



Preparing Infrastructure / Roadway Plans

An Online Continuing Education Course for Engineers

Course Number: P-5001

Credit: 5 Hours / 5 PDH / 5 CPD

PREPARING INFRASTRUCTURE / ROADWAY PLANS (5 PDH)

The Cover or Title Sheet

Most projects use a Title or Cover Sheet for identification purposes. For some jurisdictions or clients, a set of contract documents may be abbreviated to the degree that an official Title Sheet or Cover Sheet is not used, but most of the information contained on a formal Title or Cover Sheet will be included somewhere in the plans or contract documents. For the remainder of this text, the term "Title" will mean the Title and the Cover Sheet, as well as the "Lead" Sheet, "Sheet One" or any number of individualized terms in use by various agencies to identify the first or initial identification page of a set of construction plans.

The Title Sheet contains various labels, identifiers and information that will be useful to the agency funding the project, the contractor constructing the project and future designers looking for reference data that may help on other projects. The Title Sheet usually indicates a number of unique aspects of the project, including: the official name of the project; identification of the type of work to be performed and the funding program or source of money that is being drawn upon; a map or sketch showing the relationship of the project to the regional and local street network; an indication of the length of the project; the name of the responsible agencies or design professionals involved in the preparation and administration of the project, and, in some instances, the Title Sheet may serve as a display area for such elements as the Index of Sheets or Plan Content, General Notes, public and private utility contacts, scales of the various drawings, and the delineation of labor union and permitting jurisdictions.

The Project Title

The name of a project typically begins in the early planning stages, with the establishment of initial funding for studies or preliminary engineering. On rare occasions, as a project evolves, the nature of the final improvement may not exactly match the name of the project. For instance, a streetscape project may be determined to require pavement patching and then ultimately become a complete pavement reconstruction, but in order to monitor the status of the project by any of a number of interested individuals within the funding agency, the original name of the project could very well remain constant. For another example, a project may begin as a roadway-resurfacing endeavor with an add-lane condition at an intersection. By the time that preliminary studies are complete, the project may have grown into one that includes a bridge replacement, a segment of complete pavement reconstruction and traffic signal modifications. It may not always serve the best interests of the funding entity to change the name of the project as additional work becomes necessary. Therefore, it is typical for the project title to resemble the wording of the initial project title, perhaps using the term "resurfacing" in some fashion, but also include terms for bridge and traffic signal work, which might not be included in a project entitled "resurfacing". The additional work would undoubtedly exceed the initial estimates for the project, which in turn could result in a formal name change as additional funding sources are applied. In some jurisdictions, the original project title or number or description remains from start to finish of the entire engineering process from preliminary or conceptual design, to final contract document preparation. Over time, based on funding constraints, the project might actually become component parts. In such a case, each component would represent a particular specialty, such as roadway reconstruction, bridge replacement and traffic signal modifications. Each component could then become a separate set of plans, or the various components might become a sub-stage of the original resurfacing project, linked by completion dates to ensure a seamless progression of work.

Typically, a multi-disciplined project will involve various staff members representing individual specialties. The project could be re-named or categorized internally within the design firm, using a label understood by the firm's managing department. This process often results in the placement of a project name on an individual sheet within the plan set that is completely different from the project name that will appear on the Title Sheet. In many firms, it is common practice to label the product of a specific discipline, such as a drainage project, using a recognizable term. A client may have independent reasons for wanting to call the drawings by specific names. For instance, the engineers and technicians performing the design of the lighting segment may call it "electrical" work. The client may wish to refer to the sheets showing this work as "roadway electric plan" or "unit duct layout". If the internal staff applies their common term to the drawing rather than using the client's preferred term, the client might have the impression that the work has passed out of the control of the project manager. This is evident when the client offers a review comment asking to use their terminology in the work produced.

The in-house process that may help avoid the expenditure of labor dollars to revise the project title that is used on the Title Sheet, as well as the project title that is used on any other sheet within the set of plans, can be quite simple. The project title might be within the Request for Proposals or in the Request for Qualifications. The project title could be in the Advertisement for Services or in an invitation to bid for Design-Build Services. However, the project title used in the initial pre-engineering period might not be the same as that used in the actual Agreement for Engineering Services. Therefore the Agreement for Engineering Services most likely contains the official project title. Often, the representatives of the firm involved in signing the agreements are not the same as the individuals involved in the preparation of the pre-engineering submittals. Sometimes, when the firm is about to begin work, the representatives of the firm who attend the initial project kick-off meeting with the client may not be the same as the actual team members who will produce the work. In any case, the client can identify the official project title at any of the project initiation meetings. The firm then needs to advise all participants of the official name of the project and direct the staff to use the project name on all correspondence, all invoices and all sheets within the set of plans.

Jurisdiction and Funding Sources

The Title Sheet will often indicate the hierarchy of authorities or jurisdictions having an interest in the project by virtue of their governmental capacity, ownership of the property upon which the project is constructed, or ultimate responsibility for the management and operation of the completed project. The project funding and approval may take place at a number of levels and be approved by various agencies or jurisdictions. It is common to display the names of these agencies at the top of the Title Sheet, in descending order or hierarchy or proportion of funding. This listing could include the federal government, state, county, borough, parish, commonwealth, district, township, city, town, village, political precinct or management association. The listing may also acknowledge the priority for approval, or serve as a means to help identify the project as a local, regional or multi-state endeavor. It is possible for a project to commence with funding at the local level, and then to receive infusions of funding at various other levels of government or taxing jurisdictions, until the end product may consist of a Title Sheet that identifies a number of agencies whose funding has been utilized. "Ownership" or control of the project may remain unchanged.

The preferences of each client will differ regarding the ranking of the various governmental entities involved. The list might reflect the percentage of

involvement, the relative liabilities incurred, or the political rankings in either ascending or descending order. The in-house process that may help to avoid exceeding the budget for the preparation of the Title Sheet is to prepare a sample listing for discussion with, and concurrence from the client, thereby ensuring a minimum of revisions to the Title Sheet, since many clients allow only a few hours of effort for the preparation of this part of the work, but the end product may be revised several times as new information becomes available. A single confirmation meeting with the client will save many hours of revisions.

Project Identification Numbers

Many agencies and clients utilize a numbering system as the means of identification for a project. Numbers become reference tags for the various agencies to track budgets, progress and status. This identification number may change during the various phases or stages of a project, so it is common for a project to have a unique number when it originates, a separate number when it reaches conceptual approval, another number at plan preparation and a new identification number for construction. Some agencies use the same number from start to finish so that a project can refocus in a different direction without losing its identity within an accounting system. For some agency program staff, it is far easier and more cost-effective to re-define a project than to re-name or re-number it in a budget tracking system.

The numbering system may involve terms or labels such as job number, section number, project number, contract number, or other terms including fiscal year allocation, budget, line item, tracking system, appropriation, letting, or program. Each has a particular and unique origin, and each has a specific meaning to the agency. In most cases, the identification number is not interchangeable between terms and labels. The number may undergo subtle changes as the project advances from the preliminary to the final stage. A working knowledge of the derivation and meaning of the identification number is essential to ensure that it is in its proper place during design.

Given that the identification number is unique to the project, regardless of whether it refers to the project status, design job number, construction funding source or program year, the Title Sheet is the logical place for the display of all of the numbers, in the exact format that the agency prefers to see them listed, which have any bearing on the nature or development of the proposed improvement. This may include all manner of punctuation, hyphenation, brackets and spaces between letters and numbers. Often, the identification number appears in a specific manner or location on each of the drawings within the set of plans. The number may also be in bold font, italics or specific lettering size.

To avoid having to revise the project number on the Title Sheet as well as on the various other sheets or locations within the set of plans, the firm performing the work will need to understand the numbering system of the agency, the preferences of format for the number and the location for the number to be placed on a sheet. This also requires that the firm communicate the number to all disciplines involved in the project, as well as the firm's internal accounting and invoicing staffs. This will ensure that each transmittal to the client is identifiable for processing by the recipient departments. The need for this type of coordination becomes apparent on a multi-disciplined project, where each group of staff members involved in a unique specialty could generate drawings and reports using the identification number in a variety of forms and formats. Structural teams will often use an initial project number for their preliminary submittal, and will retain the use of this number throughout the entire design process. This can result in last-minute revisions of

each Sheet produced by a design discipline in order to comply with the client's system.

Project Maps

The Title Sheet will typically contain a map to locate the project. The type and scale of the map will vary based on the client. In some cases, more than one map may help identify the project within various jurisdictions. A quick glance will show a state official, such as a member of the elected representative body, state maintenance or policing agency, or a labor-related official, where the project is located in order to determine whether action, reaction or acknowledgement is required. A prospective bidder on the project can use the mapping to identify the relative proximity to staging areas, supply sources, borrow pits or dump sites. The prospective bidder can also determine the surrounding access conditions. A project map can be used to provide an indication of the relative length of the proposed improvement.

State or County Map

If a project is subject to federal or state funding, a statewide map will typically be included in order for the appropriate federal and state agency officials to quickly identify the work within their district or area of responsibility. Given the wide range of services provided at the state and federal levels, an agency may be involved or affected without having been in direct contact with the firm performing the design services or the client originating the assignment. This could include environmental agencies, interstate commerce commissions, regional planning coordinators and various bureaus whose databases will be affected or will require updating to reflect the project. There is inter-agency overview at various levels of government, but no singular entity can have all knowledge of all projects from the public and private sectors in any one region which might be taking place at any given time. It would be most undesirable to allow the implementation of an improvement to have a negative impact on the regional transportation network. So, for that reason, a simple mark on a state-shaped map provides a macro-view that can suffice as a prompt to allow the exchange of critical information regarding projects which may overlap in a specific area.

Local Project Map

The bidder or prospective contractor will focus on the micro-view of the project, typically presented as a location map or local sketch or roadway system map. This map identifies the project limits, the interaction with the local street network, the orientation of the project with regard to political boundaries such as city limits, county or township lines, and the survey terms such as USGS range and township so that other available mapping can be obtained in an efficient manner.

The interaction with the local street network would allow the potential contractor to see the access routes to the project, which might involve crossing railroad tracks, congested highways or bridges over waterways which may have seasonal delays. It would be beneficial for the location map to show all streets in the project area. However, each agency has its own requirements and it is common for a project location map that is used for a state or county project to have a different focus on the street network than the map used for a local municipality or township. All mapping would not be to the same degree of detail in every project, but it is typical to show all of the numbered routes, interchanges and intersecting streets as a minimum. The potential bidder will most likely visit the project site as a prelude to compiling an estimate of the costs involved in constructing each

component part of the project. Access or delivery routes, areas for the field office, worker parking and material storage, overhead electric power and telephone lines, viaducts and heavy traffic generators would not necessarily be shown on the location map, but would be observed by the potential bidder during a visit to the project site. The contractor and suppliers may be approaching the project from all directions, at various times of the day, and will need to be able to prepare a bid based on the realities of dealing with all physical parameters associated with the project site in order to be able to complete the project within the timeframe indicated in the proposed schedule.

The project might cross municipal, township or county boundaries, requiring the contractor to engage various ordinances which might affect the project. Seasonal maintenance activities may also affect the project. The project may contain bus-

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of a project prospective well as soil construction excavation, uting. The d material om which ect runoff n control owledge

eed to stem. sist in y the rvey on of Providing the identify whether the project investment of resources to prepare a bid. can be avoided by discussing the anticipated usage of the map with the client, by comparing the map to that shown on similar projects in the area, and by comparing the latest roadway mapping available with aerial photography and a field visit. Incorrect geographic placement of a project on a regional map can lead to revisions in construction staging, traffic detours and unintended labor hours in other parts of the plans. The project design team sometimes gets their jobsite knowledge from a photo log, and sometimes the project budget only allows one field trip to the jobsite. For projects of multiple-year duration, a person who made the visit or who took the photos could leave or be re-assigned. Jobsite knowledge can be lost during a project.