerning the effect that the proposed bridge will have on the reasonable needs of navigation.

**2.10.2.6.3 Other Permits**

Perform the following tasks:

1. Coordinate any additional permits or approvals needed to commence construction with the appropriate agency or responsible party. Prepare applications or supporting documentation to obtain permits/approvals.
2. Submit for review/comments.
3. Revise as necessary.
4. Submit permits or supporting documentation to responsible agency/party for review/approval.

**Detail:**

The following items may require an adjustment to the length of time it takes to complete final design drainage:

- Local municipal stormwater management requirements
- Specific environmental commitments relating to stormwater described in the environmental documents

The following items may require an adjustment to the length of time it takes to complete final pavement design, plans, draft special provisions and final design field view.

1. Size of the project.
2. Type of the project

The type and extent of environmental impacts will determine the Level of NEPA document required for clearance.

Coordination with the U.S. Coast Guard is required to determine the navigable status of waterway and to determine specific permit requirements, if needed. This task may also include the preparation of a permit application to obtain the Section 10 Permit.

The required permits will vary from project to project depending on the improvements being made.

**WBS**  
**Objective:**

**2.10.3 Description: Supplemental Surveys**

This task includes all survey required to supplement the original roadway survey or aerial mapping performed in Preliminary Design.

**SOW:**

Final design requires a higher level of detail in construction plan preparation than preliminary engineering. Additional detail and data are obtained through supplemental surveys. Specific examples of information to be obtained through supplemental survey could include:

- \* Stream profiles and cross sections.
- \* Inverts and elevations of underground facilities
- \* Railroad rail elevations and profiles
- \* Wire elevations to verify clearances.
- \* Verify property improvement locations of critical areas
- \* Locate any project design control where aerial mapping accuracy is insufficient.

Supplemental surveys shall be performed in accordance with the requirements outlined in Publication 122M, Survey Manual; Publication 203M, Work Zone Traffic Control; and applicable sections of Publication 10A, Design Manual Part 1A.

**Detail:**

The following items may require an adjustment to the length of time it takes to complete this task.

- \* Excessive distance from the project to achieve tie-ins to established vertical and horizontal control points.
- \* Unusual traffic control requirements needed to perform field survey work.
- \* Hostile denial of entry by property owner(s) to allow surveys to be performed.
- \* Special equipment and/or crafts required for waterway and tunnel surveys.
- \* Sight line clearing of dense vegetation for surveys.
- \* Traverse line establishment for inaccessible area surveys.

**WBS**  
**Objective:**

**2.10.4 Description: Cross Sections**

This task is the preparation of final cross sections in accordance with Publication 10A, Design Manual Part 1A.

**SOW:**

The cross sections will be based on the vertical and horizontal alignments and will be plotted at an appropriate vertical and horizontal scale.

Cross section intervals should be taken at a distance that clarifies the existing conditions not to exceed 50 feet. Shorter intervals should be considered for walls and other permanent structures or special conditions. Develop a half - section at each driveway location without prepared profiles.

The following work elements are required for the successful completion of this task:

1. Cross sections at selected intervals.

2. Cross section title sheet providing number of cross section sheets in the package, break-down of each alignment with stations and related sheet numbers.
3. Cross section reference sheet at all interchanges and complex intersections
4. Develop earthwork quantities for each section and place on sheet.
5. Submit cross sections in accordance with Publication 14M, Design Manual Part 3.

**Detail:**

The following items may require an adjustment to the length of time it takes to complete this task:

1. Show areas of environmental contamination on the affected sections
2. For rehabilitation sections, show existing pavement depths
3. For complex erosion control plans show proposed sedimentation control devices such as sediment basins
4. For projects with "tight" right of way show required right of way and easement lines
5. Base existing ground elevations on mapping prepared for the project. Consider the following when determining the type of mapping to be used i.e. field surveys, aerial mapping or existing mapping:
  - Size and complexity of project
  - Adequacy of mapping used in preliminary design
  - Cost of field surveys in relation to size of project
  - Value of field surveys versus aerial mapping

**WBS**

**Objective:**

**2.10.5 Description: Final Right-of-Way Plan**

This task includes all work necessary to prepare the final R/W plan in accordance with Publication 14M, Design Manual Part 3.

**SOW:**

Right-of-Way Plans, when specified in the project scope of work, will be the basis for determining all property damages which are involved in the construction requirements of a highway project. They will also serve as the legal record of the location, the extent, and the character of any acquisition of Right-of-Way, Permanent Easements, and Temporary Easements by the Commonwealth.

The Right of Way Plan presentation format will be as specified in the project scope of work. The Right-of-Way Plan format could be either, or a combination of the following:

- A. Standard Right-of-Way Plan - For the authorization of acquisition of both total take and partial take property, for both Free Access and Limited Access highways.
- B. Final Plan - Reestablishes and/or authorizes the GAP Plan right-of-way, if necessary, and establishes right-of-way and authorizes acquisition of property requirements that were not included under the GAP Plan.
- C. Combination Plan - This plan combines both the Right-of-Way and Construction requirements on the drawings. This plan shall be acceptable only for small Federal Aid and 100% state-financed projects involving few properties with no relocation problems.
- D. Simplified Right-of-Way Plan - This plan is a simple one (1) or two (2) sheet Right-of-Way Plan, applicable to small projects, where construction is primarily within existing legal right-of-way where only a few properties are involved and the area of taking is minor.

The following are general tasks and their description for Right-of-Way Plan preparation:

1. Current Property Owner Record Research
2. Deed Plotting
3. Composite Deed Plot Matrix Map
4. Property Owner Name
5. Parcel Numbers
6. Right-of-Way Plan Preparation

The following are the basic requirements comprising Right-of-Way Plan preparations:

1. Title Sheet
2. Index Sheet
3. Location Map, General Notes, Etc., Sheets
4. Typical Sections
5. Summary of Project Coordinates
6. Summary of Required Right-of-Way Line Coordinates



- 7. Detail Plan Sheets
- 8. Profile Sheets
- 9. Property Plats
- 10. Right-of-Way Plan Revisions

**Detail:**

The following are considered as special requirements beyond the standard Scope of Work for Right-of-Way Plan preparations. The situations will be specific to only certain projects, as required and directed by the District.

- Individual Property Boundary Surveys
- Preparation of Property Plats for Board of Viewer's Actions (except Philadelphia County)
- Combination City of Philadelphia Board of View Plans and Right-of-Way Plans
- Preparation of Property Boundary Legal Description

**WBS**

**Objective:**

**SOW:**

**2.10.6 Description: Right-of-Way Negotiations**

This task includes all time required to perform R/W negotiations.

Right-of-way claim negotiations will be in accordance with the policies and procedures as established in the latest Right-of-Way Manual.

Should rare, or unusual circumstance become evident during the negotiation process, the Chief of the Acquisition Section shall be contacted for advice and assistance.

**Detail:**

**WBS**

**Objective:**

**SOW:**

**2.10.7 Description: Right-of-Way Acquisitions**

This task includes all time required to perform R/W acquisitions.

Right-of-way acquisitions will be in accordance with the policies and procedures as established in the latest Right-of-Way Manual.

Should rare, or unusual circumstance become evident during the acquisition process, the Chief of the Acquisition Section shall be contacted for advice and assistance.

**2.10.7.1 ROW Certificate**

Various forms and reports in the Real Estate Management Information Systems (REMIS) are designed to supply current status information for every project and claim. When all claims for a project are settled and all possible costs are paid, the District will forward a letter to the Central Offices to request that the right-of-way project be closed and the central offices issuance of the right-of-way certificate.

**Detail:**

The following are considered as special requirements beyond the standard Scope of Work for Right-of-Way Plan preparations. The situations will be specific to only certain projects, as required and directed by the District.

- Right-of-Way plan revision

**WBS**

**Objective:**

**SOW:**

**2.10.8 Description: Utility Engineering**

This task consists of engineering for utility relocation.

The utilities' tentative requirements for the design and construction of the relocations shall be solicited as soon as possible to determine if: work will be done by utility staff and forces; or work will be done by utility consultant and contractor; or work will be requested to be done by PennDOT's project designer and contractor; or any combinations of the above.

The District shall advise the utilities that:

\* Authorization to perform preliminary and final utility engineering will be provided in writing by the Department.

\* When requested by the utility, the Department will acquire substitute right-of-way for utility relocation, when the requirements comply with Section 412 of the State Highway Law and Publication 16M, Design Manual Part 5.

\* All utility related formal requests for agreements, permits and occupancy applications must be in accordance with the applicable policies and procedures of Design Manual Part 5.

\* Utilities will need to provide intent for bridge occupancy, and details for their requirements, within 30 days from the receipt date of Form 4181X.

\* The utility should notify the Department of any material that may be difficult to obtain, or delivery may require early ordering to avoid project delays.

**2.10.8.1 Utility Coordination**

The general procedure for utility coordination is, but not limited to, the following:

1. Delineate the type, size and location utility information verified by the utility company onto the project plans, profiles and cross sections.

2. Submit prints of the preliminary design plans, profiles and cross sections to utility company for their review and preliminary relocation planning and cost estimates.
3. Schedule and conduct the second utility meeting to discuss and resolve utility/design conflicts and concerns, including substitute right-of-way, when required. A clear understanding of who is responsible for the preparation of the utility relocation plan, and who will be responsible for the relocation construction should be reached at this time.
4. Upon receipt of utility relocation alignment plans, establish and delineate the substitute right-of way, or reserved easements, corridor for the utility relocation on the project Right-of-Way Plan.
5. Provide all project involved utility companies with information relative to Right-of-Way Plans and Construction Plan revisions as soon as they occur.
6. Upon receipt of the final utility relocation plan for construction delineate the proposed relocations on the project's construction plan for all work to be performed by the utility company. Incorporate all utility relocation work to be performed by the PADOT contractor, as ALSO Plans, or other approved procedures, into the project construction contract documents.

Obtain the restrictive, prior, and concurrent work calendar day estimates from the utility company for work to be performed by their own forces. The utility relocation construction duration time and schedule restrictions must be incorporated into the overall project construction schedule determination.

Unless specified otherwise in the project scope of work, all project related Utility Agreements and utility authorizations will be the responsibility of the District Utility Unit.

#### **2.10.8.2 Utility Agreements**

Arrangements for utility relocation, or adjustment, reimbursements and highway occupancy for highway projects must be accomplished through applicable agreement types.

Details concerning the preparations and processing of agreement drafts and encumbrance documents are contained in Publication 16M, Design Manual Part 5.

The basic agreement type(s) for highway projects are:

- \* Standard Agreements for reimbursement will be prepared and executed when the Utility's preliminary estimates and highway occupancy requirements package has been approved by the Department. The agreement will contain, or reference, pertinent information per Design Manual Part 5.
- \* Master Agreements for reimbursement will be prepared and executed when the Utility has a uniform accounting system, that is acceptable to the Department, to allow incorporation of the basic wording of a standard agreement into a general format applicable to the project. The Master Agreements must be supplemented with a Letter Agreement in accordance with the applicable requirement of Design Manual Part 5.
- \* Lump Sum Agreements for reimbursement will be prepared and executed, when requested by the Utility, where the State's share of the utility relocation cost does not exceed \$25,000.00. This type of agreement must have prior approval from the Central Office Utility Unit, and the request must contain all pertinent information as stipulated in Design Manual Part 5.
- \* Casting Agreements for reimbursement will be prepared and executed for adjustment of utility castings on highway construction projects by either of the following procedures:
  1. Adjustments by the Utility's forces.
  2. Adjustments by the Utility's contractor.
  3. Utility's negotiation with highway project contractor.
  4. Adjustments incorporated into the highway construction contract.

Guidelines and stipulations for casting agreements and master casting agreements shall be in accordance with Design Manual Part 5.

\* Letter Agreements must be originated by the utility, on individual projects, to supplement the master agreements and master casting agreements. The requirements and information to be provided shall be as stipulated in Design Manual Part 5.

\* Supplements to Basic Reimbursement Agreements shall be prepared and executed under the following circumstances:

1. A major change in the "Scope of Work" that requires prior Department approval.
2. An increase of 10 percent or more to the original pro-rated shares of participation.
3. When the monetary increase exceed the limits listed in Design Manual Part 5.

\* Utility Corridor Agreements will be prepared and executed in accordance with Department and Federal Highway Administrations' 23 CFR policies. The agreement shall define the financial obligation of the utility, the utility highway occupancy requirements and other pertinent data necessary to provide longitudinal occupancy of a limited access highway, as stipulated in Design Manual Part 5.

#### **2.10.8.3 Utility Permits**

Except for emergency repairs to existing utility facilities, and the accessing of facilities via existing manholes within non-limited access right-of-way, a permit must be obtained from the Department for construction involving the placing of utility facilities, or the opening of the surface within any state highway right-of-way.

When applicable, the utility company desiring occupancy on a state highway project shall make a preliminary permit application submission to the Department in accordance with the provisions of Publication 16M, Design Manual Part 5, and the utilization of Department Form 4181.

When applicable, the utility owner will make a formal occupancy permit application to the Department by submitting a properly completed Department Form M-945A, with the applicants signature affixed, together with four (4) sets of legible plans depicting the location and nature of work to be performed, and a fee in the amount stipulated by the Department's fee schedule.

Upon approval of the permit application, the Department will issue a nontransferable permit to the applicant. The applicant shall abide with all stipulations and conditions of the permit. A supplement to the permit can be requested by the applicant should the nature, or limit, of work need to be changed subsequent to the original permit issuance.

When a utility requires occupancy on a state bridge, the utility owner must have a license for occupancy from the Department.

The bridge license application, Department Form M-9064, shall be completed and signed by the facility owner and submitted to the district bridge engineer, together with plan sets which depict the location and all installation details for the facilities. A fee, in the amounts stipulated in the Department Fee Schedules, shall be included with the license application submission to the Department.

Upon the approval of the bridge license application, the Department will issue a license to the applicant. The licensee shall abide with all stipulations and conditions contained on the license.

The license is issued only to the utility owner, and is not transferable.

It will be the responsibility of the utility owner to obtain any permits required by other federal, state or local government agencies that are not under the jurisdiction of the Pennsylvania Department of Transportation.

#### **2.10.8.4 D-419 (Utility Clearance)**

The utility clearance Form D-419 will be prepared for all state highway projects for the purpose of Department records and construction scheduling, and for the highway contractor's information.

The utility clearance form shall depict the involvement and status of each utility on the project, as follows:

\* When no utility facilities are involved in the highway project, Form D-419 will note "There

are no known utility facilities located within the project limits."

- \* Name of each utility company, type of facility, and location of involvement.
- \* Each area of relocation shall be identified by state route number, segment and offset.
- \* Include description of work to be accomplished, with either aerial or underground indicated.
- \* The estimated time, in working days, to complete the installation.
- \* Indicate "not affected" when existing facilities do not need relocation or other adjustment work.

The utility work listed on Form D-419 shall include at least one of the following classifications:

- A. "Prior Work" - Utility work performed prior to the highway contract notice to proceed.
- B. "Restrictive Work" - Utility work that must be completed before the highway contractor can operate without restrictions.
- C. "Concurrent Work" - Utility work that can be performed concurrent with highway contract work, without restricting the highway contractor's operations.
- D. "Coordinated Work" - Utility work that requires the highway contractor to perform certain phases of work before utility work can proceed.
- E. "Not Affected" - When utility work is not anticipated on the highway project.
- F. "Incorporated" - When the utility work is included in the PennDOT contractor's work.
- G. "Seasonal Work" - When the utility work is restricted during specified times of the year due to seasonal demands or other circumstances.

The D-419 utility clearance data shall be included in the project proposal bid documents.

For every highway project, regardless of the funding type, a utility clearance assurance statement shall be prepared and distributed by the District, to the proper official, prior to advertising for project bidding.

**Detail:**

The following items may require an adjustment to the length of time it takes to complete this task:

- \* Federal Participation Funded Projects
- \* Local Funded Projects
- \* 100% State Funded Projects
- \* Reimbursable Design and/or construction Utility Relocations
- \* Non-reimbursable Design and/or Construction Utility Relocations
- \* Utility's Refusal to Perform Relocations.
- \* Requirement for an independent firm to provide existing utilities type, size and location information.
- \* Requirement to have the Consultant prepare the Utility Relocation Plans Estimates and Specification
- \* Requirement to provide field survey measurements from the project centerline/baseline to the points of the utilities information needs

**WBS  
Objective:  
SOW:**

**2.10.9 Description: Railroad Activities**

This task includes RR coordination and PUC involvement.

When improvement or creation of a railroad crossing is included within the limits of a highway construction project, it is the responsibility of the project designer to coordinate all required railroad/highway interaction activities, in accordance with applicable policies and procedures outlined in Publication 10/10A, Design Manual Part 1/1A and Publication 16M, Design Manual Part 5.

In connection with a highway construction project on which a railroad crossing is involved, the Department will file an application with the Public Utility Commission for the improvement or creation of the railroad crossing. All parties involved, including affected utility companies, shall be furnished with copies of the application.

Relative to the Department's application, the Public Utility Commission will schedule a field investigation and conference meeting to which all parties of interest are invited to attend and discuss the project.

At the field conference, the Commission will establish the area over which it will assume jurisdiction. The Commission may assume jurisdiction over any portion, or over the entire highway improvement project.

#### **2.10.9.1 RR Coordination**

The railroad shall be contacted as early as possible in the design process and advised of the potential impact of the project on its facilities with a formal notification letter. A project location map should be enclosed with the letter.

Submit Forms D-4279 and D-4279A to the railroad and request their return of the completed forms.

Request, from the railroad, railroad track and valuation maps for the highway project area, if needed.

Request, from the railroad, their requirements and restrictions for entrance onto railroad property by Department, their agents, and personnel to make surveys and investigations for project design. The railroad's requirements concerning insurance, permits, etc. must be met prior to entering onto railroad property.

Submit copies of each design phase highway and structure plans to the railroad for their review, approval and comment. The plan submissions must clearly show the location and type of the proposed highway/railroad involvements and horizontal and vertical clearances in the case of a structure.

When the railroad work is incorporated into the highway construction contract, obtain copies of the railroad's construction details and construction specifications for the related work items, if available.

Schedule meetings, and invite railroad representatives to discuss and resolve railroad/highway design issues.

Record all railroad related meeting minutes, telephone conversations, etc. and distribute copies, including correspondence, to all affected companies and agencies.

#### **2.10.9.2 PUC Hearing**

When one or more of the affected parties raises objections to the proposed improvements for the hearing.

Plans and documents must be prepared and submitted in accordance with applicable requirements of Publication 10A, Design Manual Part 1A.

The purpose of the formal hearing is to hear testimony from parties, both for and against the proposed improvements. The hearing must also be held for the allocation of costs and assignment of maintenance responsibilities.

The result of the formal hearing will be the rendering of decisions, by a PUC judge, and the preparation of the order spelling out the actions to be taken and the responsibilities for all involved parties.

#### **2.10.9.3 PUC Secretarial Letter/Order**

If no objections are raised to the project at the field conference, a secretarial letter may be issued by the PUC approving the project. If objections are raised, the case is set for a hearing before a PUC judge with the judge deciding the issues. If any railroad property needs to be appropriated for the project, it must be done so by a PUC order rather than a secretarial letter. Final signed right-of-way plans are needed by the PUC prior to appropriation of property.

#### **2.10.9.4 PUC Approval of Construction Plan**

Final construction for the project plans must be submitted to the commission for approval and to the parties involved for review prior to the start of construction. Ideally, the project should not be let prior to the issuance of a secretarial letter or order by the PUC. In no case, the contract should be awarded without a secretarial letter/order.

#### **Detail:**

The following items may require an adjustment to the length of time it takes to complete this task:

- Issues regarding horizontal and vertical clearances.
- Project requires temporary track relocation.
- Project requires permanent track relocation.
- Project involves more than one railroad company.

- Railroad company(s) uncooperative
- Revision to Right-of-Way Plan
- Revision to Construction Plan
- Delay in issuance of a decision by the Judge
- Modification of the Judge's decision by the commission
- Revision to construction plan
- Final right-of-way plan not ready, if needed
- Hearing process delay
- If invoked
- PUC order secretarial letter issuance delay
- Required Right-of-Way Plan revision
- Required Construction Plan revision
- PUC Order or Secretarial letter issuance delay

**WBS**

**Objective:**

**SOW:**

**Detail:**

**2.10.10 Description: Wetlands Mitigation Plan**

This task is the development of the wetland mitigation plan. Refer to Publication 325, Wetland Resources Handbook.

Prepare the final wetland mitigation plan following the recommendations in the Wetland Mitigation Site Selection Report and the Conceptual Wetland Mitigation Plan. The plan will be included in the PS&E package as an "Also" Plan. For offsite mitigation, the plans and specifications can be prepared as a separate

**WBS**

**Objective:**

**SOW:**

**2.10.11 Description: Contour Grading and Drainage Plans**

This task is the development of the contour grading & drainage plan.

Final Design, Contour Grading and Drainage may be required with submissions for: new highway facilities, interchange geometrics, intersection geometrics (optional), safety rest areas, service areas, tourist sites, borrow and waste areas, and other special areas.

The objective of a Contour Grading and Drainage Plan is to relate construction elements with each other and with the topography, to reduce maintenance, to increase safety and to improve the appearance of the entire area.

**Detail:**

**WBS**

**Objective:**

**SOW:**

**2.10.12 Description: Highway Lighting Plan**

This task is the development of the highway lighting plan.

1. Develop final lighting plans in accordance with Publication 14M, Design Manual Part 3; pre-design meeting items; and Publication 13M, Design Manual Part 2.
2. Final lighting plans are to be submitted to the Central Office, Highway Lighting Section for approval prior to release of the final plans to the District office for PS&E development.
3. Any exceptions to the general lighting policies must be approved by the Deputy Secretary for Highway Administration.

**Detail:**

The following items may require an adjustment to the length of time it takes to complete this task:

1. Size of project.
2. Type of project.

**WBS**

**Objective:**

**SOW:**

**2.10.13 Description: Final Structure Plans**

This task is the development of the final structure plans.

1. Complete final engineering design(s) for structures on the project based upon the approved type, size and location (TS&L) plans and approved foundation recommendations. Prepare design calculations, construction documents and QA/QC forms in accordance with the Department's Design Manuals as amended by current strike-off letters.
2. Provide pay items and special provisions for design alternate bidding.
3. Provide plan details and special provisions as required for support of excavation and for construction phasing.
4. Provide special provisions for items not covered by Department specifications. Obtain current standard special provisions list from District and utilize standard special provisions whenever possible. Write project specific special provisions, if needed.

5. Prepare cost estimate for each structure based upon estimated quantities and historical data for similar structures in the project region. Consider access, phasing, and relative difficulty of construction in establishing unit prices.

6. Make a pre-final submission to the Department of completed plans, special provisions, quantity estimates, cost estimates, QA/QC forms and computations.

7. Revise the previously submitted documents as required to address the Department's comments thereon. Document responses to comments in writing.

8. Submit the final plans, special provisions, quantity estimates, cost estimates, QA/QC forms and computations properly signed and sealed and in the form described in Publication 15M, Design Manual Part 4.

**Detail:**

The following elements should be included as applicable:

- Seismic design requirements
- Construction phasing
- Additional review submissions or progress submissions
- Restrictions on permitted alternates
- Special considerations such as historic or environmentally sensitive sites which may impact design and construction
- Co-ordination of highway and structural design if not all being performed by same consultant.

**WBS**

**Objective:**

**2.10.14 Description: Traffic Control Plan**

This task is the development of the final traffic control plan. Publication 14M, Design Manual 3; the MUTCD and Publication 203M apply to this task.

**SOW:**

Phasing schemes, sign messages, and approximate locations of signs and traffic control devices should be approved at the Design Field View stage, prior to the development of the final plans.

The Traffic Control Plan will be a stand-alone plan and will include the following:

- Title sheet with general notes, location map, and pay item quantities,
- Tabulation of Traffic Control Devices,
- Typical-sections
- Narrative describing each stage and phase by stating the work to be performed and the traffic control to be implemented
- General plan layout
- Temporary road plan, typical-section and profile (if necessary)
- Temporary signal plan (if necessary)
- Special Sign Details (if necessary)

The plan will also include, but will not be limited to, sign messages, sign sizes, general sign locations, tapers lengths, barricades, channelizing devices, impact attenuators, temporary pavement markings, temporary roadway locations, detours, portable changeable message signs, and arrow boards. Detail of temporary roads cross-section and profile will be included as well as other details as appropriate.

If detours are necessary, the detour route(s) will be identified and driven to determine general safety issues and restrictions. State roads requiring a detour will utilize other State owned roadways. If detour routes formed from State owned roads are found to be unacceptable because of length or other reasons, then agreements between the State and municipalities will need to be developed to utilize local roadways. This scope does not include support activities needed to develop agreements between the State and municipalities.

In locations where pedestrian movements are prominent, either safe passage or restrictions will be addressed. Scope associated with construction temporary pedestrian structures and signals will be included in either the Amendments to the Standard Scope of Work or the Detailed Project Approach.

This scope of work does not provide for a temporary traffic signal plan. If the implementation of the traffic control plan impacts a signalized intersection such that a temporary signal design is necessitated, the temporary signal plan will be incorporated into the traffic control plan. However, the scope of work for the temporary signal design will be provided in the Detailed Project Approach or in the Amendments to the Standard Scope of Work.



Specifications will include the description of the construction staging and phasing. Special provisions will also be written for traffic control devices outside the scope of the specifications included in the Publication 408M.

If required for boring and drilling work associated with geotechnical studies, the subconsultant will develop traffic control plans. Details of the design for these plans will be provided in the Detailed Project Approach.

**Detail:**

The following items may require an amendment to the standard statement of work.

- Any commitments, phasing schemes, and work limitations that have been approved during the design field view process.
- Plan presentation preferences including showing sign pictorially
- Any restrictions associated with the reduction of lanes, stoppages of traffic, or use of one lane-two way alternating traffic.
- Preferences for removal of pavement markings.
- Details for anticipated temporary traffic signal designs, pedestrian requirements, and local access requirements.
- The need to calculation of Road User Liquidated Damages for Freeway and Expressway projects
- The need to consider non-standard items in the design including Off-Duty Uniformed Police Officers during peak time periods at signalized intersections inside the limits or along the detours, and the use of tow trucks on freeway/expressway projects to clear vehicle breakdowns if adequate shoulder width is not available for pulling off the road.

**WBS**

**Objective:**

**SOW:**

**2.10.15 Description: Traffic Signal Timings and Plan**

This task is the development of the traffic signal timings and final signal plans.

Prepare a traffic signal construction plan in accordance with Publication 14M, Design Manual Part 3; Publication 148, Traffic Standards (TC-7800); and Publication 149, Traffic Signal Design Handbook. The Traffic Signal Construction Plan shall include a Title Sheet, an Index Sheet, a Summary of Quantities Sheet, a Traffic Signal Plan Sheet, a Tabulation of Quantities Sheet, and Special Provisions. In event of overhead street name signs, supply type II (sign fabrication) drawings as per Design Manual Part 3.

When the Traffic Signal Construction Plan is included in a Construction Plans Package as a Supplemental Plan, the Title Sheet, the Index Sheet, and the Summary of Quantities Sheet shall be omitted from the plan. If the traffic signal is a part of a coordinated network, a Network Coordination Chart identifying the coordination scenarios and the signal offsets for each of the individual traffic signals shall be developed and included on the Traffic Signal Plan Sheet.

A Tabulation of Quantities Sheet shall be prepared. Individual tabulation of quantities shall be made for the following items.

- Signs,
- Traffic Signal Supports,
- Electrical Distribution (Conduit, Trench, Cable, Junction Boxes, Electrical Service).
- Detectors.
- Pavement Markings.
- Miscellaneous Equipment (Controller Assemblies, Systems and Communications Equipment, Signal Heads).
- A detail sheet showing none standard items, including, but not limited to, items such as mast arm details with W3-03 flashing lights.

Special Provisions need to be developed when issues pertaining to Items of Work, Materials, Requirements, or Instructions are; not contained on the drawings; are not in the specifications; apply only to the project under consideration; and are considered essential to the satisfactory completion of the contract within its intended scope. Special Provisions shall be submitted with the Traffic Signal Plan as a separate entity in themselves

Submit full size drawings of the Traffic Signal Construction Plan to the District Traffic Engineer with copy to the project manager or directly to the project manager at the completion of the 60% and 90% project completion levels for review and comment. Meet with the District Traffic Engineer or his assigns to discuss the review comments before advancing the design. Submit copies of the Special Provisions at the 90% project completion level.

The Final Traffic Signal Construction Plan shall be originated and stored in a digital format. Digital and printed copies shall be provided to the District's Project Manager. Final copies of drawings, design calculations, and Special Provisions shall be delivered in the format and



quantities specified in the Engineering Agreement.

Prepare a Traffic Signal Permit plan by modifying the Traffic Signal Plan Sheet to reflect the final permitted operation of the traffic signal. Notes specific to the signal construction shall be removed and notes identifying the Permittees responsibilities shall be added. Add a permit issue block to the upper right hand corner of the plan sheet.

Submit the Traffic Signal Permit Plan along with the completed signal permit application and a copy of the municipality's legally adopted resolution prior to the PS& E submission.

Perform the following for final traffic signal timings:

1. Use the latest version computer software, which is based upon the Federal Highway Administration's 1997 Highway Capacity Manual, to evaluate the traffic capacity of the intersections. Identify an initial optimized timing and phasing operation for each individual intersection.
2. Prepare design calculations for cycle lengths, green splits, actuation timings, pedestrian intervals, change and clearance intervals, cable and conduit sizing, and preemption timings in accordance with Publication 149, Traffic Signal Design Handbook.
3. Compile all traffic analysis and original checked work sheets into a bound document. Submit this document to the District Traffic Engineer at the 90% project completion level. Submit vehicle turning analysis with data.

**Detail:**

District preferences for mast arm vs. span wire supports  
District equipment preferences including LED lights.  
Does the District require more than the Am and PM weekday signal timings?

**WBS**

**Objective:**

**SOW:**

**2.10.16 Description: Pavement Marking Plan**

This task is the development of the pavement marking plan.

The final submission will include:

- General Plans
- Special Details
- Delineator Spacing Tables
- Delineator Mounting Details
- Quantities
- Specifications

For mainline roadway sections where markings and delineators are consistent and repetitive, typical details will be developed to eliminate unnecessary drafting and design sheets. The pavement marking and delineation plan for the interchange areas will detail all gore areas, islands and other special markings. Beginning and ending stations will be shown for longitudinal pavement markings and station locations will be identified for pavement legends.

Depending on the complexity of the project, the details of the plan and the total length of the project, the elements of the pavement marking and delineation plan may be incorporated with the signing plan.

**Detail:**

The following items may require an amendment to the standard statement of work:

- Type of pavement marking (epoxy, water based or plastic, et al.)
- Width of pavement markings
- Indication as to if delineators are anticipated
- Project preferences concerning the use and type of delineators
- Project preferences concerning reflective pavement markers

If coordinate system is required, then the type of system (i.e., time based, hard wired) should be indicated. Will the signal design have preemption requirements? Are there unique design requirements such as protected turning phase, interconnections, existing equipment conditions?

**WBS**

**Objective:**

**SOW:**

**2.10.17 Description: Signing and Sign Lighting Plan**

This task is the development of the signing & sign lighting plan.

Prior to the development of the final plans, sign messages, approximate locations, and sign types should be approved at the Design Field View stage.

The final submission will include:

- A Title Sheet
- Index Sheet
- An Index-Location Map
- Tabulation of Quantities Sheet(s)
- Summary of Quantities (used only if signing plan is a stand alone plan)
- Detail Sheets
- Specifications

Type I Detail Sheets (general plans) will include the sign messages, sign location, type of signs, and type of installation. All destinations, regulatory, warning and informational signs necessary to control and maintain traffic upon completion of construction will be included.

Type II Detail Sheet includes sign structure details. These plans include:

- A location plan
- Plan, elevation and end view of the sign structure
- Details
- Sign schematic
- Sections and steel sizes for Type A signs
- Estimated quantities
- Design criteria
- General notes.

Type III Detail Sheet consists of sign fabrication information and includes:

- Length of sign
- Height of sign
- Sign legend details including letter spacing, letter size and series, and sign color)
- Size of border and radii of corners
- Sign lighting design
- Quantities

**Detail:**

The following items may require an adjustment to the time it takes to complete this task:

- Number of at-grade intersections and/or interchanges
- Spacing between intersections and/or interchanges
- Destinations and distances to be used in each direction
- Number of anticipated overhead signs and ground mounted signs
- Indication that catwalks on the overhead sign structures will be required
- Project preferences concerning text size on fabricated signs
- Project preferences concerning the use of ultimate loading verses actual loading on sign structures
- Project preferences concerning the acceptability of bridge mounted signs
- Project preferences concerning the use of exit number panels and the expected numbering
- Indication as to if tourist oriented directional signing is anticipated
- Indication as to if mile markers are anticipated
- Project preferences concerning sign lighting
- Indication of whether a sign inventory is needed and a plan for sign removal or re-designation is required
- Directions on possible re-designation of existing routes because of the new project
- Project preferences concerning post mounted sign type specifications

**WBS**

**Objective:**

**SOW:**

**2.10.18 Description: Utility Relocation Plan**

This task is the development of the utility relocation plan.

A utility relocation plan will be prepared for incorporation to the ALSO plan portion of the highway drawing for all utility relocation work designated to be performed as part of the project contractor's construction proposal.

The utility relocation plan format and content will be prepared in accordance with relative chapter guidelines of Publication 16M, Design Manual Part 5.

The plan shall clearly show the type, size and location for each adjustment and installation, or removal to be performed.

The construction details, work requirements and materials shall conform to the associated industry standards and specifications.

All federal, state and local government laws and regulations that govern the installation, adjustment, removal and abandonment of the utility facility must be complied with.

The plan shall depict a tabulation of work items and quantities, either, by individual measurement and payment item numbers; or by lump sum basis, in which case, component items and quantities will be tabulated and noted "For Information Only".

The final utility relocation plan, together with the estimated construction cost estimates, in accordance with Design Manual Part 5, shall be submitted to the Department for approval and agreement preparation.

**Detail:**

The following items may require an adjustment to the length of time it takes to complete this task:

- \* Federal Participation Funded Projects
- \* Local Funded Projects
- \* 100% State Funded Projects
- \* Reimbursable Design and/or construction Utility Relocations
- \* Non-reimbursable Design and/or Construction Utility Relocations
- \* Utility's Refusal to Perform Relocations.
- \* Requirement for an independent firm to provide existing utilities type, size and location information.
- \* Requirement to have the Consultant prepare the Utility Relocation Plans Estimates and Specification
- \* Requirement to provide field survey measurements from the project centerline/baseline to the points of the utilities information needs

**WBS**

**Objective:**

**SOW:**

**2.10.19 Description: Incident Management Plan**

This task is the development of the incident management plan.

Determine the areas of a facility to be analyzed for incident management.

- Develop a detour plan for full closure of these areas.
- Develop maintenance and protection of traffic plans for the facility that would be used to divert the traffic.

The plan could include lane reduction layouts, temporary signal designs, and flagging operations.

- Meet with all emergency response teams in the area of the facility for input and buy-in into the plan.
- Develop an incident management reference manual to be used by local and State authorities. Manual to include responsibility breakdown, traffic flow plans, and media relations contacts.

**Detail:**

Anticipated level of incident (i.e., long term closure in both directions, short term closure in both directions, closure of one half of facility while maintaining traffic in both directions).

**WBS**

**Objective:**

**SOW:**

**2.10.20 Description: Streams and Waterways Mitigation Plan**

This task is the development of the streams & waterways mitigation plan.

1. Coordinate with the agencies to determine the expected mitigation measures and site locations for the project.
2. Prepare a conceptual mitigation plan based on the information obtained from the agencies and site visits. The conceptual plan may include a narrative discussing the rationale for the plan.
3. Submit the conceptual plan for review and comment. Revise and submit to the agencies for review and comment.

**Detail:**

Coordinate with the agencies to develop the mitigation plan.

**WBS**

**Objective:**

**SOW:**

**2.10.21 Description: Hazardous and Residual Wastes Mitigation Plan**

This task is the development of the hazardous & residual waste mitigation plan.

Perform the following tasks which describe how the remedial actions will be accomplished:

1. Prepare a brief summary of the investigations conducted to date, identifying the type, concentration(s), extent and volume of contaminated media or wastes, and recommendations and conclusions of the environmental site assessment.
2. Provide a detailed description of the remedial actions and remedial action objectives to be achieved by the contractor, including plans and specifications.
3. Specify performance standards for equipment and materials along with other requirements that may include: (a) regulatory clean-up standards; (b) site maps; (c) highway design plans with impacted areas delineated; (d) remedial design plans and specification

sheets; (e) a summary table of any environmental sampling analytical results; and (f) an "Acronyms and Definitions Section" to identify and clarify any terms used within the document.

4. In the Waste Management Plan, state the required contractor document submissions and specify the requirements/detail that is to be provided in each submission.

**Detail:**

Waste Management-related Special Provisions may need to be prepared

**WBS**

**Objective:**

**2.10.22 Description: Noise Mitigation Plan**

This task is the development of the noise mitigation plan. Final design development of a reasonable and feasible mitigation plan in accordance with Publication 10A, Design Manual Part 1A and FHWA Highway Traffic Noise Guidance.

**SOW:**

1. Conduct a detailed analysis of the selected alternative based on the Design Manual and FHWA abatement considerations for a final design noise barrier analysis.

2. Review data file

3. Plan a community meeting after final alignment and right-of-way boundaries are set.

\* Collect community desires for noise abatement. If the community refuses mitigation at any time during the process, then this task is considered to be complete. Document result as part of the Record of Decision.

\* Present the Process, including why abatement is/is not reasonable/feasible.

\* Present Abatement Options, including materials, physical dimensions, aesthetics, and cost.

\* Plan for subsequent community meetings to refine the process as necessary. Limit of 2 additional meetings is typically sufficient.

4. Proceed to conceptual design phase and reanalyze.

5. Perform measurements as appropriate.

6. Determine noise abatement consideration warrants.

7. Determine Feasibility and Reasonableness and complete the final Worksheet(s).

Consider:

\* Minimum 5 dBA Insertion Loss

\* Vehicle and/or pedestrian restrictions

\* Safety

\* Number of Benefited Sites (>3 dBA Insertion Loss)

\* Community Desires

\* Comparison of Existing to Future Sound Levels

\* Planned and Permitted Development of Sensitive Receptors

\* Cost per Residence Unit. Considered to be \$50,000 per impacted residential dwelling unit based on a \$25/ft<sup>2</sup> for concrete barrier construction cost plus cost any additional right-of-way. Update current values since modifications are made on a varying basis.

\* Maintenance

\* Constructibility

\* Utilities

\* Drainage

\* Additional Considerations, as applicable.

8. Maintain a Record of Decision from the analysis outcome

9. Describe the construction noise impacts associated with this project and any feasible mitigation measure as taken from the Design Manual.

10. Proceed to P.S. & E./construction after final design acceptance.

**Detail:**

Prior to starting the actual final design work, verify the correct procedures through a meeting or telephone call and follow-up coordination letter. Reference all data, assumptions, study techniques, and computer models used for this study. Correspondence between the FHWA and other agencies will only be initiated with concurrence of PennDOT.

Prepare a final design report. Additionally, prepare documentation for inclusion into the preliminary draft environmental report. Present the report in the following format:

1. Introduction (from draft document)

2. Project Description (from draft document)

3. Receptor sites/Selection Criteria (from draft document)

4. Methodology (from draft document)

5. Affected Environment

6. Environmental Consequences
7. Mitigation
8. Construction Noise (from draft document)
9. Coordination with Review Agencies (from draft document)
10. References (from draft document)
11. Appendix- Measurement Site Field Sheets, Model Input/Output Files

Include the following graphics:

1. Project Vicinity & Location Map (from draft document)
2. Project Limits & Local Network Map (from draft document)
3. Roadway Geometry on Plan Sheets
4. Receptor Locations, Identification Labels (from draft document)
5. Proposed Mitigation Locations, if applicable
6. Provide Perspectives generated from TNM model

Include the following tables:

1. FHWA noise criteria (from draft document)
2. PennDOT noise criteria (from draft document)
3. Existing Leq Noise Levels at the Measurement Sites
4. Existing and Predicted Leq Noise Levels at the Receptor Sites
5. Number, Identification, and Type of Impact(s) by Alternative
6. Mitigation, including lengths, heights, costs, and feasibility/reasonableness determinations, if applicable.
7. Noise Level dBA at 50 feet for Various Construction Equipment (from draft document)

Provide a copy of the final report in the electronic medium currently in use by PennDOT (Microsoft Word, Word Perfect, etc.). Include the TNM input/output files.

**WBS**  
**Objective:**  
**SOW:**

**2.10.23 Description: Section 4(f) Mitigation Plan**

This task is the development of the Section 4(f) mitigation plan.

1. Develop a mitigation plan that identifies any mitigation measures committed to in the Final Section 4(f) Evaluation and NEPA document for Section 4(f) resources.

2. Submit plan to PennDOT, PHMC and possibly FHWA for review. Revise plan if necessary.

3. Include this plan in the final design plans, specifications and estimates package to ensure that the measures are carried out during construction.

**Detail:**

If no mitigation measures were identified in the Final 4(f) document or NEPA document, this task would not be required.

**WBS**  
**Objective:**  
**SOW:**

**2.10.24 Description: Terrestrial Habitat Mitigation Plan**

This task is the development of the terrestrial habitat mitigation plan.

1. Coordinate with the agencies to determine the expected mitigation measures and site locations for the project.

2. Prepare a conceptual mitigation plan based on the information obtained from the agencies and site visits. The conceptual plan may include a narrative discussing the rationale for the plan.

3. Submit the conceptual plan for review and comment. Revise and submit to the agencies for review and

4. Receptor Locations, Identification Labels (from draft document)

5. Proposed Mitigation Locations, if applicable.

6. Provide Perspectives generated from TNM model.

**comment.**

**Include the following tables:**

**Detail:**

Coordinate with PennDOT and the agencies to develop the mitigation plan.

**WBS**  
**Objective:**

**2.10.25 Description: Erosion and Sedimentation Control Plan / NPDES Permit**

This task is the development of the Erosion & Sedimentation Control Plan and submission of the NPDES Permit Application.

**SOW:**

The Erosion and Sediment Pollution Control Plans and supporting documentation shall be submitted to the applicable Engineering District for review and approval. Upon acceptance of the plans by the District, the submission will be forwarded to the County Conservation

District for review and approval.

The following work elements are required for the successful completion of this task:

1. Develop Erosion and Sedimentation Control Plans to include:

- cover sheet
- location map
- topography of the area including watershed areas and watercourses receiving runoff from the project
- proposed alterations to the area
- limits of the project
- the location of all temporary and permanent erosion and sediment pollution control measures and facilities
- all pertinent erosion control and construction details

2. Develop a narrative report describing the project and indicating the purpose, the engineering assumptions, the specifications, and the calculations for erosion control measures and facilities. The narrative shall include a schedule of installation and removal of temporary and permanent erosion control measures and facilities as they relate to the various earthmoving operations and a maintenance program for each type of temporary and permanent erosion control measure and facility.

3. Provide detailed instructions relating to the sequence of construction on the plan and in the narrative. Include staging, sequencing and scheduling of earthmoving activities and installation and removal of erosion and sediment pollution control measures and facilities as required.

4. Provide a detailed description in the narrative report of all soil types located within the project limits including each soil type, depth, slope and resistance to erosion. The soil boundaries and a summary table of the soil types and limitations should also be included on the plans.

5. Provide all applicable construction schedules, maintenance programs (including the removal and disposal of accumulated soil materials).

6. Prepare transmittal letter, plans and narrative report for submission to the County Conservation District. If necessary, on large projects meet with the County Conservation District prior to submission to discuss submission requirements and review conceptual plan.

7. For projects exceeding 5 acres of earth disturbance or impacting High Quality/Exceptional Value (HQ/EV) waterways, prepare a Notice of Intent (NOI) Application for an NPDES Storm Water Permit and a Preparedness, Prevention and Contingency (PPC) Plan (see below). The PPC plan should also be incorporated into the narrative report and the plans.

8. Address all applicable comments from the County Conservation District and/or PADEP and re-submit the revised package for approval.

The following tasks are required for the preparation of the NPDES permit application:

1. Develop an NPDES boundary map that includes the following information: limits of disturbance, highway alignment, cut & fill limits, ROW lines, contours, stations, location identifiers and, the permit boundary.

2. Complete the NPDES Permit Application. The application package will consist of the following items: Act 14 Notification, PNDI Form, location map, NPDES Application Form, Cultural Resources Notice (if involves a Special Protection Watershed), General Information Form (if project involves a Special Protection Watershed or an Individual NPDES Application), and the Erosion and Sediment Pollution Control Plan.

3. Submit NPDES Permit Application package to PennDOT for review. Revise as necessary. Obtain PennDOT's notarized signature on the application and make the designated amount of copies to submit to the County Conservation District and, if applicable, the PADEP.

4. Schedule review meetings with the agencies prior to submitting the NPDES permit package to expedite the permitting process.

5. Submit permit package to the Conservation District/PADEP.

**Detail:**

The following items may require an adjustment to the amount of time it takes to complete this task:

- Applicable watershed information pertaining to special protection watersheds
- Erosion and Sediment Control Plans for off-site borrow or disposal areas
- Evidence of compliance with other permitting or regulatory requirements

**WBS**

**Objective:**

**SOW:**

**2.10.26 Description: Storm Water Management Plan**

This task is the development of the storm water management plan.

Pennsylvania's Storm Water Management Act (P.L. 864, No. 167) is applicable for highway improvement projects located within municipalities where there are approved watershed stormwater management plans. In these instances, the District should take necessary action to assure that the projects are consistent with the standards of the individual stormwater management plans. Permanent detention basins should be provided for stormwater management purposes wherever necessary in those areas.

For more information on stormwater management procedures, refer to PennDOT directives, review the PADEP Stormwater Management Section and/or the local municipality requirements.

**Detail:**

**WBS**

**Objective:**

**SOW:**

**2.10.27 Description: Roadside Development Plan**

This task is the development of the roadside development plan.

These include Wetland Mitigation Planting Plans, Wildlife Habitat Mitigation Planting Plans, Maintenance Yard or Stockpile Area Screening Plans or any other plans requiring landscape design and plans preparation.

Where no roadway construction is involved, the plans are an entity in themselves. Where roadside development is a part of highway construction, the quantities and plans are numbered in the Construction Plans and placed immediately after the Contour Grading and Drainage Plans.

Where separate plans are required, the Roadside Development Plan includes:

1. Title Sheet
2. Index Sheet
3. Typical Section Sheet
4. Summary and Tabulation of Quantities Sheet
5. Detail Sheets (required for all tree, shrub and vine plantings)

Where plans are a part of the highway construction, it is not necessary to prepare a separate Title Sheet, Index Sheet, Typical Section Sheet or Summary and Tabulation of Quantities Sheet.

Prepare plans in accordance with Publication 14M, Design Manual Part 3.

**Detail:**

**WBS**

**Objective:**

**SOW:**

**2.10.28 Description: Final Plan Checks**

This task is the time required to attend/perform all final plan checks.

The Final Plan Check is performed by representatives of: Bureau of Design - Field Liaison Engineer, District Engineer/Administrator, and Consultant.

The Field Liaison Engineer is in charge of the Final Plan Check and prepares a Plan Review Report on any items which are not correct at the time of the Final Plan Check.

The District Engineer/Administrator provides qualified personnel to perform all required design review; prepares Form 407, Form D-444D and a list of Structural Special Provisions, and notifies the Field Liaison Engineer when the plans will be ready for the Final Plan Check.

The Consultant is required to have the plans adequately checked prior to the Final Plan Check, and will have the Project Engineer and adequate design personnel to make any required corrections, present at the Final Plan Check. It is expected that all required corrections will be made by the Consultant prior to leaving the Final Plan Check.

**Detail:**

**WBS**

**2.10.29 Description: Assemble Final Project Documents for Contract**



**Objective:**  
**SOW:**

**Management**

This task is the preparation of the PS&E submission to District contract management. Before any attempt is made to develop and submit a proposal, it is very important to obtain all required documents, contract drawings, design estimates and supporting data. Supporting documents such as environmental clearances and re-evaluations, funding authorizations, PMC approvals, DEP and Corps of Engineer permits, utility and right-of-way clearances, agreements and related administrative requirements must be resolved. Missing supporting documents complicate the PS&E process, and may affect project advancement to letting.

Assemble all available information on the project from the designers, such as plans or sketches, permits, non-standard special provisions, agreements, construction trainee requirements, Utility Form D-419 clearance and right-of-way certification.

Contract proposals should appear as uniform as possible on a State-wide basis to assist prospective bidders as well as Department personnel who use the proposal. All proposals are to be prepared by utilizing the Contract Management System (CMS) automated bid proposal development software, in accordance with the principles in the current "CMS Users Manual."

Assemble project documents in accordance with requirements of Publication 51M, "Contract Proposal Preparation Guide."

**2.10.29.1 Pre-Bid**

Prepare the Pre-Bid package in accordance with Publication 51M, Contract Proposal Preparation Guide.

**2.10.29.2 Finalize Pre-Bid Construction Schedule/Special Provisions**

Provide provisions, requirements, or directions applying to the project, as set forth in the proposal, that are not contained in Publication 408M or its supplements. Generally, the design engineer will submit draft special provisions to be reviewed, finalized and incorporated into the Bid proposal by Contract Management.

**2.10.29.3 Final Pre-Bid Constructability Review**

Submit plans to the District Construction Unit for review and comment prior to submission of PS&E to Contract Management.

**2.10.29.4 Final Bid Package Development**

Prepare the Final Bid Package in accordance with Publication 51M, Contract Proposal Preparation Guide

**2.10.29.5 Bid Proposal**

Bid Proposal (Publication 51M - Contract Proposal Preparation Guide)

Assemble the following contract proposal components:

- \* Title Page - Provide a contract title page
- \* Project Description - Provide a brief project description
- \* Project Schedule - Provide a project schedule in calendar days
- \* List of Special Provisions, Attachments and Supplemental Specifications, Structure Drawings, Purchasable Items - tabulate these items as they apply to the job
- \* Schedule of Prices - Tabulate Items Numbers with related prequalification work classification codes, Approximate Quantity, Item and contractor's Unit Price Bid and Item Total
- \* Bid Submission Forms - Identify and insert the applicable bid submission forms into the contract document
- \* Component Item Schedule - Provide for lump sum pay items
- \* Bidder Signature Pages - Provide standard signature pages for single bidder and second and third party joint venture bids
- \* Notice to Bidder



- \* Special Provisions - Modify and expand the Specifications (Publication 408M) to provide for requirements unique to a specific project.
- \* Index - Provide an index to the special provisions, schedule of prices and bid component schedule.
- \* Attachments - Assemble and provide contract attachments as indicated in Publication 51.

**2.10.29.6 Engineer's Estimate**

Prepare a detailed estimate, which will be used to verify funding requirements and to determine acceptability of bids, and submit with the PS&E to Contract Management.

**2.10.29.7 Construction Schedule**

Prepare Form D476 & D476A, or CPM schedule, for construction of the project.

**2.10.29.8 Enter Project into CMS**

Upon assembly of the bid proposal at the District, enter into CMS all pertinent project information (i.e.. Project identification numbers, special provisions, pay items, quantities, estimate, etc..)

**2.10.29.9 QA Items of Work**

Identify and prepare form work as it relates to items that will require subsequent QA involvement.

**2.10.29.10 Assemble and Deliver PS&E to Bureau of Design (BOD)**

Assemble all item involved with the PS&E Task into a Package Document identified by the project CMS number and forward to Bureau of Design. Notify the Engineering Data Center to change the project status from design to let.

**2.10.29.11 Review PS&E**

The PS&E is to be reviewed for completeness. The following items are to be performed and verified before a project is advertised for bid:

- \* Contract Management Data Entry and Proofing
- \* Contract Management Review
- \* Programming
- \* Contract Management Compilation and notice to Bureau of Design
- \* Bureau of Design Proposal Production
- \* Contract Management Clearance Check
- \* Bureau of Design Distribution For and Review of Proposal
- \* Wage Rates
- \* Bureau of Design and District/Consultant Revisions
- \* FHWA Review and Authorization

**2.10.29.12 Advertise**

Prepare the advertisement forms in CMS and transmit the forms to Central Office Contract Management with the PS&E. The advertisement forms are to indicate:

- \* Project identification
- \* Description of work
- \* Bid deposit location and time and bid opening location and time
- \* Location where plans and proposal will be available for review

**2.10.29.13 Pre-Bid Meetings**

If a pre-bid meeting is requested by the District, provide pertinent information that is to be included in the proposal advertisement. Coordinate pre-bid meeting activity with the District Construction Unit in accordance with standard Department procedures.

**2.10.29.14 Addenda Development**

Prepare and distribute addenda that are necessary to make changes to the contract documents after the bidders have secured plans and proposals in accordance with Publication 51M.

Addendum Preparation and Review - this activity is the responsibility of the District and CO Addendum Engineer and follows discovery of the need to issue an addendum. The output of this activity is an addendum request:

- \* District enters addendum contents and request into CMS, and mails or faxes hard copy to Addendum Engineer

- \* Addendum Engineer reviews addendums, consolidates, prepares FHWA approval request and mails or faxes request and hard copy attachments

Addendum Approval and Distribution - This activity is the responsibility of FHWA, the Chief Engineer and/or the BOD Data Center and follows the Addendum Request. The output of this activity is a revised contract proposal incorporating the addendum:

- \* FHWA reviews addendum and gives approval

- \* Chief Engineer or designee signs addendum

- \* Data Center updates estimates in CMS to incorporate addendum

- \* Data Center faxes addendums to plan holders

#### **2.10.29.15 Letting**

All bids received in accordance with the terms of the proposal shall be publicly opened at the time, date and place indicated. A secured depository is to be established. A bid opening official and designated employee of the Contract Management Section will be authorized to open the depository. Bids will be read and documented and the apparent low bid announced.

#### **2.10.29.16 District Letting**

All bids received in accordance with the terms of the proposal shall be publicly opened at the time, date and place indicated. A secured depository is to be established. A bid opening official and designated employee of the Contract Management Section will be authorized to open the depository. Bids will be read and documented and the apparent low bid announced.

#### **2.10.29.17 Local Letting**

All bids received in accordance with the terms of the proposal shall be publicly opened at the time, date and place indicated by a local representative. A representative from the District familiar with Department letting procedures shall attend and witness the bid opening.

#### **2.10.29.18 Central Office Letting**

All bids received in accordance with the terms of the proposal shall be publicly opened at the time, date and place indicated. A secured depository is to be established. A bid opening official and designated employee of the Contract Award Section will be authorized to open the depository. Bids will be read and documented and the apparent low bid announced.

#### **2.10.29.19 MPMS Letting Date**

Upon identifying the actual letting date, enter the date into MPMS.

**Detail:**

Local let projects must enter bid amount into MPMS.

**WBS Objective:**

#### **2.10.99 Description: Other Final Design Activities**

This includes any other necessary PennDOT final design activities for the project which are not otherwise covered under the standard final design tasks.

**SOW: Detail:**

Provide work as detailed by the Department. See Below.

**WBS Objective:**

#### **2.11.1 Description: Post-Design Activities**

This includes post design activities necessary to evaluate bids, prepare and execute the contract and coordinate construction activities including shop drawing and alternative design review.

**SOW:**

##### **2.11.1.1 Assessment of Bid Results**

Perform a bid review process that examines the bids for responsiveness to the requirements of the bid proposal, total price, unit prices, comparison to other submitted bids and comparison to the engineer's estimate. Key factors to consider are:

- \* Adequacy of competition

- \* Affects of deferring project to rebid or redesign

\* Unbalanced bidding

Upon completion of the bid review process, enter the results in CMS. Perform a post bid review and monitor post-bid submittals and deadlines. Perform CMS procedures for completed bids or rejection of bids.

**2.11.1.2 Award**

Notify the Engineering Data Center to change the project status from Let to Selection Pending and review pre-award procedures in CMS.

Prepare a contract worksheet, award letter and obtain approvals to award.

Update CMS with approvals.

Obtain original and copies of the computer printed contract documents from the Engineering Data Center, review, collate and staple.

Distribute contracts.

**2.11.1.3 Contract Execution**

Obtain contracts executed by contractor for execution by the Department. Review contract for compliance. Update CMS.

Forward contract for execution. Obtain fully executed contract from Comptroller's Office. Distribute fully executed contracts.

**2.11.1.6 Alternate Design Review**

Review and approve alternative design drawings following the procedures in Design Manual Part 1A.

**Detail:**

**WBS Objective:**

**2.11.2 Description: Shop Drawing Review**

This task involves the coordination, review and approval of shop drawings submitted by the contractor in accordance with Publication 10/10A, Design Manual 1/1A.

**SOW:**

Review and approve shop drawings following the procedures in Design Manual Part 1A.

**Detail:**

**WBS Objective:**

**2.11.3 Description: Construction Consultation**

This task is coordination with the contractor prior to issuance of the notice to proceed.

**SOW:** Upon contract execution, issue a Notice-to-Proceed letter and coordinate the scheduling of a pre-construction meeting.

**Detail:**

**WBS Objective:**

**2.11.99 Description: Other Post-Design Activities**

This includes any other necessary PennDOT post design activities for the project which are not otherwise covered under the standard post design tasks.

**SOW:**

Provide work as detailed by the Department. See Below.

**Detail:**

**WBS Objective:**

**7.1.99 Description: Other Administrative Open End**

Administrative work provided under a Department open end contract.

**SOW:**

Provide work as detailed by the Department. See Below.

**Detail:**

**WBS Objective:**

**7.2.1 Description: Consultant Construction Inspection**

Consultant Construction Inspection provided under a Department open end contract. (Department's Inspector-in-Charge)

Construction Supervision and Contract Administration.

I. Staffing

A. The Engineer shall comply with the following in establishing the inspection forces:

1. The Engineer shall designate a member of his management staff who will be the official contact person for the administration of the Engineering Agreement. The Engineer will not be directly reimbursed for any management staff time or expenses in carrying out this function.

2. The Engineer's staffing shall include the individuals who were proposed in the Engineer's letter of interest. If the Engineer is unable to supply the staffing proposed in the letter of interest, the Engineer must explain to the District Engineer in writing, with a copy to the Chief Engineer, Highway Administration, why the proposed staffing cannot be supplied and provide resumes of the proposed substitute.

3. A member of the Engineer's project staff shall be designated as the Lead Inspector and shall remain on the project during those periods of time when the Department's Inspector-in-Charge is absent. The Lead Inspector shall be considered the Engineer's ranking employee on the project and shall not receive additional compensation from the Department for acting as the Inspector-in-Charge.

The Department Inspection Classification for the Lead Inspector for this project shall be designated by the Department. On all projects which require the Engineer to supply three (3) or more inspectors, the Lead Inspector shall be classified as a Transportation Construction Inspector Supervisor (TCIS) or higher.

4. Sufficient inspectors shall be assigned to the project to adequately inspect and document the work performed. The number of inspectors and Department Inspection Classifications for the Engineer's inspectors shall be designated by the Department's District Engineer.

5. The inspection staff assigned to each individual Department construction project shall meet the requirements shown in the Tables A, B, and C below.

6. The entire inspection staff must meet the minimum NICET Certification or State Equivalency requirements for the appropriate Department Inspection Classification indicated in Tables B and C below.

TABLE A

Row 1	Total No. of Inspectors	1	2	3	4	5	6	7	8	9	10
Row 2	No. of Recommended Inspectors with NICET Certification Or Equivalent	1	1	2	3	3	4	5	5	6	6

Row 1 Indicates the total number of consultant inspectors assigned to the individual construction project.

Row 2 Indicates the recommended number of consultant inspectors who must meet one of the requirements:

a) Be certified by the National Institute for Certification in Engineering Technologies (NICET) in the field of Transportation Engineer Technology, subfield of Highway materials, at the level specified in Table B, or higher for the required Inspection Classification, OR

b) Be registered as a Professional Engineer by the Commonwealth of Pennsylvania with the required highway experience for the specified Inspection Classification acceptable to the Department, OR

c) Be certified as an Engineer-in-Training by the Commonwealth of Pennsylvania with the required highway experience for the specified Inspection Classification acceptable to the Department, OR

d) Hold a Bachelor of Science Degree in Civil Engineering with two (2) years of highway experience acceptable to the Department or a Bachelor of Science Degree in Civil Engineering Technology with the required highway experience for the specified Inspection Classification acceptable to the Department, OR

e) Hold an Associate Degree in Civil Engineering Technology with the required highway experience for the specified Inspection Classification acceptable to the Department.

Note: If more than ten (10) inspectors are required for an individual project – use the number of Inspectors with NICET Certification, or the State equivalency, required when ten (10) consultant inspectors are assigned to the individual construction project, plus the highest line total from Row 1 which adds up to the total number of inspectors required and then add the corresponding lines from Row 2 to determine the recommended number of consultant inspectors that must meet the NICET requirement or the State equivalency.

**Table B – NICET Certification Requirement for Each Inspection Classification**

PennDOT Insp. Class.	Technical Assist.	Technical Assist. -1	Trans. Const. Insp. or Const. Insp. Mat.	Trans. Const. Insp. Supr.	Trans. Const. Mgr. 1	Trans Const Mgr. 2
	(TA)	(TA-1)	(TCI) or (TCI – Materials)	(TCIS)	(TCM-1)	(TCM-
Required Field Exp.	None	1 year	2 years	5 years	10 years	15 ye
NICET	Student Enroll	Student Enroll	Assoc. Eng. Tech.	Eng. Tech.	Senior Eng. Tech.	Senio Eng. Tech.
NICET Sub-field	Hwy. Const.	Hwy. Const.	Hwy. Const. Or Hwy. Materials	Hwy. Const.	Hwy. Const.	Hwy. Const
NICET Level	Level 1	Level 1	Level 2	Level 3	Level 4	Level .

**Table C – NICET Equivalency Requirement for each Inspection Classification**

PennDOT Insp. Class.	Technical Assist.	Technical Assist. -1	Trans. Const. Insp. Or Trans. Const. Insp. Mat.	Trans. Const. Insp. Sup.	Trans. Const. Mgr. 1	Trans. Const. Mgr. 2
	(TA)	(TA-1)	(TCI) or (TCI – Materials)	(TCIS)	(TCM-1)	(TCM-
Assoc. Degree In Civil Eng. Tech.	None	1 year as Technical Assist.	2 years	3 years	7 years	12 year
Bachelor of Science Degree in	None	None	1 year	2 years	5 years	9 yea

Civil Eng. Or Civil Eng. Tech.							
PA Certified Eng. - in - Training	None	None	1 year	2 years	4 years	8 years	
PA Registered Professional Eng.	None	None	None	1 year	3 years	6 years	

Years of Construction Inspection Experience

B. The entire Engineer's inspection staff shall meet the qualifications and requirements as shown in Attachment "A" for their respective Department's Inspection Classifications.

(1) The Department will notify the Engineer at least one (1) week prior to individual staffing assignments whenever possible.

(2) The Engineer shall make a detailed background check on all potential staffing candidates and then submit their proposed wage rate and resumes in sufficient detail to assure the Department that the individual meets and/or exceeds the requirements for the Departments Inspection Classification for which the individual is being considered. Individuals are not considered approved for this agreement just because their names and rates are included in the Engineer's proposal. The job descriptions and requirements for the various Departments Inspection Classifications are attached hereto as Attachment "A".

(3) The staffing will be reviewed and approved in writing by the Department's District Engineer. Inspectors assigned to the project shall remain for the duration of the project unless a transfer is approved by the Department or the inspector is no longer employed by the Engineer.

(4) The Department reserves the right to order the immediate removal of any of the Engineer's staff from the project because of unsatisfactory performance or behavior.

(5) The Department reserves the right, upon giving a minimum of two (2) weeks notice, to replace any or all of the Engineer's staff on the project with Department employees.

(6) The Department reserves the right to immediately remove any or all of the Engineer's staff due to delay, discontinuation, or termination of the Construction Contractor's Operations. The Department will attempt to give the Engineer notice as soon as the Department is notified by the construction contractor.

C. The Engineer's staff shall be provided the opportunity to work the same as Department employees during periods of inclement weather; that is, they will work on the field books, etc., rather than being sent home. As long as an Engineer's employee is assigned to a project he shall be provided the opportunity to work a minimum of thirty-seven and a half (37.5) hours of work per week, excluding Saturdays and Sundays. However, holidays, vacation days, and sick leave days will be counted as part of the thirty-seven and a half (37.5) hours.

D. The Engineer's staff shall adhere to Commonwealth and Department policy regarding conduct and behavior. Acceptance of gifts and favors is strictly forbidden.

II. Method of Payment

The method of payment for services and work will be a maximum hourly payroll rate per classification for each Engineer's employee together with Direct Cost other than Payroll, as specified by the Department, and the Direct Costs of Services and Work Performed By Others, if applicable.

A. The maximum hourly payroll rate per classification for each Department Inspection Classification for each calendar year shall be as follows:

Reimbursement for Maximum Hourly Payroll Rate Per Classification/Hour of Inspection

Year	TCM-2	TCM-1	TCIS	TCI-M	TCI	TA-1	TA
2000	\$26.50	\$23.22	\$20.34	\$17.55	\$17.05	\$13.80	\$11.7

The maximum hourly payroll rate per classification/hour of inspection for each consecutive year will be revised each July based on the Master Agreement between the Commonwealth of Pennsylvania and Council 13.

Legend

TCM-2 Transportation Construction Manager 2  
(NICET Highway Construction Level 4 or equivalent)

TCM-1 Transportation Construction Manager 1  
(NICET Highway Construction Level 4 or equivalent)

TCIS Transportation Construction Inspector Supervisor  
(NICET Highway Construction Level 3 or equivalent)

TCI-M Transportation Construction Inspector – Materials  
(NICET Highway Materials Level 2 or equivalent)

TCI Transportation Construction Inspector  
(NICET Highway Construction Level 2 or equivalent)

TA-1 Technical Assistant -1  
(NICET Highway Construction Level 1 or equivalent)

TA Technical Assistant  
(NICET Highway Construction Level 1 or equivalent)

(1) The job descriptions for the above Department Inspection Classifications for Construction Inspection Services by Consultant Engineering Firms are included in Exhibit "A" of this Agreement.

(2) The maximum hourly payroll rate is the maximum hourly rate paid to an employee by Department classification. The District reserves the right to negotiate hourly rates of compensation of individuals based on knowledge, experience and education up to the maximum specified hourly payroll rate. The Department will not directly reimburse the consultant for time required to travel to and from the project.

(3) The Engineer will be required to use their latest audited field Federal Acquisition Regulation (FAR) overhead rate. The FAR rate shall remain fixed for the life of the Agreement.

(4) The Engineer shall not request approval for any hourly payroll rate which exceeds the Department's maximum hourly payroll rate established in accordance with II.A above for the respective Department Inspection Classification for a particular year as specified.

B. The Department Inspection Classification and the hourly payroll rate for each Engineer's employee must be approved by the District Engineer in writing prior to the employee being assigned to work on this project. All hourly payroll rate increases must be approved in writing by the District Engineer prior to the effective date of the increase.

C. In addition to the reimbursement hourly payroll rate of inspection, the Engineer will be paid the actual direct costs other than payroll specified by the Department.

D. The Department shall not accept any charges for mileage with rates in excess of the maximum State rate set forth in appropriate directives promulgated by the Governor's Office,

Commonwealth of Pennsylvania (Currently Management Directive 230.10), or the Engineer's company policy, whichever is less.

E. A maximum of \$32.50/day for mileage to and from the work site or lodging will be reimbursed. An inspector will be reimbursed for either mileage to and from the work site or lodging, but will not be reimbursed for a combination of the two during the same day. The mileage will be reimbursed for the most direct route from the inspector's residence or the consultant's office to the project site and return.

A commuting distance of 15 miles between residence or the consultant's office and the work location will be considered a normal reimbursable commuting and will not be eligible for mileage reimbursement. Lodging will be reimbursed at a maximum rate of \$32.50/day, in lieu of mileage, but receipts for all costs must be provided to the Department with the Engineer's invoice. Lodging will only be reimbursed for employees whose home or headquarters is more than 65 miles from the project.

F. The Department will not directly reimburse the Engineer for holidays, vacation days, or sick leave days.

G. The Engineer may bill the Department for overtime for each Inspection Classification approved by the District Engineer provided:

1. The employee has been compensated for forty (40) hours of actual work during that work week at his/her regular salary while assigned to the project and/or agreement. Vacation days and/or sick days will not be counted towards the forty (40) hours for the purpose of determining overtime. Only the following six (6) holidays (7.5 hours per day) will be counted toward the forty (40) hours for the purpose of determining overtime: 1. New Year's Day; 2. Memorial Day; 3. Independence Day (Declaration Day); 4. Labor Day; 5. Thanksgiving Day; and 6. Christmas Day. The work week is defined as Sunday a.m. to Saturday p.m. for the purpose of determining overtime. The work week definition may be changed if mutually agreed upon in writing by both parties.

2. The Engineer has included a copy of the company's written policy for the payment of overtime in his proposal and he actually compensates the employee for overtime hours. Employees in the TCM or higher Department Classification will not receive premium compensation.

H. The Engineer's "Direct Costs Other Than Payroll" reimbursement will be limited to the actual cost of providing the equipment specified under Section XIII (Special Requirements for this Agreement) of this scope of Work and the cost of eligible mileage and lodging.

I. The Engineer shall furnish all safety equipment for his employees (hard hats, safety vests, etc.), unless otherwise directed. No direct reimbursement will be made for this equipment.

J. The Engineer shall furnish all hand tools for his employees (6 foot rules, tapes, hand levels, etc.). No direct reimbursement will be made for this equipment.

K. The Department will directly reimburse the selected engineering firm for the following equipment, if required, for use by the consultant inspection staff for this agreement. A maximum direct reimbursement will be established in the Department's Advertisement. The engineering firm is required to include their billing rates for each type of equipment.

- ◆ Vehicle for Gauge
- ◆ Nuclear Densometer Gauges/License\*  
(at point of need when needed)
- ◆ Two-way Radios/Repeater Equipment
- ◆ Base Station
- ◆ Cell Phone Usage\*\*
- ◆ Paint Inspection Medical Tests
- ◆ Pagers
- ◆ Any other item specified in the project advertisement identified by project needs\*\*\*

The following is the maximum direct reimbursement to the Consultant for the following equipment at the designated monthly rates:

Nuclear Densometer Gauge	@	\$660.00	<u>Maximum</u> /month
Vehicle for Gauge	@	\$650.00	<u>Maximum</u> /month
Two-way Radio	@	\$ 25.00	<u>Maximum</u> /month



Radio Base Station	@	\$ 35.00 <u>Maximum</u> /month
Cell Phone Usage		as per Invoice
Repeater		as per Invoice
Pagers		as per Invoice
Paint Inspection Medical Tests		as per Invoice

\*If the equipment is self-owned, reimbursement will be based on actual cost of ownership not to exceed the maximum allowable. If equipment is from an outside supplier, the engineer must secure a minimum of three written quotes. The Department reserves the right to request additional quotes.

\*\*Cost of phone and activation fees are not eligible for direct reimbursement.

\*\*Must be approved by the Director of the Bureau of Construction and Materials.

### III. Preconstruction Considerations

#### A. Preconstruction Conference

A preconstruction conference shall be held by the Department and attended by the Engineer, if directed by the Department and if their engineering agreement has been executed, to discuss with the contractor all essential matters pertaining to the performance of the project.

#### B. Notice to Proceed

The Department shall issue to the Engineer a written Notice to Proceed specifying the calendar date on which work shall begin.

### IV. Records and Documentation

A. The Engineer shall keep records and document the work by methods defined in Department Publication No. 2 – Project Office Manual, or methods approved by the Department. All documentation, including source documents, shall be made part of the project record.

B. The Engineer shall be furnished with diaries and related record keeping forms. The Engineer shall provide one (1) copy of the following publications for the use of the field inspection staff:

- ◆ Pub. 2 - Project Office Manual
- ◆ Pub. 8 - Construction Manual
- ◆ Pub. 19 - Field Test Manual
- ◆ Pub. 21 - Field Computation Guide Book
- ◆ Pub. 123 - District Construction Engineer's Manual
- ◆ Pub. 203 - Work zone Traffic Control
- ◆ Pub. 408 - Specifications

The Engineer may purchase these publications from the Department.

C. During the performance of the work, the Department will assure and document that the Engineer's inspection staff abides by the approved documentation procedures.

### Construction Inspection

The project shall be inspected by the Engineer under the supervision and direction of the Department's Inspector-in-Charge.

The Engineer's construction staff shall be responsible for administering the construction contract under the supervision and direction of the Department's Inspector-in-Charge for assuring by written documentation that the construction is or is not performed in conformity with the approved plans, specifications, and contract provisions; for determining and documenting the quality and quantity of materials and work items; for the preparation of as-built drawings; for recording all pertinent information related to the prosecution and progress or work; for the measurement and recommending acceptance for payment of completed work; for being knowledgeable of and complying with all applicable FHWA regulations; for cooperating and consulting with Department officials during the course of the contract; and for other duties as may be required.

### V. Materials Control

#### A. Acceptance Testing and Inspection

1. The Engineer shall assist the Department in performing a sampling and testing program which will provide adequate assurance that the materials incorporated in the project are in conformance with the contract requirements.

2. The manner in which materials will be sampled and tested for acceptance shall be by Department approved methods. Laboratory testing shall be performed by the Department's Materials and Testing Division.

3. During the prosecution of the work, the Engineer's inspection staff shall abide by the approved materials acceptance procedures.

4. Testing equipment will be provided by the (Department); (Contractor); or (Engineer).

B. Quality Assurance Program

1. The quality assurance program shall be administered by the Department without exception.

C. Project Materials Certification

1. The Department will ascertain and document that materials have been certified by issuance of the District's letter of Project Materials Certification, Form TR 4238-A.

VI. Payments to Contractor

A. The Department shall make payment to the contractor in accordance with the terms of the contract.

B. The Engineer's personnel shall prepare estimates in the Department's format.

VII. Work Orders

A. The Engineer's personnel will assist the Department in preparing Work Orders.

B. The Department will be responsible for issuing any Work Orders.

VIII. Monitoring Contract Time and Schedule Adjustments

A. The Engineer shall assist the Department, as appropriate, in:

1. The evaluation of Construction Contractor's Project Schedule.

2. Preparing a letter accepting the Construction Contractor's Project Schedule within 7 days of receiving the schedule.  
List all concerns in a narrative format.

3. The monitoring of an Early Start, Late Finish, Base Line Chart that displays the Contractor's Project Schedule, including project cash flow.

4. The monitoring of the Base Line Chart, the Contractor's actual work performed compared to the Project Schedule, for the life of the project.

5. The monitoring of bi-monthly reports needed to convey operational Start Gains, Start Delays, Production Gains, Production Delays, scheduled percent of project completion and actual percent of project completion to the Department's Assistant Construction Engineer.

B. The Department will be responsible for approving contract time and/or schedule adjustments.

IX. Contract Compliance

A. Labor Compliance

The Engineer shall assist the Department in obtaining compliance with the labor standards' provisions of the contract particularly Sections IV and V of the Required contract Provisions and the related wage determination decisions of the Secretary of Labor.

B. Construction Safety

The Engineer shall provide assistance to the Department in obtaining compliance with the safety and accident prevention provisions of the contract; however, the Engineer shall not have control over or charge of and shall not be responsible for safety precautions and programs in connection with the work of the contractor, because these are solely the contractor's responsibility under the contractor's contract, particularly Section VIII of the Required Contract Provisions on Federal-Aid Projects.

C. Equal Opportunity

The Engineer shall assist the Department in obtaining compliance with the equal opportunity provisions of the construction contract, particularly Section II of the Required Contract Provisions and the EEO and MBE/WBE/DBE special provisions.

X. Contract Finalization and Project Acceptance

A. Final Inspection

1. The Engineer shall participate with the Department in a final inspection when notified by the contractor that the project is substantially completed.
2. If the Department is satisfied that the project has been completed in accordance with the terms of the contract, the Department shall, in writing, relieve the contractor of responsibility for further work on the entire project.

B. Final Settlement of Contract

1. The Engineer shall determine from documented project records the final quantity of each contract item and forward this information to the Department within 30 days of the issuance of the Acceptance Certificate (CS-4138).
2. Upon receipt of written acceptance of the final quantities from the contractor, the Department shall prepare the final estimates and final work order.

C. Records

The Engineer shall deliver the project records to the Department.

**Detail:**

XI. Staffing Requirements – Provide for each Construction Project

A. Part I S. R. \_\_\_\_\_, Section \_\_\_\_\_,  
 \_\_\_\_\_ County

	No. of <u>Insp.</u>	Proj. Hrs. <u>S/T</u>	Proj. Hrs. <u>O/T</u>
Trans. Const. Manager 2 (TCM-2) (NICET Highway Const. Level 4 or Equivalent)	_____ ( )	_____	_____
Trans. Const. Manager 1 (TCM-1) (NICET Highway Const. Level 4 or Equivalent)	_____ ( )	_____	_____

Trans. Const. Insp. Super. (TCIS) (NICET Highway Const. Level 3 or Equivalent)	_____ ( )	_____	_____
Trans. Const. Insp. Materials (TCI-Materials) (NICET Highway Const. Level 2 or equivalent)	_____ ( )	_____	_____
Trans. Const. Ins. (TCI) (NICET) Highway Const. Level 2 or equivalent	_____ ( )	_____	_____
Technical Assistant (TA) (NICET Highway Const. Level 1 or equivalent)	_____ ( )	_____	_____
Technical Assistant 1 (TA-1) (NICET Highway Const. Level 1 or equivalent)	_____ ( )	_____	_____

( ) Indicates the number of inspectors who must be certified by NICET in Transportation Engineering Technology, subfield of Highway Construction, or Highway materials at the Level indicated, or greater, See Table B, or the NICET Equivalency Requirement, see Table C.

B. Part II S. R. \_\_\_\_\_, Section \_\_\_\_\_, \_\_\_\_\_ County

	No. of <u>Insp.</u>	Proj. Hrs. <u>S/T</u>	Proj. Hrs. <u>O/T</u>
Trans. Construction Manager 2 (TCM-2) (NICET Highway Construction Level 4 or equivalent)	_____ ( )	_____	_____
Trans. Construction Manager 1 (TCM-1) (NICET Highway Construction Level 4 or equivalent)	_____ ( )	_____	_____
Trans. Construction Insp. Supervisor (TCIS) (NICET Highway Const. Level 3 or equivalent)	_____ ( )	_____	_____
Trans. Construction	_____ ( )	_____	_____

Insp. Materials  
(TCI-Materials)  
(NICET Highway  
Const. Level 2  
or equivalent)

Trans. Construction \_\_\_\_\_ ( ) \_\_\_\_\_  
Insp. (TCI)  
(NICET Highway  
Const. Level 2  
or equivalent)

Technical \_\_\_\_\_ ( ) \_\_\_\_\_  
Assistant (TA-1)  
(NICET Highway  
Const. Level 1  
or equivalent)

Technical \_\_\_\_\_ ( ) \_\_\_\_\_  
Assistant (TA)  
(NICET Highway  
Const. Level 1  
or equivalent)

C. Part III (etc., for each construction project)

( ) Indicates the number of inspectors who must be certified by NICET in Transportation Engineering Technology, subfield of Highway Construction, or Highway Materials at the Level indicated, or greater, See Table B, or the NICET Equivalency Requirement, see Table C.

XII. Special Requirements for this Agreement

(Specify for each Part, i.e. special equipment, special needs, project duration, etc.)

A. Part I S. R. \_\_\_\_\_, Section \_\_\_\_\_,  
\_\_\_\_\_ County

- 1.
- 2.
- 3.

B. Part II S. R. \_\_\_\_\_, Section \_\_\_\_\_,  
\_\_\_\_\_ County

- 1.
- 2.
- 3.

C. Part III (etc., for each construction project)

**WBS** **7.2.99 Description: Other Construction Open End**  
**Objective:** Construction related work provided under a Department open end contract.  
**SOW:** Provide work as detailed by the Department. See Below.  
**Detail:**

**WBS** **7.3.1 Description: Various Design and Environmental Services**  
**Objective:**  
**SOW:** The work and services required under this Contract may encompass a wide range of environmental studies and engineering efforts with the possibility of several different types of projects with short completion schedules being assigned concurrently. The anticipated types of projects include, but not limited to, bridge replacements or bridge rehabilitation with minor approach work, environmental studies, roadway betterments (3R type,) minor capital improvement projects (bridges or roadway), railroad grade crossing projects, and minor location studies, etc.

The engineering work and services which may be required under this Contract include, but are not limited to, perform field surveys; plot topography and cross sections; prepare submission for utility

verification and relocations engineering; prepare all pertinent submissions and materials necessary for the Department to prepare the application to PUC and for the PUC field conference; attend and supply any required information for all PUC meetings and hearings during the design of the project; develop erosion control details and narrative; prepare right of way plans; complete structure designs including type, size and location reports, core boring layouts and foundation designs and reports; develop traffic control plans with narratives; conduct soils investigations and prepare soils reports; investigate utility involvement on projects; provide material for and participate in value engineering reviews; coordinate contacts with railroad officials and procure railroad related costs, permits, and insurance; collect signal timing, accident data and other traffic flow data; document engineering study findings and activities; alternative analysis to assess impacts and mitigation; and prepare construction plans, specifications, and estimates.

The areas of environmental study required under the Contract may include, but are not limited to: air quality; noise; energy; vibration; hazardous waste; surface water and ground water quality; surface water and ground water hydrology; terrestrial ecology including threatened and endangered species; wetlands; soils; geology; farmlands; visual quality; socio-economic resources; cultural resources; Section 4(f) Evaluations; early coordination and; scoping correspondence; meeting minutes; public meeting and hearing presentations; visualization materials, handouts and displays; technical basis reports (TBRs) and/or technical files; NEPA environmental documents; Section 106 documents; mitigation plans and reports; wetland and floodplain findings; and preliminary engineering plans, and remote sensing/mapping innovations; The format and content of all documents will be consistent with applicable State and Federal regulations, policies and guidelines.

The engineering services and environmental studies identified above are the general work activities that can be expected under this Open-End Contract. A specific project-related Scope of Work will be outlined for each

**Detail:**

**WBS**  
**Objective:**  
**SOW:**  
**Detail:**

**7.3.99 Description: Other Design/Environmental Open End**  
Design or Environmental related work provided under a Department open end contract.  
Provide work as detailed by the Department. See Below.

**WBS**  
**Objective:**  
**SOW:**  
**Detail:**

**7.4.99 Description: Other Maintenance Open End**  
Maintenance related work provided under a Department open end contract.  
Provide work as detailed by the Department. See Below.

**WBS**  
**Objective:**  
**SOW:**  
**Detail:**

**7.5.1 Description: Other Traffic & Safety Open End**  
Traffic or Safety related work provided under a Department open end contract.  
Provide work as detailed by the Department. See Below.