

PLANS PREPARATION MANUAL

Issued by
STATE OF CALIFORNIA
CALIFORNIA STATE TRANSPORTATION AGENCY
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DIVISION OF DESIGN
OFFICE OF CADD & ENGINEERING GIS SUPPORT



FOREWORD

This manual establishes uniform standards and procedures to be used when preparing right of way maps, preliminary exhibits and the development of project plans. The text portion of this manual describes what should be contained on each type of project plan sheet. Examples illustrate the standards (particularly design presentation standards) that work for the majority of projects, in all districts.

This manual is first and foremost a “Presentation Manual” of engineered decisions and judgments. This manual states and illustrates how Caltrans presents a project for bidding and construction.

The standards in the latest version of the Plans Preparation Manual available on the internet (<https://dot.ca.gov/programs/design/manual-plans-preparation-manual-ppm>) are to be used unless the standards themselves cannot clearly and concisely show the information. You can subscribe to automatic email notifications of Manual changes and updates at the above website.

If a user chooses to print or download a copy of the Manual, the user is responsible for keeping their copy up to date and current.

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This manual is dedicated to John Gizinos, who even after retirement, gave of his time, effort and knowledge to help produce this manual. John has spent nearly 20 years in the pursuit of assisting the Project Engineer in developing a quality set of contract plans. Without him, this manual might never have been a reality.



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CHAPTER 1 INTRODUCTION TO THE PLANS PREPARATION MANUAL

SECTION 1-1 GENERAL

1-1.1 Purpose

This manual establishes uniform standards and procedures to be used when preparing right of way maps, project plans, route adoption maps, freeway agreement exhibits, PUC exhibits, and other maps and exhibits.

1-1.2 Application of Plan Preparation Standards

Plan preparation must follow the standards in this manual.

The categories of plan preparation standards, as used in this manual, are defined as:

- *Boldface Standards* - Standards that are essential to produce a complete, concise and legal set of project plans. Boldface Standards use the words “shall” or “must.” The words "shall" or "must" are used interchangeably due to sentence structure. Additional word phrases such as "do not use," "are to be," and "is to be" are also Boldface directives.
- *Underlined Standards* - Standards that are also important, but allow some flexibility to be compatible with the procedures and practices for the preparation of project plans. Underlined Standards use the word "should."
- *Permissive Standards* - All standards other than boldface or underlined. Permissive standards use the word "may." Additional words such as "option" and "can" also denote permissive standards.

1-1.3 General Drawing Criteria

Line Work

Line quality is extremely important to the readability of CADD drawings. Line widths are varied to distinguish certain classes of features from others. The more basic outlining features are emphasized with heavier (wider) lines. Examples are station lines, base lines, construction layout lines, borders and the basic outline of objects. Medium weight lines are used for proposed construction, text and right of way. Light lines are used for existing topography, dimensioning, leader lines and other less important details. Dashed or dotted lines are used to distinguish existing from proposed work. For additional drafting conventions and standards regarding line weights, line styles and graphical representation of features refer to the CADD Users Manual, the Standard Plans, and Section 2-1.2 of this manual.

Text

Refer to Section 2.6 of the CADD Users Manual for text sizes and fonts. Caltrans uses uppercase text for projects. Use of uppercase text makes it easier to distinguish characters within the callouts, dimensioning, and labeling in the contract plans. See Section 2-1.2 of this manual regarding placement of text.

Scales

Recommended scales for project plans and other drawings are discussed in Section 2-1.3 of this manual. Caltrans does not draw to a scale, it only plots to a given scale.

1-1.4 Preparing Drawings

Generally, there is no prescribed sequence in which to prepare drawings. Each type of drawing involves different preparation procedures.

When preparing geographically oriented drawings, it is important that the physical features be drawn in exact position using state plane coordinate values. Labels, dimensions, notes, and other data is to be positioned to present the most understandable picture. For example, the area within the right of way may be used for data pertinent to construction. Notes and other data are usually placed outside the right of way.

To be effective, an engineering drawing must be clear, concise, complete, accurate, and functional. It is a graphic set of instructions.

1-1.5 Types of Engineering Drawings

Engineering drawings are generally categorized into two types, geographically oriented and nongeographically oriented. Geographically oriented drawings have graphic elements (lines, symbols) located on the drawing by their on-ground horizontal (N, E) locations. For example, a layout sheet is geographically oriented. Combining levels of data from a master drawing create geographic drawings. Refer to Section 2.4 of the CADD Users Manual. Nongeographically oriented drawings generally have graphic elements that describe the dimensional relationship of an object or planned construction without a direct relationship to specific on-ground horizontal locations. An example is a detail drawing for a drainage feature.

1-1.6 Use of Computer Aided Drafting and Design

Computer Aided Drafting and Design (CADD) has been used by Caltrans for more than 20 years. CADD is an integral part of the project delivery process, from project initiation through completion of the As-Built plans.

Civil 3D is the standard roadway design software. Civil3D was chosen to replace CAiCE, it does not replace MicroStation. Standalone AutoCad is not used by Caltrans and AutoCad files are not accepted for any designed and advertised projects on the state highway system. Civil 3D files are needed by surveys and construction to efficiently stake the project for the contractor to build (not all projects will need survey involvement). The Survey File Checklist, located in Appendix QQ of the Project Development Procedures Manual (PDPM), details the information the design engineer needs to provide surveys. Delivering all the files that surveys needs is now a performance indicator for final Ready-to-List (RTL) Certification.

MicroStation is the Caltrans standard drafting software. It is used primarily for the preparation of final contract plans for all PS&E submittals but can also be used for 3D modeling and visualization. A fully supported V8i version of MicroStation has been deployed by Caltrans. Caltrans will accept either MicroStation V8 or V7 file format for PS&E submittals, but each format must adhere to the current Caltrans CADD standards as defined in Section 4.1 of the CADD User's Manual. Even though MicroStation V8i has been deployed for use at Caltrans, some of the limitations or restrictions of the V8 file format are:

- Use only one model per DGN file, (the “Default” model)
- Use the appropriate State Plane Coordinates for all plan view sheets
- Use only Caltrans V8 zone seed files
- For every MicroStation highway design file a resolution of 10,000 for the "Working Units" is still required
- U.S. Survey foot must be defined as the default for the "foot unit"
- Use the level DGNLIB supplied by Caltrans
- Use only the standard Caltrans fonts and line styles

The current Caltrans official plotting solution is Interplot. Interplot shall be utilized for all Authority to Advertise Office Engineer (AAOE) and Authority to Advertise District Delegation (AADD) projects. Project plans (for any project on the state highway system (SHS)) submitted to any District or the Division of Engineering Services - Office Engineer (DES-OE) as part of the plans, specifications and estimate (PS&E) submittal package, must have an individual Interplot parameters file called an iparm (.i)_for each MicroStation design file (DGN). Each DGN file contains just one individual plan sheet, with no reference files attached. Each project plan sheet is a stand-alone legal document when it is part of the awarded contract documents. The submittal of models representing the entire limits of a project and containing individual sheet files are not accepted for PS&E submittals.

1-1.7 Electronic Data and Project Delivery Process

Electronic data is used throughout the project delivery process from the inception of a Project Initiation Document (PID) such as a Project Study Report (PSR) or Project Report

(PR) to the completion of the As-Built plans. Information used for an advance planning study, environmental document or corridor study may not be appropriate or accurate enough for the final design of a project. For guidance on reports, requests and submittals needed for developing and completing a project, see Chapter 14 of the Project Development Procedures Manual.

Before requesting surveys and mapping or acquiring existing data (vector or raster), decide who will need to use or receive the information and what really needs to be included in the final product.

When developing a project for PS&E, keep in mind what electronic files will be required by construction, surveys or contractors to build the project, including the completion of the As-Built plans. Project Delivery Directive (PD-06) details how the sharing of electronic files is to occur on a Caltrans project.

An informal project assessment meeting (sometimes called a scoping meeting) early in the project delivery process will assist in identifying the functional units needed to help deliver the final project.

A project development team (PDT) meeting will also assist the designer in determining the extent of electronic data (i.e. mapping or surveys) needed and the accuracy required for their project. Early identification of each functional unit's electronic data needs and what they will be required to deliver will allow for more effective and efficient sharing of the project electronic files.

One important item commonly overlooked on many projects is the early face-to-face field meeting onsite at the project location between the Project Engineer and the functional units such as Construction, Maintenance, Right of Way, Surveys, Hydraulics and Environmental. A face-to-face meeting prior to any constructibility review will promote teamwork, the sharing of critical project decisions, and will minimize last minute changes and surprises. Knowing what the final products are and who will receive them early in the design process, will minimize duplication of work and contribute to the on-time delivery of a quality project.

Another key factor in project development is the early coordination between the designer, the drafting unit, and the DOE unit specifications engineer. Many disagreements can be avoided during final project review if the designer, the drafting unit, and the DOE unit work together early in the design of the project.

The designer should confer with their district delineation unit regarding drafting standards early in the design of the project or have delineation do the drafting work.

As a project is being designed, the designer should get a copy and read the special provisions that apply to the bid items in their project. By doing this, the designer will have a better understanding of how the bid items will need to be shown and accounted for on the plans.

1-1.8 Content and Development of Electronic Files

Electronic files for project plans should generally contain the following information and are developed in this order:

Master Topographic File

This file (sometimes referred to as the "bb" file) contains mapping that depicts existing conditions of a project. Existing topography may be provided by scanned maps, digitized maps or maps from ground surveys (digital terrain models).

This file will contain natural and man-made features such as:

- Roads and streets
- Driveways, sidewalks and curbs
- Streams, ditches and drains
- Bridges and culverts
- Utilities (railroads, poles, and pipelines)
- Fences and gates
- Buildings
- Trees and shrubs
- Contours of the original terrain

Topographic symbols are shown on Standard Plan A10E.

Master Design File

This file contains all proposed permanent design information for a project.

This file (sometimes referred to as the "aa" file) will contain features such as:

- Station lines
- Station tick marks and annotations
- Alignment line and route identification
- Layout lines
- Right of way lines
- North arrow
- Driveways, sidewalks and curbs
- Edge of roads
- Toe of slope and top of cut
- Construction features (guard railing, fences, sound walls, barrier, etc.)

Additional Master Design Files

For certain functional units it may be advantageous to create a separate Master Design File in addition to the Master Design ("aa") File. This allows all the elements from one bid item, system or owner to be in one DGN file.

- Drainage features
- Utilities
- Pavement Delineation
- Landscape

Symbology for Design Features is shown on Standard Plan A10C and A10D.

Contract Plan Files

The contract plan sheet file contains information that is necessary to the bidder and contractor and that is unique for that particular plan sheet. Plan view sheets (such as Layouts, Drainage, Utility sheets, etc.) are to be geo-referenced based on the California state plan coordinates. It generally includes labeling, descriptions, notes or symbology that defines or quantifies the bid items shown on that plan sheet. Specific plan sheet content, checklists and example plan sheets are contained in Section 2-2 of this manual.

Caution should be exercised when using completed projects as criteria in preparing new projects. Drafting standards and design standards may have changed and would not be reflected in completed projects. Due to a variety of reasons, a completed project may not have been prepared in an adequate manner.

Do not perpetuate mistakes when developing new projects. The instructions in this manual take precedence over the use of any completed project or past practices.

This manual not only states drafting standards for the presentation of the design of a project but also reflects policy and procedures related to the design and construction of a project. This includes such subjects as:

- Design designation criteria included on typical cross sections
- Determination of how and when project right of way is to be shown
- Determining if a project has railroad involvement
- Information regarding the inclusion of water pollution control best management practices (BMPs) in a project
- How staging and traffic handling information is to be shown for a project
- Necessary information to be provided to the contractor and sign manufacturer to furnish and install project sign panels

- Utilities and sub-surface features:
 1. Necessity of showing high-priority facilities and sub-surface features, including Caltrans-owned facilities
 2. Not providing full disclosure of utility locations can impact project construction
 3. Significant work stoppages have occurred in the past when an underground utility, not shown on the plans, was encountered during construction
- Project Control Data - Necessity of including horizontal and vertical control data and basis of datum control that is to be used to construct the project
- Drainage:
 1. Why existing ground lines and proposed grade lines are to be shown on drainage profiles for the installation or construction of a drainage facility
 2. Why existing ground line or average depth of excavation is required to be shown for removal of existing underground drainage facilities
 3. Why drainage system numbers and unit designations are required to identify the locations of drainage work
 4. What data is required to be included for drainage work such as, type of feature, type of material to be used, size, length of culverts, slope of culverts, and flowline elevations
- Walls designed to facilitate oversight by Office of Structure Design
- Why electrical systems work is to be segregated and clearly identified on plan sheets
- Construction Quantities:
 1. Why and how construction quantities are to be summarized in tabular format
 2. Why similar or related items of work are grouped together
 3. Why individual quantity summaries are to be provided for the various types of work involved (roadway, drainage, traffic handling items, signs, pavement delineation, etc.)
 4. Why lump sum items are to be clearly identified and shown only once as a bid item

CHAPTER 2 PROJECT PLANS

The purpose of Chapter 2 is to provide the designer with the policies and procedures to present design information on a final set of project plans.

This manual not only covers drafting standards for the presentation of the design of a project but also the policy and procedures related to the design and construction of a project. For more detailed information, refer to "Contract Plan Files" in Section 1-1.8 of this manual.

SECTION 2-1 POLICIES AND PROCEDURES FOR PREPARING PROJECT PLANS

2-1.0 Application of Plan Preparation Standards

The categories of plan preparation standards, as used in this manual, are defined as:

- *Boldface Standards* - Standards that are essential to produce a complete, concise and legal set of project plans. Boldface standards use the words "shall" or "must."
- *Underlined Standards* - Standards that are also important, but allow some flexibility to be compatible with the procedures and practices for the preparation of project plans. Underlined standards use the word "should."
- *Permissive Standards* - All standards other than boldface or underlined. Permissive standards use the word "may."

For a more detailed clarification of manual standards, see Section 1-1.2 of this manual.

2-1.1 Composition of Project Plans and General Preparation Procedures

Project plans contain plan sheets that are specific to that advertised project. Project plan sheets contain details and dimensions specific to the project work. Project plans are supplemented by the Caltrans Standard Plans. Do not include the drawing of a standard detail as it is shown in the Caltrans Standard Plans.

The project plans need only call out the name of that particular standard detail (example: HMA Dike, Type A), when applicable to the project. If a standard detail needs to be modified and included in a specific project, follow the instructions in "Use of Standard Plans" in Section 2-1.4 of this manual.

A set of project plans needs to be complete and concise and to clearly identify all bid items that a competent contractor can easily interpret and build. Eliminate extraneous information not directly related to that specific project plan sheet. Background topography should not generally be shown much beyond the right of way unless the design or construction of the project (or specific sheet) requires it. The ultimate goal is to communicate clearly with bidders, contractors, and the Resident Engineer.

All projects must have at least two sheets, a title sheet and one other sheet showing proposed work. A utility plan sheet may be a third sheet required for all projects, see Sections 2-1.8 and 2-2.13 of this manual.

The layouts are the base plan sheets and all plan sheet information can be shown on them. If the layouts become too crowded or cluttered, other plan sheets are to be used to clearly show the proposed work (i.e. drainage, pavement delineation, signing, etc).

Some projects do not need layouts to show the proposed work. If the typical cross sections, details and quantity sheets (along with the special provisions) clearly and concisely convey and explain the proposed work, then layouts (or any other plan sheets) may not be necessary.

When possible, group similar or inter-related bid items on the same plan sheets (i.e. pavement delineation and signing). The fewer and simpler the sheets, the more concise and understandable the final plans will be. However, avoid placing too much information on a plan sheet just to save paper. Make sure that all of the bid items shown on the plan sheet are under the purview of the individual signing and approving the sheet. If not, separate the bid items so each licensed individual is signing for the bid items under his/her purview.

Do not include plan sheets that do not contain work to be performed as part of the project, not even layouts, since it adds no value to the bidder or contractor and may cause confusion. Use break line symbols and gaps in stationing on the plan sheets to reflect the length of highway where no work is to be performed. Not all layout sheets will have corresponding drainage, utility, and pavement delineation sheets. If there is no work of that nature being performed on that portion of the project, do not show that kind of sheet for that length of highway. A good key map eliminates any confusion on the number of sheets for each type of plan sheet work (layout, drainage, pavement delineation, signing, etc.), and shows how these sheets are arranged.

All bid items must be clearly identified so quantities can be determined from the labeling and dimensioning on plan, profile or detail sheets. A bidder or contractor shall never be required or expected to scale from a hard copy print of the project plans in order to determine a quantity.

Labeling of bid items identified on plan, profile, and detail sheets must be consistent with the labeling as it appears in the quantity tables, the bid item list and special provisions. Quantities should be easy to identify, calculate and locate for all bid items.

In general, when identifying physical features, first describe the item, then the spacing, and then the total number of items (i.e. 10' steel poles @ 20' centers, total 4). See Section 2-1.3 for additional instructions for dimensioning and locating construction features.

Where stationing identifies bid items, plan sheets must include alignment lines so that plus stations or offset distances can be referenced to known stationing. Minor projects, designed using only post miles in place of stationing, must identify locations to a hundredth of a post mile. An alignment line labeled with post miles is to be shown in place of showing stationing.

If the quantity for the same bid item is shown on more than one type of plan sheet or quantity table (i.e. roadway, landscape or structures), the sub-totals from each quantity table are to be added together and displayed as a grand total on the quantity table most logically associated with that bid item (usually on the summary of quantities).

If there is a discrepancy between the project plans and the special provisions, the special provisions take precedence in any claim or disagreement between the contractor and the Department. When developing a set of project plans, the project engineer must keep in mind the special provisions and how these two parts complement each other. Do not add specifications on the plans. They belong in the project special provisions. Plans graphically show bid items and identify their locations. Specifications identify how a bid item is to be paid for and how it is to be constructed, installed, placed, etc.

Right of Way

Except for indeterminate right of way, as described herein, defined right of way must be shown on:

- The layout sheets of the project plans or if there are no layouts, the first set of plan view sheets. If there are no plan view sheets, then on the typical cross sections or first detail sheets.
- Other plan view sheets (in addition to the layouts), if the defined right of way has an impact on the work shown on those specific sheets.

Defined right of way, except indeterminate right of way, shown on a plan view sheet shall be depicted with a solid line and the R/W label above or below the line (not within Caltrans right of way) with no leader line and arrow.

With the exception of indeterminate right of way, plan view sheets that depict defined right of way lines are to include the following note, "FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE." Use of this note on all plan view sheets is necessary to notify subcontractors who typically perform work shown only on one particular type of plan sheet (example: Electrical Systems). These subcontractors typically do not receive the project layout sheets that include this note.

In some instances, the right of way will be indeterminate (i.e. right of way is by implied dedication – which basically means Caltrans does not own the property on which the highway is located). In these instances, the right of way lines are not to be shown, and the following note is to be placed on the layout sheets: "RIGHT OF WAY LIMITS ARE INDETERMINATE, AND ARE NOT SHOWN. THE CONTRACTOR MUST CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE

FOR CONDITIONS OF USE PRIOR TO COMMENCING WORK."

The defined right of way note or the indeterminate right of way note, as applicable to the project, should be placed in the upper left corner of the plan view sheet. Do not use the indeterminate right of way note just because sufficient time was not allotted to properly research the right of way.

Railroad Involvement

Negotiations with railroad companies are usually long and involved. The District Right of Way Railroad Agent must be contacted early in the project design phase, if:

- An existing railroad facility (example: at-grade crossing, underpass, or overhead) is within the project limits or immediately adjacent to the project
- A new railroad facility is to be constructed within the project limits.

In most instances, when a railroad facility is shown on the title sheet of the project, it is generally for the purpose of geographical reference (identifiable point or landmark), but it may also indicate that railroad clearances need to be addressed. If a railroad facility is shown on the layout sheets of the project plans, then it would definitely indicate railroad involvement, directly or indirectly.

Railroad clearance will need to be addressed in those situations where project construction:

- Will impact traffic at any railroad grade crossing that is adjacent to or within the limits of highway construction
- Requires entry of railroad property for access to the work
- Involves the attachment of guard railing to the abutment of an underpass, jacking of a pipe beneath the railroad roadbed, or construction of fences adjacent to railroad property

If a railroad is shown on the title sheet of the project plans and project construction does not impact the railroad facility, as determined by the District Right of Way Railroad Agent, then railroad clearance could be in the form of a single page letter stating that there is no railroad involvement.

2-1.2 Drafting Standards

Good drafting can enhance and clarify the readability of the project plans. A perfectly engineered project is only perfect if it can be easily read and understood by the bidders, winning contractor and the construction inspector. While developing the project, the designer must always keep in mind the people who will read and interpret the plans.

Clarity and consistency are two of the important aspects of good drafting practices.

Consistency statewide in following Caltrans drafting standards (which augments basic drafting standards) when developing project plans will promote clarity and familiarity with all Caltrans advertised projects.

Drafting standards include:

- Line weights, line styles and graphical representations of features conforming to the CADD Users Manual, the Standard Plans and this manual.
- Abbreviations, acronyms, symbols and symbologies are to conform to Standard Plans A3A through A3C (formally A10A through A10E, H1 and H2, and ES-1A through ES-1C). Caltrans has established, by long-standing practice, the use of an uppercase letter at the beginning of a single word abbreviation followed by lowercase letter(s). In the case of multiple word abbreviations or acronyms, Caltrans uses all uppercase letters.

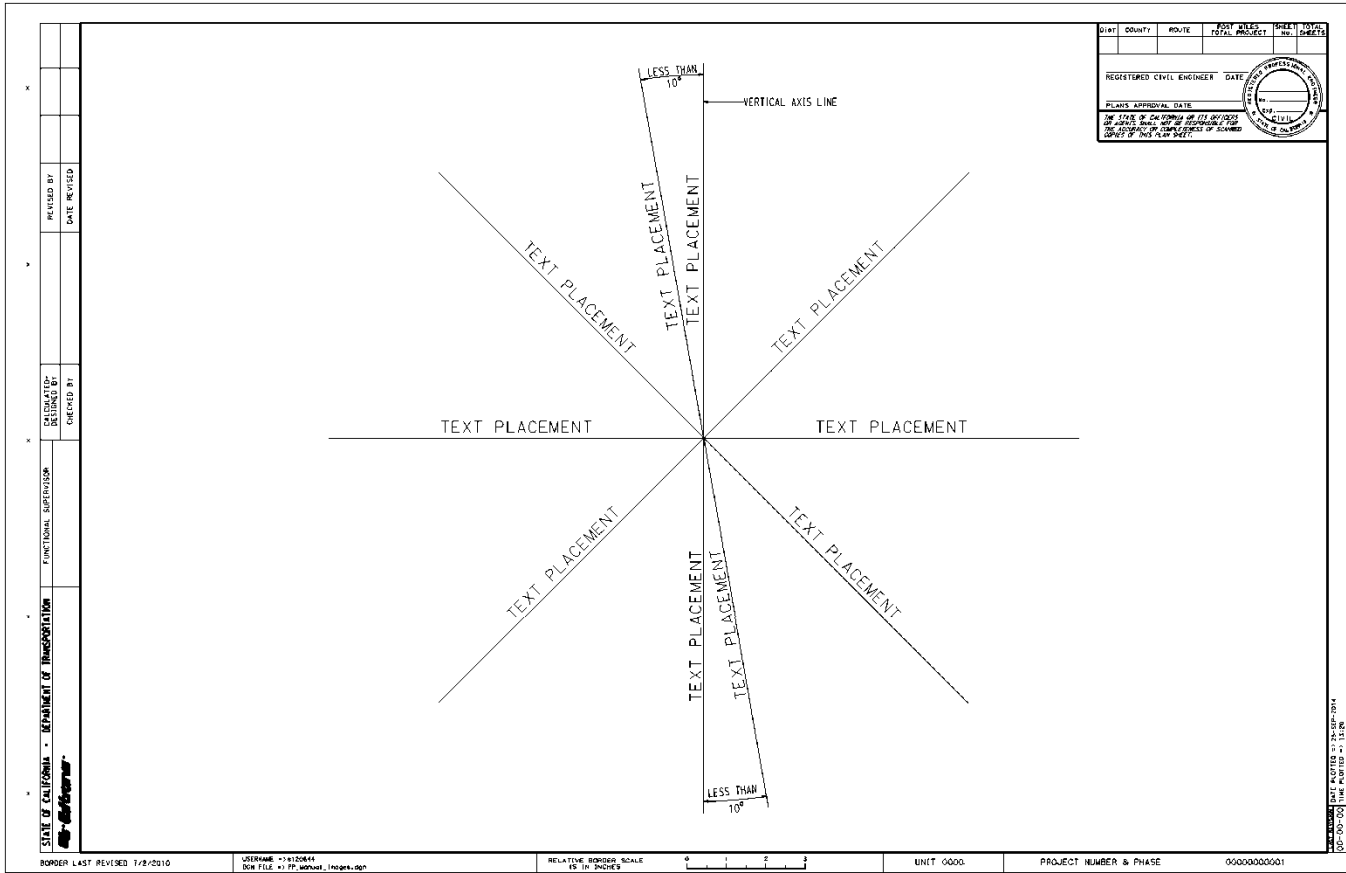
- Text sizes conform to Section 2-6 of the CADD Users Manual. Caltrans uses uppercase text for projects. Use of uppercase text makes it easier to distinguish characters within the callouts, dimensioning, and labeling in the contract plans.
- Placement of text, as shown in Figure 2-1, typically reads left to right. Some numeric text is placed along vertical lines (i.e. BC and EC alignment annotation and matchlines). This text reads bottom to top.
- Placement of text is to be consistent and legible throughout the project. Text is generally placed above the line work, if a leader line is not used. Where a leader line is used to label a bid item or the limits of a bid item, place the leader line so that the text will read from left to right.
- Placement of text should not break line work or shapes, or interfere with other text or annotation.
- Sheet match lines are to be placed perpendicular to the alignment line (station line or layout line). Sheet match lines are not to be placed at a full station, because the match line would obscure the station annotation and station tick mark. The match line break should be located halfway between station tick marks (i.e. +50).
- Placement of legends, notes or disclaimer information on plan sheets should be consistent for all projects.
- Leader lines with or without arrowheads are used to label bid items. Use of arrowheads should be dependent on whether their addition would create more clutter and reduce the legibility of the information to be shown. Leader lines without arrowheads are generally used to identify station limits of an item of work. Be consistent in the use of leader lines and arrowheads.

- Begin and end points of bid items are to be shown on the plans. Identify begin and end points of bid items using plus stations and offset distances from the alignment control line. If the alignment of the bid item coincides with the alignment control line, offset distance is not used. Plus stations and offset distances are to be shown to the nearest foot or tenth of a foot depending on the type of work. In those cases where a greater degree of accuracy is needed, identify begin and end limits of bid items or offset distances to hundredths of a foot. Where multiple bid

items begin or end at the same plus station, use one extension line from the plus station to identify each bid item in a stacked group. If sheets are really cluttered, an alternative method is to identify only the begin point of the bid items and include the overall actual length of each bid item. Be consistent within each plan set type (layouts, drainage, signs, pavement delineation, etc.) in the method used to identify locations of the bid items.

FIGURE 2-1

TEXT PLACEMENT AND READING DIRECTION



2-1.3 U.S. Customary Unit Standards

Dimensions

Dimensions of existing features should reflect their actual values. Dimensions of new features should reflect the required values to accurately construct the feature. Dimensioning, in general, should reflect the accuracy of the equipment required to construct the feature.

The use of feet and decimals of a foot for dimensions versus the use of feet and inches should be based on the bid item involved. Pavement structure work is to be dimensioned by the foot and decimals of foot (see Section 2-2.3 Typical Cross Sections).

Formed concrete construction features (bridges, walls, drainage features, curbs, sidewalks, etc.) are dimensioned in feet, inches and fractions of inches. Generally, manufactured or fabricated items are dimensioned in feet, inches and fractions of inches. The Caltrans Standard Plans should be used as a guide to determine whether a dimension should be expressed in feet and decimals of a foot or feet and inches.

Dimensions in feet, tenths of a foot or hundredths of a foot are to be shown with an accompanying apostrophe (symbol for foot). Where a dimension is to be displayed in tenths or hundredths of a foot and the dimension is less than one foot, use a zero in front of the decimal point (example: 0.2', 0.35').

Dimensions in inches are to be shown with an accompanying quotation mark (symbol for inch). Where a dimension is to be displayed in feet and inches and the dimension is one foot or greater, place a hyphen between the foot and inch values, (example: 1'-0", 2'-3", 10'-1/2"). Where a dimension is displayed in inches and the dimension is less than one foot, do not use the foot designation or hyphen in advance of the inch value, (example: 6", not 0'-6"). Do not use notes

such as, "ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE SHOWN," on the project plan sheets.

Fractions of a foot are not to be used in dimensioning (example: 10¹/₂'). Fractions of an inch are acceptable but decimal inches are not used on project plan sheets.

Locations of Construction Features

With the exception of those instances where construction is located by post miles or in those more rare instances where construction features are located by distance offsets from fixed objects, construction features are to be located using stationing and, as applicable to the bid items, plus stations and offset distances from alignment lines. Depending on the accuracy required, construction features are shown to the nearest foot, tenths of foot or hundredths of foot.

Horizontal dimensions and offset distances from an alignment line are to be shown with an accompanying apostrophe (symbol for foot).

Elevations

Accompanying foot tick marks are not used for existing or new contour lines, spot elevations, or for datum elevations shown on the grid lines of profiles. Depiction of elevations without a foot tick mark has been established by long-standing engineering practice. The basis for vertical control is to be included within the project plans when elevations are shown.

Bearings of Lines and Angular Identification

Bearings for all alignments shall be Degree-Minute-Second (plus the direction). Angles used to depict a detail shall be shown in the conventional mode (i.e. 57.5°).

Cross Slopes

Pavement cross slopes and superelevations shall be shown as percents.

Side Slopes

Side slopes shall be expressed in a nondimensional ratio. The horizontal component is shown first and then the vertical (X:Y). When a side slope becomes steeper than 1:1, the horizontal component shall be shown as a fraction such as 3/4:1.

Flares and Tapers

Flares and tapers shall be expressed in a nondimensional ratio. The longitudinal component is shown first and then the lateral offset component (example: 20:1, 15:1, etc.).

Scales

For plan sheets, a horizontal scale of 1" = 50' (Caltrans standard base scale) should be used in urban areas and some rural areas. A horizontal scale of 1" = 20' is used where greater detail is required than can be shown on the plan layouts. These sheets would typically be used for Electrical Systems plans, etc. For projects in rural areas, a horizontal scale of 1" = 100' may be used. Where a horizontal scale of 1" = 50' is used and just a few bid items are involved, the roadway layout information may be stacked one above the other on the same plan sheet. The above three scales are the only scales to be used for plan view sheets.

For roadway profile sheets, the following scales are commonly used for the condition described:

- Rural sections in hilly or mountainous terrain: 1" = 10' vertical and 1" = 100' horizontal
- Rural or urban with gentle rolling terrain: 1" = 5' vertical and 1" = 50' horizontal
- Rural or urban with level terrain: 1" = 2' vertical and 1" = 20' horizontal

Vertical to horizontal scale ratios producing roadway profile grade line plots steeper than 1:1 should be avoided because it overly distorts the actual field conditions. Scale ratio of horizontal to vertical (H/V) = 10 is typically used for roadway profiles.

Contour lines are to be as follows:

Plotting Scale	Index Contours	Intermediate Contours
1" = 20'	5'	1'
1" = 50'	10'	2'
1" = 100'	20'	4'
1" = 200'	50'	10'
1" = 400'	100'	20'

The index contour line will be every fifth contour and will be a heavier weight than the intermediate contour lines. In very steep terrain (at any scale), the intermediate contours may be eliminated if the contour lines are so close together that they affect the readability of the mapping or plans.

When developing geographically oriented drawings, use state plane coordinate values. Caltrans does not draw to scale; it only plots to a given scale.

Individual nongeographical oriented drawings, such as typical cross sections and detail sheets, do not need to be drawn to scale. The details are drawn proportionally, but the dimensions shown will govern over the image. These sheets are labeled "No Scale." If objects of different sizes are to be shown on the same detail sheet, one or both of the details may be enlarged or reduced to provide a balanced appearance on the sheet. If an object cannot be shown in its entirety and the elements of the object are repeated uniformly, then a break line may be used, but the total length or width must be shown.

Earthwork design cross section plotting scales, both horizontal and vertical, should be 1" = 10' for rural projects and 1" = 5' for urban projects. Cross section intervals are not to be greater than 50 feet.

Stationing

Plan sheet stationing is to be based on 100 feet per station with full annotation at 500-foot stations (multiple of 5). Annotation at 100 foot stations is a single digit number (the ones column). With the exception of precise stationing required at equations, BCs, ECs, and POCs, annotation for whole stations shall not include plus stations (i.e. +00). Refer to the plan sheet examples in Section 2-2 of this manual for stationing annotation examples. Precise stationing in U.S. customary units is expressed to the hundredth of a foot.

Stationing for preliminary drawings shall also be based on 100 feet per station and with full annotation at 500 foot stations for both 1" = 200' and 1" = 400'. The 100-foot stations do not need to be annotated.

The length of a station tick mark (in a MicroStation design file) is 2.8' at 1" = 20' scale, 7.0' at 1" = 50' scale and 14.0' at 1" = 100' scale. Station tick marks are centered on the alignment line. Annotation is placed below the alignment line. Station annotation is generally located one-half the height of the text below the tick mark. For those situations when station annotations would obscure a construction feature, the interfering annotations may be placed further below the tick mark or if necessary above the station tick mark.

Units of Measurement

The units of measurement as shown on Standard Plan A3C (formerly A10B) are to be used for bid items shown on a plan sheet, the quantity summaries and the Bid Item List so that they will

match those used in the Basic Engineering Estimating System (BEES). **NOTE:** The BEES has field limitations and will not accept upper and lower case units of measurement so there may be some differences between the plans and BEES, but the contract plans are to follow the convention set forth in the Standard Plans.

2-1.4 Use of Standard Plans

Caltrans Standard Plans are approved standardized details that are applicable to the construction of highway facilities. The Standard Plans are divided into sections designated by an alpha prefix:

- "A"- Pavement delineation, excavation and backfill details, barriers, guard railing, crash cushions, fencing, curbs, dikes and curb ramps
- "P" - Pavements
- "C" - Crib walls
- "D" - Drainage items
- "H" - Planting and Irrigation
- "T" - Temporary facilities
- "B" - Bridge related work, retaining walls, and sound walls
- "RS" - Roadside signs
- "S" - Overhead signs and sign panels
- "ES" - Electrical systems

All engineers and detailers should have a copy of the current Standard Plans book and be familiar with its contents.

The Standard Plans book is updated and issued at regular intervals, usually between 3-5 years by the Division of Engineering Services-Office Engineer (DES-OE). In between the official releases of the Standard Plans book, revisions, additions or deletions may occur and are called a revised standard plan (RSP) that supplements the current edition of the book. All project specific applicable RSP sheets must be included in the advertised contract plan set.

The Standard Plans applicable to a specific project are indicated by the use of the "Standard Plans List" that is included in the project special provisions. This list is updated in conjunction with the issuance of any revised standard plans. Where revised standard plans are applicable to a project, they are to be indicated on the "Standard Plans List." DES-OE will insert the indicated applicable revised standard plans as plan sheets into the project plan set. For AADD projects, the district will be responsible for the insertion of applicable revised standard plan sheets as part of the project plan set.

The design section responsible for the project is to verify that the applicable revised standard plans are identified on the current "Standard Plans List" sent to either DES-OE or DOE as part of the PS&E submittal.

Caltrans standard plans are available via the Caltrans DES-OE Internet web site in several electronic formats.

Unsigned MicroStation design files for each standard plan are provided on the web site to assist project designers where a standard plan detail does not fit a given situation and must be modified. Only the individual modified detail or

details from the standard plan, not the entire standard plan detail sheet, are to be included on the applicable detail sheet within the project plans (construction details, drainage details, etc.) and labeled "MODIFIED." These detail sheets containing the individual modified detail or details based on a standard detail are to be signed by the licensed individual who made the decision that a modification was necessary. If minimal changes are made, show only the dimensions for the modified portion with a reference to the applicable standard plan. If significant changes are made, show all of the dimensions of the detail. When all dimensions are shown, reference to the standard plan sheet is not necessary.

For AADD projects, Caltrans personnel may access signed tiff file formats of revised standard plans via the Caltrans internal network for the submittal of a complete project plan set in electronic format.

All revised standard plans (RSP) must be included as part of the advertised project plan set. This helps ensure that the policy for including all RSP in the As-Built plans is met, see Section 4.3 of the CADD Users Manual.

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2-1.5 Plan Border Sheets

Plan border sheets contained in the Caltrans CADD English Cell Library are to be used for project plan preparation. Access to the English Cell Library for consultants is available at this web site:

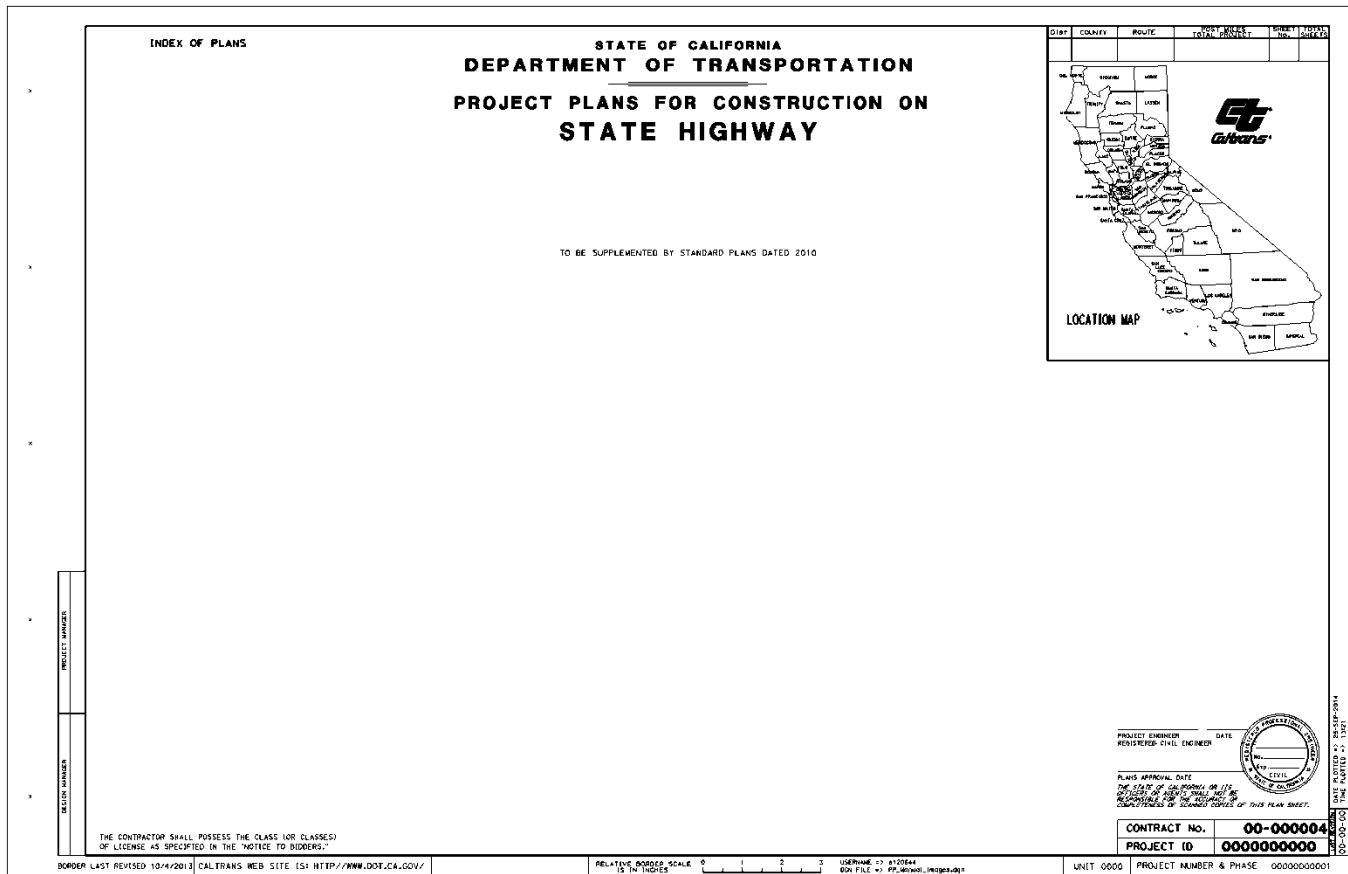
http://www.dot.ca.gov/hq/oppd/cadd/rsc_files/webpage.htm

The figures contained herein depict the various plan border sheets. There may be newer border sheets than those depicted. Updated border sheets are contained in the Caltrans English Cell Library.

BASIC BORDERS FOR THE PREPARATION OF PROJECT PLANS

FIGURE 2-2A

Border for Title Sheet of Caltrans Prepared Projects




The name of the cell for this title sheet border is AC = TITLE.

BASIC BORDERS FOR THE PREPARATION OF PROJECT PLANS

FIGURE 2-2B

Border for Title Sheet of Consultant Prepared Project for Caltrans

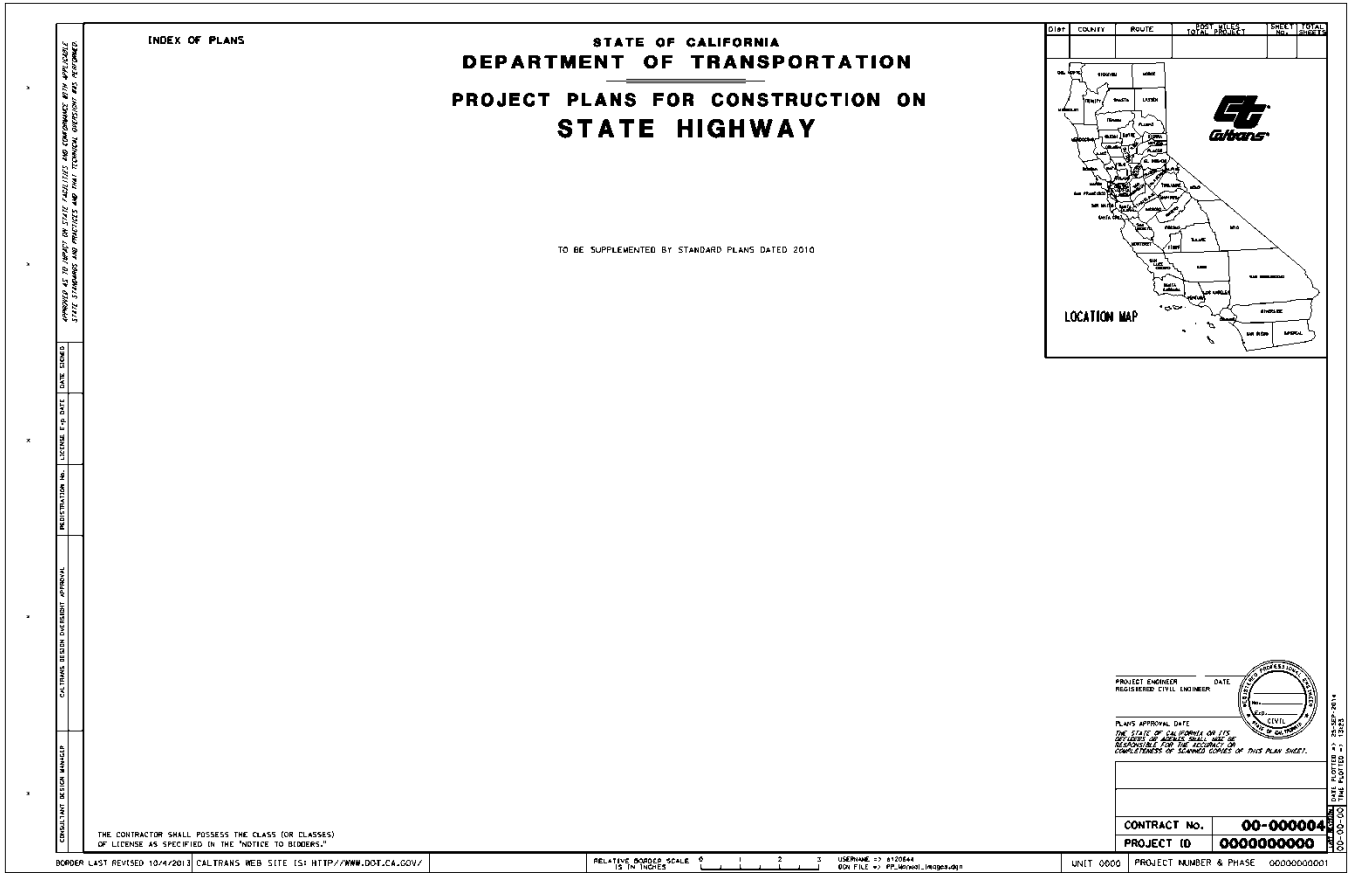
INDEX OF PLANS APPROVED BY THE ARCHITECT OR ENGINEER AND ENGINEERING ARCHITECTS, INC. FOR THE STATE OF CALIFORNIA AND THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION.	<p>STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION PROJECT PLANS FOR CONSTRUCTION ON STATE HIGHWAY</p> <p>TO BE SUPPLEMENTED BY STANDARD PLANS DATED 2010</p>	<table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px;"> <thead> <tr> <th>DIST.</th> <th>COUNTY</th> <th>ROUTE</th> <th>SECTION</th> <th>SHEET NO.</th> <th>TOTAL SHEETS</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> 	DIST.	COUNTY	ROUTE	SECTION	SHEET NO.	TOTAL SHEETS						
DIST.	COUNTY	ROUTE	SECTION	SHEET NO.	TOTAL SHEETS									
CONSULTANT DESIGN NUMBER CALTRANS DESIGN AGREEMENT APPROVAL PREPARATION IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR THE CONSTRUCTION OF STATE HIGHWAYS AND BRIDGES	<p>THE CONTRACTOR SHALL POSSESS THE CLASS (OR CLASSES) OF LICENSE AS SPECIFIED IN THE "NOTICE TO BIDDERS."</p>	<table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px;"> <tr> <td>PROJECT ENGINEER</td> <td>DATE</td> </tr> <tr> <td>REGISTERED CIVIL ENGINEER</td> <td> </td> </tr> <tr> <td>PLANS APPROVAL DATE</td> <td> </td> </tr> <tr> <td colspan="2" style="font-size: 6px;"> THE STATE OF CALIFORNIA OR ITS AGENTS OR FIELD OFFICES WILL BE RESPONSIBLE FOR THE COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET. </td> </tr> <tr> <td>CONTRACT No.</td> <td style="text-align: center;">00-000004</td> </tr> <tr> <td>PROJECT ID</td> <td style="text-align: center;">000000000</td> </tr> </table>	PROJECT ENGINEER	DATE	REGISTERED CIVIL ENGINEER		PLANS APPROVAL DATE		THE STATE OF CALIFORNIA OR ITS AGENTS OR FIELD OFFICES WILL BE RESPONSIBLE FOR THE COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.		CONTRACT No.	00-000004	PROJECT ID	000000000
PROJECT ENGINEER	DATE													
REGISTERED CIVIL ENGINEER														
PLANS APPROVAL DATE														
THE STATE OF CALIFORNIA OR ITS AGENTS OR FIELD OFFICES WILL BE RESPONSIBLE FOR THE COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.														
CONTRACT No.	00-000004													
PROJECT ID	000000000													
BORDER LAST REVISED 10/4/2013 CALTRANS WEB SITE IS: HTTP://WWW.DOT.CA.GOV/	RELATIVE BORDER SCALE 0 1 2 3 IS IN INCHES	UNIT 0000 PROJECT NUMBER & PHASE 0000000001												

The name of the cell for this title sheet border is AC = TITLE2.

BASIC BORDERS FOR THE PREPARATION OF PROJECT PLANS

FIGURE 2-2C

Border for Title Sheet of Consultant Prepared Project for Local Agency



The name of the cell for this title sheet border is AC = TITLE3.

BASIC BORDER FOR THE PREPARATION OF PROJECT PLANS

FIGURE 2-2D

Border for Most Plan Sheets Prepared by Caltrans

DIST. COUNTY. ROUTE. EST. NO. TOTAL PROJECT. SHEET NO. TOTAL SHEETS.	
REGISTERED CIVIL ENGINEER DATE	
PLANS APPROVAL DATE	
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION 	
FUNCTIONAL SUPERVISOR	CHECKED BY
DESIGNED BY	DATE REVISED
BORDER LAST REVISED 1/2/2010	
USERNAME **4120844 DOC FILE ** PP_M00001_1.mxd	
RELATIVE BORDER SCALE 1/8" = 1'-0"	
UNIT 0000	
PROJECT NUMBER & PHASE 0000000001	

The name of the cell for this border sheet is AC = FULPLN. Use for layouts, typical cross sections, drainage details, construction details, contour grading, sign plans, quantity sheets, etc.



BASIC BORDER FOR THE PREPARATION OF PROJECT PLANS

FIGURE 2-2F

Border Sheet with Full Profile Grid Insert for Caltrans Prepared Projects

The name of the cell for this border sheet is AC = FULPLN. The name of the cell shown for this full profile grid insert is AC = PROFIL and it is used for the 1" = 50' Caltrans base scale. Two separate profile grid inserts for the other allowable Caltrans plotting scales are available. These grid inserts are for use with the 1" = 100' plotting scale (cell name AC = PRF100) and the 1" = 20' plotting scale (cell name PRFL20). Use these grid inserts for roadbed profiles and superelevation diagrams. Where these grid inserts are used for roadbed profiles, show earthwork quantities along the bottom of the sheet.

Two additional grid inserts are available for use with this border sheet to depict drainage profiles, sewer profiles, etc. Their cell names are; AC = GRID1 and AC = GRID2.

There are three cells that have stacked grid inserts when there is a need to stack one profile above another. The three cells are; AC = PROFLS, PRF10S and PRF20S.



BASIC BORDER FOR THE PREPARATION OF PROJECT PLANS

FIGURE 2-2G

Border Sheet with Full Profile Grid Insert for Consultant Prepared Projects for Caltrans or a Local Agency

The name of the cell for the border sheet is AC = FULPLN2. The name of the cell shown for this full profile grid insert is AC = PROFL2 and it is used for the 1" = 50' Caltrans base scale. Two separate profile grid inserts for the other allowable Caltrans plotting scales are available. These grid inserts are for use with the 1" = 100' plotting scale (cell name AC = PROFL3) and the 1" = 20' plotting scale (cell name PROFL4). Use these grid inserts for roadbed profiles and superelevation diagrams. Where these grid inserts are used for roadbed profiles, show earthwork quantities along the bottom of the sheet.

Two additional grid inserts are available for use with this border sheet to depict drainage profiles, sewer profiles, etc. Their cell names are AC = GRID1C and AC = GRID2C.

There are three cells that have stacked grid inserts when there is a need to stack one profile above another. The three cells are; AC = PROFL5, PROFL6 and PROFL7.

BASIC BORDER FOR THE PREPARATION OF PROJECT PLANS

FIGURE 2-2H

Border Sheet with Partial Profile Grid Insert

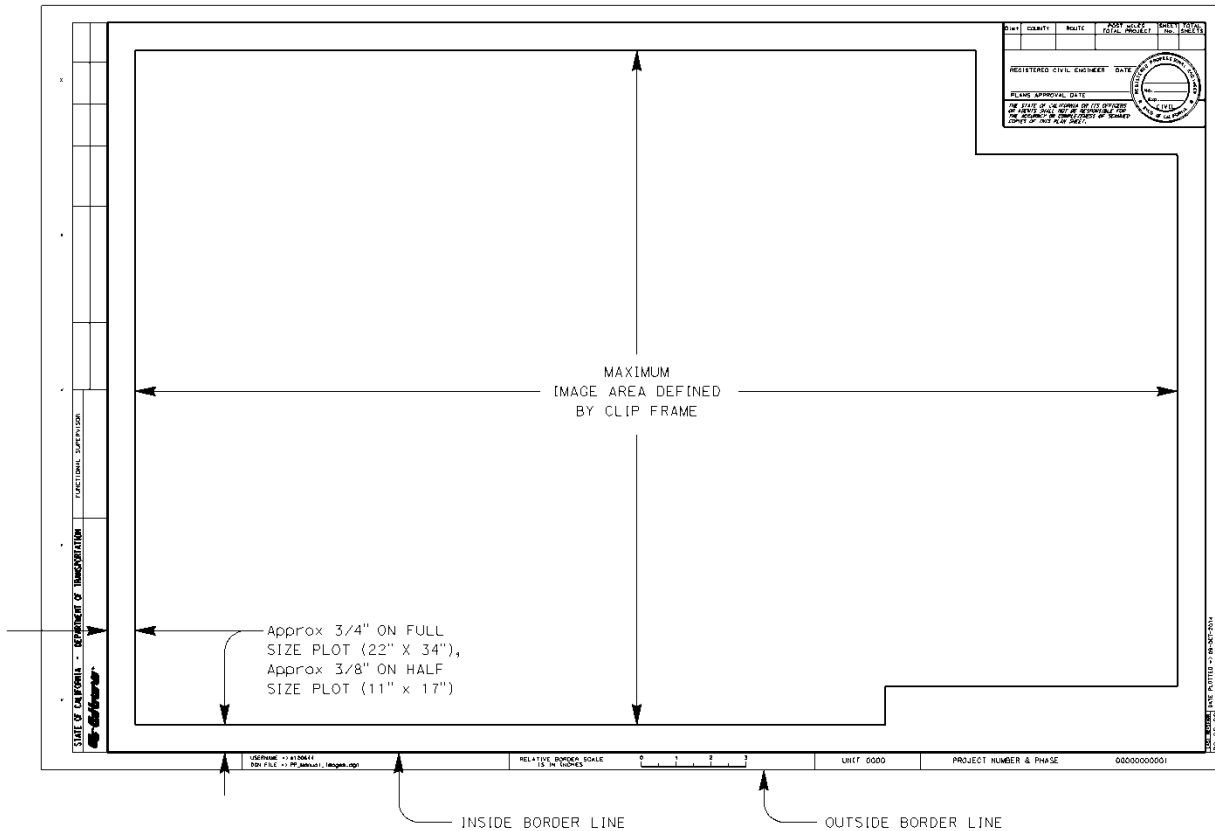
DIST. COUNTY ROUTE TOTAL PROJECT		SHEET NO. TOTAL SHEETS
REGISTERED CIVIL ENGINEER DATE		PROFESSIONAL SEAL
PLANS APPROVAL DATE		STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
FUNCTIONAL SUPERVISOR		STATION BY DATE
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION Caltrans		TOTAL
BORDER LAST REVISED 1/2/2010 USERNAME: ***3120844 DOC FILE: PP_BORDER_Inches.dgn		RELATIVE BORDER SCALE IS IN INCHES
UNIT GOOD		PROJECT NUMBER & PHASE 0600000001

NOTES:

1. The name of the cell shown for this border sheet for Caltrans prepared projects is AC = FULPLN. The name of the cell for the partial profile grid insert shown is AC = PLNPRO. It is used for the 1" = 50' Caltrans base scale. Two separate partial profile grid inserts for the other allowable Caltrans plotting scales are available. These grid inserts are for use with the 1" = 100' plotting scale (cell name AC = PLP100) and the 1" = 20' plotting scale (cell name PLPR20). Use these grid inserts for roadbed profiles and superelevation diagrams. Superelevation diagrams may be included on the grid profile portion of the sheet where sufficient space is available and such addition will not produce sheets which are cluttered, unreadable or confusing. Where these grid inserts are used for roadbed profiles, show earthwork quantities along the bottom of the sheet.
2. For consultant prepared projects for Caltrans or local agency, use the cell named AC = FUPLN2 for the border sheet. For the partial profile grid inserts, use the cells described in Note 1.
3. Two additional grid inserts are available for use with these border sheets to depict drainage profiles, sewer profiles, etc. Their cell names are AC = GRID3 and AC = GRID4.

BASIC CONFIGURATION FOR FULL USE OF GENERIC BORDER SHEETS

FIGURE 2-2I

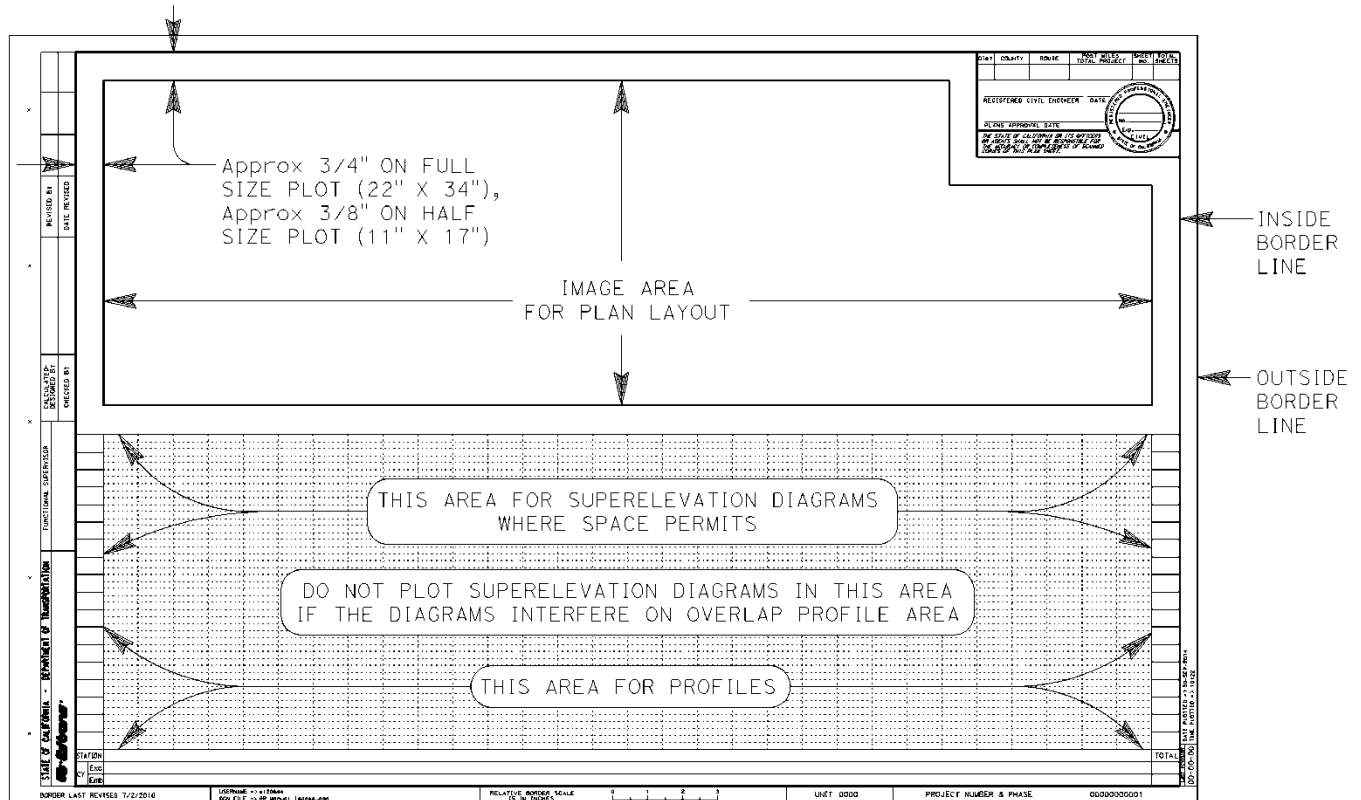


GENERIC BORDER SHEET

- 22" x 34" outside border line dimension for a full-size plot
- Never extend the drawing, details, tables or notes beyond sheet border or into the margin area
- Use the area in the lower right corner of sheet for the approved sheet name and sheet identification code as provided in Section 2.1 of the CADD Users Manual. Do not enclose sheet name, sheet ID code and number in a box. Two other items may be used in this area: a sub-title (or modifier) if pertinent to the plan sheet, and the plot scale
- Use match lines with no overlap from sheet to sheet where plan layouts are shown
- Do not place the border at various scales to accommodate stationing (for the three allowable scales at Caltrans, see Section 2-1.3 of this manual)
- The length of stationing that can be shown within the horizontal image area at a plot scale of 1" = 50' scale is approximately 1500 feet
- Underneath the outside border line is a plot marker and plot shape. These can help automate plotting. The attributes associated with these are Level 10, Color 252, Line Code 7, Weight 0 and a Construction Element. The outside border line on all contract bid plan sheets, regardless of format (tiff, pdf or hard copy) **must** be visible

BASIC CONFIGURATION FOR USE OF COMBINATION PLAN AND PROFILE SHEET

FIGURE 2-2J



PLAN AND PROFILE SHEET

- 22" x 34" outside border line dimension for a full-size plot
- Never extend the drawing, details, tables or notes beyond sheet border or into the margin area
- Use match lines with no overlap from sheet to sheet where plan layouts are shown
- Use the area in the lower right corner of sheet for the approved sheet name and sheet ID code as provided in Section 2.1 of the CADD Users Manual. Do not enclose sheet name, sheet ID code and number in a box. Two other items may be used in this area: a sub-title (or modifier) if pertinent to the plan sheet, and the plot scale. The grid lines do not need to be removed where this listed information is placed
- Do not place the border at various scales to accommodate stationing (for the three allowable scales at Caltrans, see Section 2-1.3 of this manual)
- The length of stationing that can be shown within the horizontal image area at a plot scale of 1" = 50' scale is approximately 1500 feet
- The grid portion (lower half) of the sheet is to be used for profiles, superlevation diagrams and the listing of earthwork quantities along the bottom of the sheet
- See Figure 2-2I of this manual regarding sheet plotting

2-1.6 Electronically-Generated Plan Sheet Signatures and Project Development Names

General

The California Board for Professional Engineers, Land Surveyors and Geologists recognizes electronically generated seals as an acceptable form of the professional seal. Federal and State laws allow the use of electronically generated signatures. Electronically generated seals and signatures include those affixed to documents through the use of CADD programs and digital methods.

Title Sheet Signatures

Signature and license seal information on the title sheet of the project plans identifies the licensed professional assigned responsibility for coordinating the effort to produce a complete set of project plans for construction. Depending on the type of project, the person signing the title sheet typically is a licensed civil engineer, electrical engineer, or landscape architect.

The title sheet serves as a cover sheet for the project to identify the location(s) where the work will occur. This sheet is not considered an engineering document, as no item of work is to be shown on the sheet (this also applies to the Locations of Construction sheet). Items of work are to be shown on other sheets within the project plans (e.g. Layouts, Drainage, Electrical Systems, etc.).

Except for the Caltrans design oversight approval information (signature, license number and license expiration date) required on consultant prepared projects for Caltrans (see Figure 2-7), only one license seal shall appear on the title sheet. Title sheet borders with the seal and associated signature information are available in the Caltrans English Cell Library. The signature

must be electronically affixed to the title sheet. In all cases, the words "Registered Civil Engineer," "Registered Electrical Engineer," "Licensed Landscape Architect," or equivalent designation must appear with the signature. See Figures 2-3, 2-4, and 2-5 for title sheet signature and license seal information.

Where a consultant prepares a project for Caltrans or where a firm or local agency finances and prepares the entire project, their name and address is to be placed in the lower right-hand corner of the title sheet (see Figure 2-4).

The prime consultant, that prepares the entire project for a permittee or local agency, shall place the company name and address in the location shown in Figure 2-5 or Title Sheet, Example "B." Logos, telephone numbers, or artwork are not permitted.

Title Sheet Project Development Names

For projects prepared by Caltrans, the printed name of the individual providing oversight of the Caltrans person assigned responsibility for coordinating the effort to produce a complete set of project plans shall be placed in the "Design Manager" name block space located in the lower left margin of the title sheet. The printed name of the Caltrans project manager shall be placed in the "Project Manager" name block space located in the lower left margin of the title sheet. See Figure 2-6 for project development names required on the title sheet of Caltrans prepared projects. Printed names included in the name blocks shall not have any designation indicating professional status.

For projects prepared by consultants for Caltrans or local agencies, the printed name of the individual in the prime consultant's company responsible for providing oversight of the person assigned responsibility for coordinating the effort to produce the complete set of project plans shall be placed in the "Consultant Design Manager"

name block space located in the lower left margin of the title sheet. The Caltrans engineer providing design oversight approval shall have their printed name, signature, license number, license expiration date, and date of signature included in the block spaces located in the left margin of the title sheet. The signature must be electronically affixed to the title sheet. The design oversight approval note must not be removed. See Figure 2-7 for project development names required on the title sheet of consultant prepared projects.

Individual Plan Sheet Signature

Individual project plan sheets, other than the title sheet, must have the license seal and signature of the licensed civil engineer, electrical engineer, mechanical engineer, geologist, architect or landscape architect who has the technical expertise and is in responsible charge for the preparation of the individual plan sheet. Licensed traffic engineers can sign traffic plans (traffic handling, pavement delineation sheets, etc.). Only one license seal and number with associated signature shall appear on the sheet. For all disciplines except Landscape Architecture, the printed name, license number and license expiration/renewal date must appear within the license seal. The registrant's signature and date signed for the completion of the sheet shall go outside the license seal but within the signature block on the line provided in the upper right hand corner of the sheet border (see Figure 2-8 or the "Generic Project Border Sheet" example under the Section 2-2.5 examples).

For Landscape Architecture, the signature, license renewal date and the date signed for the completion of the sheet by the licensed landscape architect shall be within the license seal. The printed name and license number is arched above the signature within the seal. A second signature of the licensed Landscape Architect shall go outside the license seal but within the signature

block on the line provided in the upper right hand corner of the sheet border (see Figure 2-9a).

All advertised project plan sheets (including the Title Sheet) **MUST** include the license expiration date of the person signing and sealing the sheet. Refer to the December 22, 2009 Memorandum "Inclusion of Expiration Date on Engineering and Land Surveying Documents" for the Caltrans business practice of including the expiration date.

The signature must be electronically affixed to the plan sheet. In all cases, the words "Registered Civil Engineer" or equivalent designation must appear with the registrant's signature. Do not add job titles such as "Utility Engineer," "Project Studies Engineer," etc. See Figure 2-8 for individual plan sheet signature and license seal information for Caltrans prepared projects.

Where a consultant prepares the individual plan sheet for Caltrans, a permittee or local agency or the individual plan sheet is prepared by a local agency, their company name and address shall be placed in the location shown in Figure 2-9. Logos, telephone numbers, or artwork are not permitted.

Where the work shown on the individual plan sheet is financed and prepared by a permittee or local agency, their name and address shall be placed in the location shown in Figure 2-9. Logos, telephone numbers, or artwork are not permitted.

Individual Plan Sheet Development Names

For projects prepared by Caltrans, individual project plan sheets, other than title sheets, shall have the printed name of the person in the functional unit providing oversight of the registered engineer or other licensed person and other individuals involved in the development of the plan sheet. The printed name shall be placed in the "Functional Supervisor" name block space located in the left margin of the plan sheet. The intent of including the functional supervisor's name is to identify the individual that assisted the project engineer in the project delivery process, including acquisition of documents to assure that the project meets the Ready-To-List requirements. See Figure 2-10 for project development names required on individual roadway plan sheets prepared by Caltrans. For Caltrans Office of Structure Design plan sheets, the printed names of individuals involved in the development of the plan sheet are to be placed in the spaces provided on the structure plan sheet borders. Printed names included in name blocks of individual plan sheets shall not have any designation indicating professional status. Do not place additional name blocks other than those shown on the approved sheet borders.

For projects prepared by consultants for Caltrans or local agencies, the printed name of the individual in the consultant company responsible for providing oversight of the consultant project engineer or other licensed person involved in the development of the individual plan sheets shall be placed in the "Consultant Functional Supervisor" name block space located in the left margin of the plan sheet. See Figure 2-11 for project development names required on individual roadway plan sheets of consultant prepared projects.

Structure plans for externally developed projects have specific sheet borders to provide design oversight information.

Structure General Plan Sheet Signature and Structure Development Names

The general plan for a structure shall have the license seal and signature of the lowest classification licensed person in responsible charge for preparation of the plans for an entire structure. Only one licensed seal and number with associated signature shall appear on the sheet. The printed name, license number and license expiration date shall appear within the generic license seal. The licensed professional's signature and date signed shall be outside the license seal and within the signature block on the line provided in the upper right hand corner of the sheet. The signature shall be electronically affixed to the general plan sheet. In all cases, the words "Registered Civil Engineer" or equivalent designation must appear with the licensed professional's signature. The signature of the design engineer and the printed names of individuals involved in the development of the general plan sheet are to be placed in the spaces provided on the structure general plan sheet.

Caltrans Standard Plan Sheets

Standard Plan sheets are signed and sealed by the licensed person with the technical expertise and in responsible charge of the preparation of the individual standard plan sheet (which are published in the Standard Plans book). The standard plan sheets shall not be included as part of the advertised project plans. The revised standard plan (RSP) sheets are also signed by the licensed person with the technical expertise and in responsible charge of the preparation of the individual standard plan sheet but must be included as part of the advertised project plans. When RSP sheets are applicable to the project without any modification, the signed and sealed sheets are available in TIFF format for inclusion in the project plans. Any detail from a standard plan sheet or RSP that is modified by the project engineer for his/her project, must be included on a detail sheet as part of the advertised project

plans. Unsigned DGN files for both standard plan and RSP sheets are available for the project engineer to utilize portions as it pertains to his/her project. The project engineer takes full responsibility for all modifications and must sign and seal the detail sheet.

Standard Drawings from Other Agencies

When standard details from another agency are applicable to the project, they shall be included on a detail sheet as part of the project plans. Making only a reference to another agency's standard drawing number or name instead of including the detail in the project plans **is not acceptable**. Such incorporated standard details shall be legible when reduced to the contract bid document size of 11" x 17". The detail sheet shall have the signature, date signed and seal of the lowest classification licensed person with the technical expertise and knowledge of the design and use of the standard detail. Generally, the Caltrans project engineer will sign these plan sheets.

In some cases, another agency's standard detail may be included in the project plans and signed by the licensed individual from the local agency that has the technical expertise. If included, the detail(s) must be on a separate sheet (with the appropriate Caltrans border) and signed by the forementioned licensed individual from the local agency. These sheets must adhere to the Caltrans standard naming convention for files. If local agency specifications are included with the standard detail, **they must be removed** and included in the Caltrans special provisions.

Bridge Standard Detail Sheets (XS)

Bridge Standard Detail Sheets (XS) are developed and maintained by the Division of Engineering Services (DES). The detail sheets are intended to be inserted directly into either the District PS&E package or the Structure PS&E

package. The details are considered to be "Project Plans" for contract administration purposes in accordance with Section 5-1.02 "Contract Components", of the 2015 Standard Specifications (the same as in the 2010 Standard Specifications).

For additional or updated information concerning the XS sheets, go to the following website:

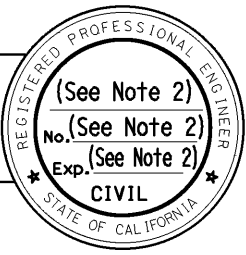
<http://www.dot.ca.gov/hq/esc/techpubs/manual/bridgemanuals/bridge-standard-detail-sheets/index.html>

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**TITLE SHEET SIGNATURE FOR CALTRANS PREPARED PROJECTS
(Lower Right Corner of Title Sheet)**

FIGURE 2-3

<p>(See Note 1) →</p> <p>PROJECT ENGINEER _____ DATE _____ REGISTERED CIVIL ENGINEER</p> <p>(See Note 3)</p> <p>PLANS APPROVAL DATE _____</p> <p><i>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</i></p>		<p>DATE PLOTTED => 30-SEP-2014 TIME PLOTTED => 06:21</p>				
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;">CONTRACT No.</td> <td style="width: 50%; padding: 5px;">00-000004</td> </tr> <tr> <td style="padding: 5px;">PROJECT ID</td> <td style="padding: 5px;">0000000000</td> </tr> </table>	CONTRACT No.	00-000004	PROJECT ID	0000000000	<p>LAST REVISION 00-00-00</p>	
CONTRACT No.	00-000004					
PROJECT ID	0000000000					
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; padding: 5px;">UNIT 0000</td> <td style="width: 50%; padding: 5px;">PROJECT NUMBER & PHASE</td> <td style="width: 25%; padding: 5px;">00000000001</td> </tr> </table>			UNIT 0000	PROJECT NUMBER & PHASE	00000000001	
UNIT 0000	PROJECT NUMBER & PHASE	00000000001				

GENERAL:

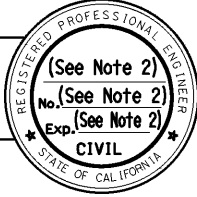
Signature and license seal information on the title sheet of the project plans shall be the licensed professional assigned responsibility for coordinating the effort to produce a complete set of project plans for construction. Depending on the type of project, the licensed professional signing the title sheet typically would be a civil engineer, electrical engineer, or landscape architect. Only one seal with associated signature shall appear on the title sheet. Additional seal, license number and signature of supervisors and managers shall not be placed on the title sheet.

NOTES:

1. Signature and date signed of licensed professional assigned responsibility for coordinating the effort to produce the complete set of project plans. Use (month/day/year, e.g. 4-8-13 or 10-10-13) for date signed.
2. Printed name, license number and license expiration date of person whose signature is affixed to this sheet (See Note 1). Use FT =3, TH = 7, TW = 5 or less depending on the length of the name. The name of individuals with long first and last names may be placed as two lines within the space provided. Note: the license expiration date must be included on each plan sheet. This has been and will continue to be a business practice by Caltrans. This practice also applies to local agency or consultant projects on the state highway system.
3. For the plans approval date see Title Sheet Examples "A" and "C."

TITLE SHEET SIGNATURE FOR A PROJECT PREPARED BY CONSULTANT FOR CALTRANS OR A PROJECT PREPARED BY A LOCAL AGENCY (Lower Right Corner of Title Sheet)

FIGURE 2-4

(See Note 1) → PROJECT ENGINEER DATE REGISTERED CIVIL ENGINEER			DATE PLOTTED => 30-SEP-2014 TIME PLOTTED => 06:23
(See Note 3) PLANS APPROVAL DATE <small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>			
CONTRACT No.	00-000004	LAST REVISION 00-00-00	
PROJECT ID	000000000		
UNIT 0000	PROJECT NUMBER & PHASE 0000000001		

GENERAL:

Signature and license seal information on the title sheet of the project plans shall be the licensed professional assigned responsibility for coordinating the effort to produce the complete set of project plans for construction. Depending on the type of project, the person signing the title sheet typically is a licensed civil engineer, electrical engineer, or landscape architect. Only one signature and license seal shall appear on the title sheet. The only other name, signature, professional license number and license expiration date (NO SEAL) on the title sheet is for the Caltrans Design Oversight Approval (see Figure 2-7).

NOTES:

1. Signature and date signed of the licensed professional assigned responsibility for coordinating the effort to produce the complete set of project plans. Use (month/day/year, e.g. 4-8-13 or 10-10-13) for date signed.
2. Name, license number and license expiration date of person whose signature is affixed to this sheet (See Note 1). Use FT =3, TH = 7, TW = 5 or less depending on the length of the name. The name of individuals with long first and last names may be placed as two lines within the space provided.
3. For the plans approval date see Title Sheet Examples "A" and "C."
4. Where a prime consultant develops the entire project for Caltrans, the name and address of the prime consultant shall be placed in this location. Use FT =3, TH = 6, TW = 6.
5. Where the entire project is financed and prepared by a permittee or agency, the name and address of the permittee or agency shall be placed in this location. Use FT =3, TH = 6, TW = 6.
6. Only the name and address of the permittee or agency or prime consultant, as applicable, responsible for the project shall be shown. No logos, phone numbers or artwork.

**TITLE SHEET SIGNATURE FOR A PROJECT PREPARED BY A
CONSULTANT FOR A PERMITEE OR LOCAL AGENCY
(Lower Right Corner of Title Sheet)**

FIGURE 2-5

(See Note 1) → PROJECT ENGINEER DATE REGISTERED CIVIL ENGINEER			DATE PLOTTED => 30-SEP-2014 TIME PLOTTED => 06:24
(See Note 3) PLANS APPROVAL DATE <small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>			LAST REVISION 00-00-00
CONTRACT No.	00-000004		
PROJECT ID	000000000		
UNIT 0000	PROJECT NUMBER & PHASE 0000000001		

GENERAL:

Signature and license seal information on the title sheet of the project plans shall be the licensed professional assigned responsibility for coordinating the effort to produce the complete set of project plans for construction. Depending on the type of project, the licensed professional signing the title sheet typically is a licensed civil engineer, electrical engineer, or landscape architect. Only one signature and license seal shall appear on the title sheet. The only other name, signature, professional license number and license expiration date (NO SEAL) on the title sheet is for the Caltrans Design Oversight Approval (see Figure 2-7).

NOTES:

1. Signature and date signed of licensed professional assigned responsibility for coordinating the effort to produce the complete set of project plans. Use (month/day/year, e.g. 4-8-13 or 10-10-13) for date signed.
2. Name, license number and license expiration date of licensed professional whose signature is affixed to this sheet (See Note 1). Use FT =3, TH = 7, TW = 5 or less depending on the length of the name. The name of individuals with long first and last names may be placed as two lines within the space provided.
3. For the plans approval date see Title Sheet Examples "A" and "C."
4. Where a prime consultant develops the entire project for a permittee or agency, the name and address of the prime consultant shall be placed in this location. Use FT =3, TH = 6, TW = 6.
5. The name and address of permittee or agency that hired the prime consultant shall be placed in this location. Use FT =3, TH = 6, TW = 6.
6. Only names and addresses of the permittee or agency or prime consultant responsible for the project shall be shown. No logos, phone numbers or artwork.



**TITLE SHEET PROJECT DEVELOPMENT NAMES
(Left Margin of Title Sheet)**

Projects Prepared by Caltrans

FIGURE 2-6

DESIGN MANAGER (See Note 1)	PROJECT MANAGER (See Note 2)
--------------------------------	---------------------------------

(Do not add additional project development name blocks)

NOTES:

1. Printed name (minimum first and last) of the individual providing oversight of the Caltrans project engineer or other licensed person involved in the development of the entire project. Use FT =3, TH = 6, TW = 6. The word "MANAGER" may be removed and the appropriate word placed in the name block (e.g., "ARCHITECT"), if the licensed individual providing oversight is not an engineer.
2. Printed name of Caltrans project manager. Use FT =3, TH = 6, TW = 6.

Projects Prepared by Consultants

FIGURE 2-7

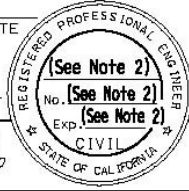
CONSULTANT DESIGN MANAGER (See Note 3)	CALTRANS DESIGN OVERSIGHT APPROVAL (See Note 4)	REGISTRATION No. ←	LICENSE Exp DATE (See Note 5)	DATE SIGNED →	<i>APPROVED AS TO IMPACT ON STATE FACILITIES AND CONFORMANCE WITH APPLICABLE STATE STANDARDS AND PRACTICES AND THAT TECHNICAL OVERSIGHT WAS PERFORMED.</i>
---	--	-----------------------	----------------------------------	------------------	--

NOTES:

3. Printed name of the individual in the prime consultant's company responsible for providing oversight of the prime consultant project engineer involved in the development of the entire project. Use FT =3, TH = 6, TW = 6. The word "MANAGER" may be removed and the appropriate word placed in the name block (e.g., "ARCHITECT"), if the licensed individual providing oversight is not an engineer.
4. Printed name (use FT =3, TH = 6, TW = 6) and signature of Caltrans licensed professional providing design oversight approval (for any project on a state highway).
5. License number, license expiration date, and date of signature of Caltrans licensed professional whose signature is in the Caltrans design oversight approval name block. Use FT =3, TH = 6, TW = 6. Use (month/day/year, e.g. 4-8-13 or 10-10-13) for date signed.

**INDIVIDUAL PLAN SHEET SIGNATURE FOR PROJECTS
PREPARED BY CALTRANS
(Upper Right Corner of Border Sheet)**

FIGURE 2-8

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
<p>(See Note 1) → REGISTERED CIVIL ENGINEER</p>			<p>DATE</p>		
<p>(See Note 3) PLANS APPROVAL DATE</p>					
<p><small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small></p>					

GENERAL:

Only one seal and signature of the appropriate licensed professional in responsible charge for developing the plan sheet shall appear on each individual plan sheet.

NOTES:

1. Signature and date signed of licensed professional in responsible charge for preparation of the plan sheet. Use (month/day/year, e.g. 4-8-13 or 10-10-13) for date signed. NOTE: for a licensed Landscape Architect see Figure 2-9a.
2. Name, license number and license expiration date of person whose signature is affixed to this sheet (See Note 1). Use FT = 3, TH = 7, TW = 5 or less depending on the length of the name. The name of individuals with long first and last names may be placed as 2 lines within the space provided.
3. For the plans approval date see Title Sheet Examples "A" and "C."

**INDIVIDUAL PLAN SHEET SIGNATURE FOR A PROJECT PREPARED BY A CONSULTANT FOR CALTRANS, OR A PROJECT PREPARED BY A LOCAL AGENCY, OR A PROJECT PREPARED BY A CONSULTANT FOR A PERMITEE OR LOCAL AGENCY
(Upper Right Corner of Border Sheet)**

FIGURE 2-9

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
<p>{See Note 1} → REGISTERED CIVIL ENGINEER DATE</p>					
<p>{See Note 3} PLANS APPROVAL DATE</p>					
<p><small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small></p>					
<p>{See Notes 4 and 6}</p>				<p>{See Note 5}</p>	

GENERAL:


Only one seal and signature of the appropriate licensed professional in responsible charge of developing the plan sheet shall appear on each individual plan sheet.

NOTES:

1. Signature and date signed of licensed professional in responsible charge for preparation of the plan sheet. Use (month/day/year, e.g. 4-8-13 or 10-10-13) for date signed.
2. Name, license number and license expiration date of person whose signature is affixed to this sheet (See Note 1). Use FT =3, TH = 7, TW = 5 or less depending on the length of the name. The name of individuals with long first and last names may be placed as 2 lines within the space provided.
3. For the plans approval date see Title Sheet Examples "A" and "C."
4. Where the prime consultant or sub consultant prepares the plan sheet for Caltrans or a permittee or local agency, the name and address of the **one** consultant responsible for the sheet shall be placed in this location. Use FT =3, TH = 6, TW = 6.
5. The name and address of the permittee or local agency that hired the consultant shall be placed in this location. Use FT =3, TH = 6, TW = 6. Not for the name of a second consultant. This space is reserved for permittee or local agency use only.
6. Where the work shown on the plan sheet is financed and prepared by a permittee or agency, the name and address of the permittee or agency shall be placed in this location. Use FT =3, TH = 6, TW = 6.
7. Only names and addresses of the local agency and consultant responsible for each specific sheet shall be shown. No logos, phone numbers or artwork

**LANDSCAPE TITLE SHEET OR INDIVIDUAL LANDSCAPE PLAN SHEET
SIGNATURE FOR A PROJECT PREPARED BY A CALTRANS, OR A
CONSULTANT FOR CALTRANS, OR A PROJECT PREPARED BY A LOCAL
AGENCY, OR A PROJECT PREPARED BY A CONSULTANT FOR A
PERMITEE OR LOCAL AGENCY
(Lower Right Corner of Title Border Sheet)
or
(Upper Right Corner of Border Sheet)**

FIGURE 2-9a

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
See Note 1 →					
REGISTERED CIVIL ENGINEER			DATE		
See Note 3					
PLANS APPROVAL DATE					
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.					

GENERAL:

Only one seal and signature of the appropriate licensed Landscape Architect in responsible charge for developing the plan sheet shall appear on the title sheet or each individual plan sheet.

NOTES:

1. A second signature of the licensed Landscape Architect in responsible charge for preparation of the plan sheet.
2. Signature, date of signature, license number, printed name and license renewal date of Landscape Architect whose signature is affixed to this sheet. Use FT =3, TH = 5, TW = 5 and WT = 1 for signature date and renewal date. Use FT = 3, TH = 3, TW = 3 and WT = 0 for printed name and license number (arched above the signature within the seal).
3. For the plans approval date see Title Sheet Examples "A" and "C."



**INDIVIDUAL PLAN SHEET PROJECT DEVELOPMENT NAMES
(Left Margin of Border Sheet)**

Projects Prepared by Caltrans

FIGURE 2-10

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION Caltrans	(See Note 1)	FUNCTIONAL SUPERVISOR (See Note 2)	CALCULATED-DESIGNED BY (See Note 3)	REVISED BY (See Note 4)
			CHECKED BY (See Note 3)	DATE REVISED (See Note 4)

NOTES:

1. Name of the functional area responsible for development of the plan sheet, e.g., DESIGN, TRAFFIC OPERATIONS, etc. If one Caltrans district develops the plan sheet for another Caltrans district, the functional area shall be preceded with the preparer's district number, e.g., 01-DESIGN. Use FT =43, TX = 10, WT = 0. For Landscape Architecture, use FT=43, TH = 10, TW=8, WT=0.
2. Printed name (minimum first and last) of the licensed professional in the functional unit responsible for providing oversight of the licensed engineer or other licensed professional who developed the plan sheet. Use FT =3, TH = 6, TW = 6.
3. Printed name (minimum first and last) of individual who calculated or designed the information on the sheet. Printed name of individual who checked the designed information and/or quantities on the sheet. The names in these blocks must be two different individuals. The name of the individual responsible for the work indicated **must** be placed in each name block. Use FT =3, TH = 6, TW = 6.
4. Printed initials of the person responsible for any design or quantity revisions on the sheet. Use (month, day and year, e.g., 4-8-13 or 10-10-13) for date revised. Use FT =3, TH = 6, TW = 6.
5. Structure plan sheet borders have other name block formats for Caltrans prepared projects.

Projects Prepared by Consultants

FIGURE 2-11

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION Caltrans	(See Note 6)	CONSULTANT FUNCTIONAL SUPERVISOR (See Note 7)	CALCULATED-DESIGNED BY (See Note 8)	REVISED BY (See Note 9)
			CHECKED BY (See Note 8)	DATE REVISED (See Note 9)

NOTES:

6. No entry is to be made in this name block when a consultant prepares the plan sheet.
7. Printed name of the individual in the consultant's functional unit responsible for providing oversight of the licensed engineer or other licensed person who developed the plan sheet. Use FT =3, TH = 6, TW = 6.
8. Printed name of individual in the consultant's company who calculated or designed information on this sheet. Printed name of individual in the consultant's company who checked the designed information and/or quantities on this sheet. The names in these blocks must be two different individuals. The name of the individual responsible for the work indicated must be placed in each name block. Use FT =3, TH = 6, TW = 6.
9. Printed initials of the individual responsible for any design or quantity revisions on the sheet. Use (month, day and year, e.g., 4-8-13 or 10-10-13) for date revised. Use FT =3, TH = 6, TW = 6.

10. Structure plan sheet borders and seed files for consultant prepared projects are available at this web site:
http://www.dot.ca.gov/hq/oppd/cadd/rsc_files/webpage.htm

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2-1.7 Project Identification Block and County Abbreviations

Project Identification Block

The project identification block (see Figure 2-12) must contain these items specific to each project:

- Caltrans District Number (two District Numbers on very rare occasions)
- Standard abbreviation for county or counties where the project is located (see Table 2-1.6)
- Route or routes where project construction is to take place
- Post mile limits of construction (except for those specific projects described herein)
- Individual sheet number
- Project total number of sheets

The sheet number and total number of sheets are to be left blank for projects which are not AADD. Division of Engineering Services-Office Engineer (DES-OE) will insert the sheet number and total number of sheets. For AADD projects, the districts will include both sheet number and total number of sheets.

FIGURE 2-12

PROJECT IDENTIFICATION BLOCK
(Upper Right Corner of each Border Sheet)

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Project Case Designation Numbers

For the purpose of referencing instructions related to the development of each title sheet project description and its associated project identification block, the various types of projects have been assigned case designation numbers. These case identification numbers apply to both this section of the manual and to the subsection titled, "Title Sheet Project Descriptions," in Section 2-2.2 of this manual.

Project Construction on One Route

Case 1A Project - One location on one route in one county with a continuous length of construction that is 0.2 mile or greater

In the project identification block, use a slash between the associated post miles for begin and end of construction. (In the title sheet project description use the "From...To..." format to describe the location.)

Example:

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	LA	5	74.9/79.3		

Project Construction on One Route (Continued)

Case 1B Project - One location on one route in more than one county with a continuous length of construction that is 0.2 mile or greater

In the project identification block, list the counties in order of the direction of construction. Use a comma between counties. A slash is used between the associated post miles for each county and a comma is used between the two sets of post miles. The order of listing the post miles is to match the order of listing the counties. (In the title sheet project description, use the "From...To..." format to describe the location.)

Example:

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SM, SF	1	R78.1/R78.2, R0.0/R0.7		

Case 1C Project - Two locations on one route in one county with both locations having a length of construction that is 0.2 mile or greater in length

In the project identification block, use a slash between the associated post miles for begin and end of construction for each location and a comma between the two sets of post miles. (In the title sheet project description, use the "From...To..." format to describe each location.)

Example:

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	LA	5	74.9/79.3, 81.2/83.5		

Case 1D Project - Two locations on one route in one county with one location 0.2 mile or greater in length and one location less than 0.2 mile (spot location)

In the project identification block, use a slash between the associated post miles for begin and end of construction for the location 0.2 mile or greater in length followed by a comma and a single post mile to describe the spot location. (In the title sheet project description, describe the location 0.2 mile or greater in length using the "From...To..." format and describe the location less than 0.2 mile in length by using a spot location description "At...".)

Example:

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	LA	5	74.9/77.6, 78.9		



Project Construction on One Route (Continued)

Case 1E Project - Two locations on one route in one county with individual lengths of construction less than 0.2 mile (spot locations)

In the project identification block, use a single post mile to describe each location separated by a comma. (In the title sheet project description, describe the two locations by using spot location descriptions "At..." and "At...".)

Example:

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
06	Fre	99	43.9, 45.7		

Case 1F Project - One location on one route in one county with an individual length of construction less than 0.2 mile (spot location)

In the project identification block, use a single post mile to describe the location. (In the title sheet project description, describe the location by using a spot location description "At...".)

Example:

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Men	1	80.8		

Case 1G Project - One or more locations in one county with all locations within a 0.6-mile radius of the center of a route separation

In the project identification block, use a single post mile for each route to describe the location (post miles at route separation). The order of listing the post miles is to match the order of listing the routes. (In the title sheet project description, describe the location by using a spot location description "At Route XX/XXX Separation.")

Example:

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	LA	5, 118	63.4, 18.3		

Project Construction on One Route (Continued)

Case 1H Project - Three or more locations on the same route in one county where each location's length of construction is less than 0.2 mile; 0.2 mile or greater; or a combination of these lengths

In the project identification block, use a slash between the associated post miles for begin and end of construction. In the title sheet project description, use the "From...To..." format to describe the beginning of the first location as the begin point of construction and the end of the last location as the end point of construction. Begin and end points of work are also to be shown.

If the distance between two successive locations of construction exceeds 3 miles, begin and end points of construction and work at those particular locations of construction may need to be shown (see Title Sheet Example "P"). Discussion with District Traffic should occur before deciding on the need of having advanced traffic signs for each location of construction. **NOTE:** Caltrans maintenance forces do not conduct routine maintenance between begin and end points of work. Arbitrarily adding advanced traffic signs may not be in the best interest of conducting routine maintenance on the route under construction or the route adjacent (where there is no work occurring) to the route under construction.

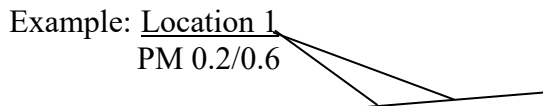
Example:

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	LA	101	0.2/7.2		

The following applies to the identification of construction on the title sheet mapping for Case 1H projects:

Method 1 Identification

Identify each location on the Title Sheet strip map graphically. Identify each location that is less than 0.2 mile in length with a leader line displaying its location number and specific post mile. Identify each location that is 0.2 mile in length or greater with leader lines displaying its location number and its post mile limits.



See Title Sheet Example "I"

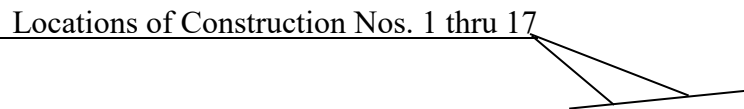
Method 2 Identification

When the magnitude of the number of locations of construction does not allow room for post mile(s) to be shown at each individual location number on the title sheet mapping, identify each location graphically with a leader line and specific location number enclosed in a circle (see Title Sheet Example "J"). There is not to be numerical gaps in the location numbers nor is there to be an addition of alpha designation to the location numbers. Include a table on the Title Sheet with a heading of "Locations of Construction" and a listing within the table of all project location numbers and associated post miles. When the magnitude of locations does not allow room for the tabulation on the Title Sheet (typically more than 15 locations - see Title Sheet Example "X"), the tabulation of all of the locations of construction must be placed on a separate sheet or sheets. The name of the sheet or sheets is to be "LOCATIONS OF CONSTRUCTION" and the sheet identification code is to be "LC." The "Locations of Construction" sheet(s) must immediately follow the Title Sheet.

When the "Locations of Construction" sheet(s) are used in the project plan set, a note is to be placed on the Title Sheet directing attention to the sheet(s). Example: "THE TABLE OF LOCATIONS OF CONSTRUCTION IS SHOWN ON THE LOCATIONS OF CONSTRUCTION SHEET." If more than one sheet is used, change "SHEET" to "SHEETS." DO NOT include any bid item information within the "Locations of Construction" table (this table is for identifying work locations only).

Method 3 Identification

When the magnitude of locations does not allow room for each individual location number to be shown on the title sheet mapping (typically more than 100 locations), identify the locations by sequential grouping on the route. Use leader lines to identify the limits of the locations within each grouping (see Title Sheet Example "K"). Label the origin of the leader lines with the specific location numbers. Example:



A table with a heading of "Locations of Construction" must be used to list all of the project's location numbers and associated post miles. The "Locations of Construction" table is to be placed on a separate sheet or sheets. The name of the sheet or sheets is to be "LOCATIONS OF CONSTRUCTION." The "Locations of Construction" sheet(s) must immediately follow the Title Sheet.

When the "Locations of Construction" sheet(s) are used in the project plan set, a note is to be placed on the Title Sheet directing attention to the sheet(s). Example: "THE TABLE OF LOCATIONS OF CONSTRUCTION IS SHOWN ON THE LOCATIONS OF CONSTRUCTION SHEET." If more than one sheet is used to list "Locations of Construction," change the word "SHEET" in the note to "SHEETS."



Project Construction on Two Routes

Case 2A Project - Two locations - Each location is on a different route in one county. The length of construction for each location is 0.2 mile or greater

In the project identification block, both routes are shown with a comma between them (routes are listed in numerical order); a slash is used between the associated post miles for begin and the end of construction for each location and a comma is used between the two sets of post miles. The order of listing the post miles is to match the order of listing the routes. (In the title sheet project description, describe each location using the "From...To..." format.)

Example:

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
11	SD	8, 67	26.2/26.5, 0.2/0.5		

Case 2B Project - Two locations - Each location is on a different route in one county. The length of construction on one route is 0.2 mile or greater and the length of construction on the other route is less than 0.2 mile

In the project identification block, both routes are shown with a comma between them (routes are listed in numerical order); a slash is used between the associated post miles for begin and end of construction for the location 0.2 mile or greater in length followed by a comma and a single post mile to describe the spot location. The order of listing the post miles is to match the order of listing the routes. (In the project description, describe the location which is 0.2 mile or greater in length using the "From...To..." format and describe the location less than 0.2 mile in length by using a spot location description "At...".)

Example:

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
11	SD	8, 67	26.2/26.5, 0.5		



Project Construction on Two Routes (Continued)

Case 2C Project - Two locations - Each location is on a different route in one county. Each construction location is less than 0.2 mile in length

In the project identification block, both routes are shown with a comma between them and a single post mile is used to describe each location separated by a comma. Routes are listed in numerical order. The order of listing the post miles is to match the order of listing the routes. (In the project description, describe each location using a spot location description "At...".)

Example:

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
11	SD	8, 67	26.5, 0.5		

Case 2D Project - Two locations - Each location is on a different route. Each route is in a different county. The length of construction for each location is 0.2 mile or greater

In the project identification block, list the routes in numerical order and list counties to match associated routes. Use a comma between counties. A slash is used between the associated post miles for each route and a comma is used between the two sets of post miles (post miles for begin and end of construction for each location). The order of listing the post miles is to match the order of listing the routes. (In the title sheet project description, describe each location using the "From...To..." format.)

Example:

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
08	SBd, Riv	18,71	11.3/12.1, 0.0/R3.4		



Case 2E Project - Two locations - Each location is on a different route. Each route is in a different county. The length of construction on one route is 0.2 mile or greater and the length of construction on the other route is less than 0.2 mile

In the project identification block, list the routes in numerical order (use a comma between route numbers). List the counties to match their associated routes. Use a comma between counties. Use a slash between the associated post miles for begin and end of construction for the location 0.2 mile or greater in length followed by a comma and a single post mile to describe the spot location. The order of listing the post miles is to match the order of listing the routes.

(In the project description, describe the location which is 0.2 mile or greater in length using the "From...To..." format and describe the location less than 0.2 mile in length by using a spot location description "At ...".)

Example:

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
08	SBd, Riv	18,71	11.3/12.1, R3.4		

Case 2F Project - Two locations - Each location is on a different route. Each route is in a different county. Each construction location is less than 0.2 mile in length

In the project identification block list the routes in numerical order (use a comma between route numbers). List the counties to match their associated routes. Use a comma between counties. The order of listing the post miles is to match the order of listing the routes. (In the project description, describe each location using a spot location description "At...".)

Example:

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
08	SBd, Riv	18,71	11.3, R3.4		



Project Construction is:

- At three or more locations on two or more routes
- At three or more locations in two or more counties

The following applies to the project identification block for these projects:

- Counties, in which the project is located, are listed in alphabetical order with a comma between them. The order of listing the counties may not always match the order of listing of the routes. When the number of counties exceeds six, see instructions herein.
- Routes are listed in numerical order. When the number of routes exceeds six, see instructions herein.
- Up to six counties or routes can be shown in the project identification block.
- No post miles are to be listed in the "Post Mile Block." "Var" is to be used in the "Post Miles Block." "Var" represents the various post miles of the different routes.

Example I.D. Block for project in two counties on five routes:

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
08	Riv, SBd	18, 71, 138, 173, 189	Var		

Number of counties exceeds six:

If a project is in more counties than can be listed in the county identification block (more than six), then list the first five counties alphabetically and include "etc." at the end of the county listings in the county identification block. Use lowercase and italic text for "etc.", see example below. Do not use the "Var" designation in the identification block for "County." The Title Sheet project description must include the listing of all counties involved. Do not use abbreviations for the county names in the title sheet project description. The special provisions for the project must list all counties as well. If there isn't enough room to list the six counties in the identification block, see Title Sheet Example "X" for acceptable text size variation.

Example I.D. Block for project with more than six counties on two routes:

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
03	But, ED, Nev, Pla, Sut, <i>etc.</i>	49, 99	Var		



Number of routes exceeds six:

If a project is on more than six routes, list the first five routes in numerical order and include "etc." at the end of the route listings in the route identification block. Use lowercase and italic text for "etc.", see example below. For a project with more than six routes, see Title Sheet Example “X.” Do not use the "Var" designation in the identification blocks for "Route." The special provisions for the project must list all routes as well. If there isn’t enough room to list the six routes in the identification block, see Title Sheet Example “X” for acceptable text size variation.

Example I.D. Block for project in two counties on six or more routes:

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
08	Riv, SBd	18, 71, 138, 173, 189, <i>etc.</i>	Var		

The following applies to the identification of construction on the title sheet mapping for project construction at:

- Three or more locations on two or more routes
- Three or more locations in two or more counties

Case 3A Project - Three locations on two or more routes in one county - The length of construction for each location is 0.2 mile or greater.

Use a solid line on each route to represent the limits of construction on that route or local roads. Identify begin and end points of construction and begin and end points of work for each location on state highway (see Title Sheet Example "F"). Also identify limit of work for each local road where construction occurs.

Case 3B Project - Three or more locations on two or more routes in one county - The length of construction for each location is less than 0.2 mile.

Identify each location graphically. Use a leader line and specific location number enclosed in a circle to identify each location. There is not to be numerical gaps in the location numbers nor is there to be an addition of alpha designation to the location numbers. Begin and end points of construction and begin and end points of work do not have to be identified on the title sheet mapping for Case 3B projects. See instructions herein regarding tabulation of locations of construction for Case 3B projects.



Case 3C Project - Three or more locations on two or more routes in two or more counties - Each location's length of construction is less than 0.2 mile, 0.2 mile or greater, or a combination of these lengths

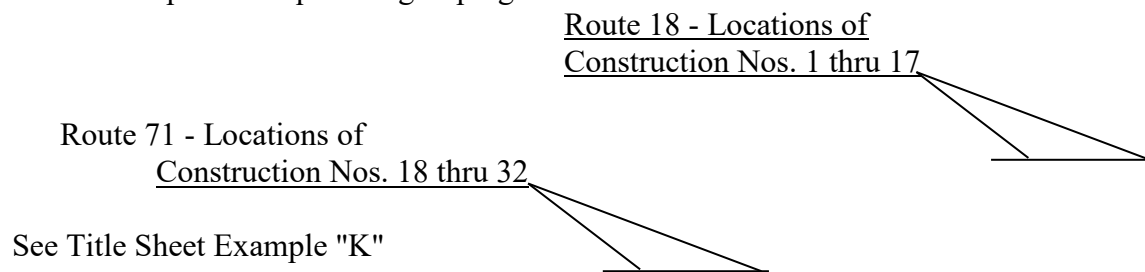
If there is sufficient space available on the title sheet mapping, identify each location graphically. Use a leader line and specific location number enclosed in a circle to identify each location. There is not to be numerical gaps in the location numbers nor is there to be an addition of alpha designation to the location numbers. See Title Sheet Example "J."

Begin and end points of construction and begin and end points of work are not identified on the title sheet mapping for Case 3C projects. See instructions herein regarding tabulation of locations of construction for Case 3C projects.

Case 3D Projects - The magnitude of locations (typically more than 100 locations) does not allow room for each individual location number to be shown on the title sheet mapping as in a Case 3C project. Each location's length of construction is less than 0.2 mile, 0.2 mile or greater, or a combination of these lengths

Identify the locations by sequential grouping on each route. Do not repeat construction location numbers from route to route. Use leader lines to identify the locations within each grouping. Label the origin of the leader lines with the specific route and locations of construction numbers.

Examples of sequential grouping:



Begin and end points of construction and begin and end points of work are not identified on the title sheet mapping for Case 3D projects. See instructions herein regarding tabulation of locations of construction for Case 3D projects.

Case 3B, Case 3C, and Case 3D Projects- Tabulation of Locations of Construction

When the locations of construction are shown individually (Case 3B and Case 3C) or by sequential grouping (Case 3D) on the Title Sheet mapping, a table with a heading of "Locations of Construction" must be included in the project plans. The table must list each location of construction (whether it is a spot location or "To...From" format) by location number, county, route, and post mile(s).

The "Locations of Construction" table is to be placed on the Title Sheet when sufficient space is available. When the magnitude of locations does not allow room for the table on the Title Sheet (typically more than 15 locations), the tabulation of all of the locations of construction must be placed on a separate sheet or sheets. The name of the sheet or sheets is to be "LOCATIONS OF CONSTRUCTION." Since this table is part of the title sheet (and bid items ARE NOT to be included on the title sheet) DO NOT include bid items with this table.

The "Locations of Construction" sheet(s) must immediately follow the Title Sheet. When the "Locations of Construction" sheet(s) are used in the project plan set, a note is to be placed on the Title Sheet directing attention to the sheet(s). Example: "THE TABLE OF LOCATIONS OF CONSTRUCTION IS SHOWN ON THE LOCATIONS OF CONSTRUCTION SHEET." If more than one sheet is used, change "SHEET" to "SHEETS."

Case 4 Project - The locations of construction are on a large number of routes and sufficient space is not available on the Title Sheet mapping to identify the locations of project construction by use of individual location of construction numbers (Case 3B or Case 3C) or by numbered sequential grouping of locations of construction for each route (Case 3D)

The following applies to Case 4 projects:

- Use a solid line on each route to represent the limits of the locations of construction on that route. Do not show begin and end points of construction and begin and end points of work.
- Use an alpha designation enclosed in a circle and a leader line pointing to the solid line used on each route to indicate that there are locations of construction on that route.
- Include a table on the Title Sheet that lists the alpha designations and their corresponding locations of construction for each route. Use the title "LOCATIONS SUMMARY" for this table. This should avoid any confusion between the table on the title sheet and the required listing of individual locations on the table titled "Locations of Construction" on the "Locations of Construction" sheet(s). The "Locations of Construction" sheet(s) must immediately follow the Title Sheet.
- The "Locations of Construction" table on the "Locations of Construction" sheet(s) must list (at a minimum) locations of construction by each individual location number, county, route, and post mile(s). The "Locations of Construction" sheet(s) must immediately follow the Title Sheet.
- Include a note on the Title Sheet directing attention to the locations of construction sheet(s). Example: "THE TABLE OF LOCATIONS OF CONSTRUCTION IS SHOWN ON THE LOCATIONS OF CONSTRUCTION SHEET." If more than one sheet is used to list "Locations of Construction," change the word "SHEET" in the note to "SHEETS."

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TABLE 2-1.6

COUNTY ABBREVIATIONS

COUNTY	COUNTY ABBREVIATION
Alameda	Ala
Alpine	Alp
Amador	Ama
Butte	But
Calaveras	Cal
Colusa	Col
Contra Costa	CC
Del Norte	DN
El Dorado	ED
Fresno	Fre
Glenn	Gle
Humboldt	Hum
Imperial	Imp
Inyo	Iny
Kern	Ker
Kings	Kin
Lake	Lak
Lassen	Las
Los Angeles	LA
Madera	Mad
Marin	Mrn
Mariposa	Mpa
Mendocino	Men
Merced	Mer
Modoc	Mod
Mono	Mno
Monterey	Mon
Napa	Nap
Nevada	Nev

COUNTY	COUNTY ABBREVIATION
Orange	Ora
Placer	Pla
Plumas	Plu
Riverside	Riv
Sacramento	Sac
San Benito	SBt
San Bernardino	SBd
San Diego	SD
San Francisco	SF
San Joaquin	SJ
San Luis Obispo	SLO
San Mateo	SM
Santa Barbara	SB
Santa Clara	SCl
Santa Cruz	SCr
Shasta	Sha
Sierra	Sie
Siskiyou	Sis
Solano	Sol
Sonoma	Son
Stanislaus	Sta
Sutter	Sut
Tehama	Teh
Trinity	Tri
Tulare	Tul
Tuolumne	Tuo
Ventura	Ven
Yolo	Yol
Yuba	Yub

Use the above list for the correct abbreviation of each county. Use upper and lower case lettering as shown.

2-1.8 Sheet Identification Codes, Sheet Names, and Plan Order

A coding system maintains sheet order during the design and construction of the project. The larger the project, the more important a coding system becomes because it facilitates sorting out specific data and is used extensively for cross-referencing.

Coding consists of identifying each sheet of plans by the appropriate sheet identification code letter(s) and by numbering those sheets consecutively, e.g., L-1, L-2, L-3, etc. The codes such as L-1, D-1, etc., identify individual project plan sheets for cross-referencing. The title sheet does not require a sheet identification code.

The sheet name such as layout, drainage plan, etc., identifies the plan for indexing.

Refer to Section 2.1 of the CADD Manual for additional instructions for the sheet naming convention (sheet identification codes, sheet names, print sequence codes (part of the DGN file name), and order of sheets in a project plan set).

The project plan sheet name and sheet identification code is required on every sheet, except the title sheet. They are to be placed inside the sheet border at the lower right-hand corner of each sheet.

When Office of Structure Design prepared plans (e.g. sign structure, retaining wall, sound wall, etc.) are included in the roadway portion of the plans, the sheet name, sheet identification code, print sequence code and file name must be those listed for roadway plans. Office of Structure Design may use their border sheet for such plans. The project plan sheet name, sheet identification code and any appropriate modifier shall be the only sheet identification shown.

Where the project consists of work at various locations, the work location number unique to

that sheet is to be shown in the lower right-hand corner under the sheet name (as a modifier). A modifier is also to be included on the Stage Construction sheets identifying which stage or sequence of work. Any modifier used is not to be considered part of the sheet name.

The official project description, as it appears on the title sheet, is not to be repeated on individual plan sheets. The project description shall appear only on the title sheet of the project set of plans.

Where more than one type of work is being shown on an individual sheet, the combined sheet name shall follow the plan sheet name order in Section 2.1 of the CADD Manual (example: "Pavement Delineation and Sign Plan"). The sheet identification code for a plan sheet with more than one type of work shown is to be the code letter for the first type of work shown in the plan sheet name (example: "PD" for Pavement Delineation and Sign Plan). One exception; when contour grading and drainage information is combined, use the drainage sheet identification code. Combining types of work on an individual plan view sheet should be limited to two types of work, with the exception of layout sheets. The layout sheet may include all types of work, depending on the complexity of the project. Regardless of the various types of work included on the layout sheet, the sheet name is to be "Layout" and the sheet identification codes are to be L-1, L-2, L-3, etc.

The sheet name for an Electrical Systems plan is handled differently than the other plan sheets in the project. Various individual bid items may appear on the layout, drainage, signing, etc. plan sheets. Whereas, Electrical Systems work is usually paid for on a lump sum basis. The plan sheet name is to be the same as the bid item on the Bid Item List. The sheet name for an Electrical Systems plan is the lump sum bid item that appears in the bid item list. The plan sheet can contain various materials and components, but it is paid for by the name of the plan sheet.

Do not use the non pay symbol (N) for components of the lump sum bid item. For further information on Electrical Systems plans see Section 2-2.23 of this manual.

Showing Design Information on Multiple Plan View Sheets.

Layout sheets provide much of the background (base topographic and roadbed information) for all other plan view sheets (e.g. drainage, pavement delineation, utilities, signing, electrical systems, etc.). The statement "*APPROVED FOR WORK ONLY*" is needed to clarify that the "other" plan view sheets (e.g. drainage, pavement delineation, signing, electrical systems, etc.) are only to be utilized for the specific work approved on that specific sheet. The statement above is not to be placed on the layout sheet as most all bid items can be shown on the layout sheet if space allows. The statement "*APPROVED FOR WORK ONLY*" is not to be placed on profile, detail or quantity sheets (since there usually isn't "plan view" background information shown on these sheets).

The statement for utility plan sheets is slightly different than all other plan view sheets. The statement to be used is "*THIS PLAN TO BE USED FOR UTILITY INFORMATION ONLY.*" The word "*APPROVED*" is not included in the statement so that it will not imply that an exception to the utility policy had already been granted. **NOTE:** do not confuse the above statement with the two standard Caltrans utility notes that might also appear on the plans.

When there is sufficient justification to vary from the statutory requirements of providing all utility information on the plans, such an exception must first be approved by HQ Division of Design. Once a variance is approved by HQ Division of Design, then one of the two standard Caltrans utilities notes can be placed on the plans (see Section 2-2.13 for the exact wording of the notes).

Discovery of undisclosed subsurface facilities during construction can have a major impact to the cost and schedule of completing any project. Thus all utilities owned by others must be shown on the "Utility Plans." Subsurface facilities owned by Caltrans must either be shown on the utility plans or the Electrical Systems plans. This will depend on the type of subsurface facility, the size and type of project and the most appropriate individual responsible for the depiction of the subsurface facilities on the project plans he/she is responsible for. Existing Caltrans drainage facilities are to be shown on the drainage plans (or layouts on a small project). Utilities or subsurface facilities may also be shown on other plan view sheets for reference purposes only when these facilities are in close proximity to identified work in the project. Some Caltrans owned electrical subsurface facilities may be shown on the electrical systems plan sheets.

Design information identified as a bid item should only be shown on one plan view type sheet. If there is a need to show the bid item on another plan view sheet for reference purposes only, then it must **not** be identified (labeled) as a bid item. It must be clear to the bidder/contractor, for estimating and payment purposes, on what plan sheet a bid item is paid for (so an item doesn't get missed or counted twice). Example: an irrigation conduit paid for on the layout sheet, is also necessary to show on the irrigation plan sheet, in order to show where and how the irrigation system connects at the irrigation conduit. In this example, the irrigation conduit on the irrigation plan sheet may either be dropped out or the weight of the line reduced to avoid confusion.

2-1.9 Project Plan Submittals

The plans portion of the PS&E submittal sent to DES-OE or any district Office Engineer for AADD projects, are to be electronic files consisting of a DGN and Iparm for each project plan sheet. Use the appropriate "PS&E CADD Submittal Form" and a "Project Plan Review Checklist" (contact district Office Engineer to obtain the form and checklist). Fill in all the information on both forms completely and accurately to process the project in a timely manner.

Prints of the electronically transmitted CADD files are not required as part of the PS&E submittal unless requested by district Office Engineer.

The regional center or each district, not within a regional center, is to submit the roadway portion of the project plans to DES-OE, for all non AADD projects, using the above-specified procedures. Roadway plans prepared by local agencies or consultants must be sent to the appropriate regional center or district for final processing.

Office of Structure Design is to submit their portion of the project plans (DGN files and Iparms) to DES-OE, for all non AADD projects, following the same procedures specified above. For all AADD projects, the Office of Structure Design will send the DGN files and Iparms to each district for final processing. Structure plans prepared by local agencies or consultants must first be sent to Office of Structure Design for technical review before the final processing by the district.

Office of Transportation Architecture and The Office of Electrical, Mechanical, Water and Wastewater (TAEMWW) is to submit their portion of the project plans (DGN files and Iparms) to DES-OE, for all non AADD projects, following the same procedures specified above.

For all AADD projects, TAEMWW will send the DGN files and Iparms to each district for final processing. Building plans prepared by local agencies or consultants must first be sent to TAEMWW for technical review before the final processing by the district.

2-1.10 Project Plan File Formats

Standard Acceptable File Format

Caltrans only accepts 100 percent electronic submittals. The standard file format for all submissions of plans is a MicroStation design file or DGN.

The following variations, with prior written approval at approximately 60 percent completion from the Division of Design, Office of CADD and Engineering GIS Support, will be considered for PS&E submittal, under these specific circumstances:

- DGN format files with imbedded or imported raster data (aerial photographs or digital pictures). Raster data should be limited to detail sheets that require enhancing or emphasizing of a detail or a unique location (i.e. toll plaza at the San Francisco/Oakland Bay Bridge) that the contractor might need to see. The need for imported raster data should be based on an engineering need, not for aesthetics or a location identification need. Project plans should first and foremost be engineered plans not photogrammetric plans. Aerial photographs were designed for preliminary plans not final project plans. If aerial mapping is needed for identifying specific locations, plan sheets have been established to handle the raster data. These sheets are called "Aerial Identification" and follow the "Key Map and Line Designation" sheets. Raster data is not be used as background for other plan sheets such as layouts, drainage, utilities, pavement delineation, etc.
- Tiff or tagged image file format are acceptable where legacy plans are being considered for submission as part of a new CADD submittal.

Legacy plan sheets, such as existing log of test boring and as-built data of existing structure or roadway plans for reference or location purposes, which are not available as electronic files, may be scanned into raster (Tiff) format and submitted for purposes of establishing a 100 percent electronic PS&E submittal. This is a single, complete plan sheet with borders intact, submitted as a tiff raster image. The legacy sheet is to be scanned, sized (cropped), de-speckled and de-skewed before submittal. The preferred size of the finished Tiff plot is 22 inches x 34 inches and for special circumstances the maximum allowable size is 23 inches x 35 inches. These files will be raster edited.

Unacceptable Formats:

- Hard Copy Originals
- Reference Files (neither vector nor raster)
- Cadd Generated Raster - Any file that was created as a **DGN** file, but converted to raster for convenience or expediency, will not be accepted for PS&E Submittal.
- Models- (submittals must be only one DGN file for each project plan sheet.) Design models containing multiple sheet models are not acceptable.
- AutoCad Files - Files started with AutoCad (.dwg or .dxf) must be converted into a MicroStation file (DGN) under the direction of the engineer of record.

For additional information regarding project plan formats, see Section 4.1 of the CADD User's Manual.



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SECTION 2-2 - PROJECT PLAN SHEET SPECIFIC DATA AND EXAMPLES

2-2.1 Introduction

The example plan sheets contained in Section 2-2 were obtained from several different sources. The examples were selected from multiple projects to show the designers of a project how to present design information on a final set of project plans. Explanatory notes for the preparation of the various plan sheets are included on the examples, and in most instances are outlined. Final project plans are used by prospective bidders to prepare bids, by successful bidders to construct projects, and by engineers to inspect the work.

Refer to Section 2-1 of this manual for policies and procedures for the preparation of project plans.

2-2.2 Title Sheets

General

The first sheet of the project plan set is the title sheet. The title sheet serves as a cover sheet for the project. The title sheet is not considered an engineering document, as no bid items are to be shown on the title sheet (this also applies to the Locations of Construction sheet(s)). Bid items are to be shown on the other sheets of the plans (layouts, etc.).

The title sheet is to be a neat, clear, and concise presentation of the project. Compared to other sheets of the plans, the title sheet, by itself, is distributed to more people and may be used for press releases, public hearings, updating maps, and locating project work by out-of-state contractors.

For projects developed by Caltrans personnel, the title sheet of the project shall be prepared by the district, except projects consisting entirely of bridge, building, or other transportation related structures work (no road plans). When only structure-related or building-related plans are required for the project plan set, the responsible unit in the Office of Structure Design or TAEMWW shall prepare the title sheet.

Title sheets for city or county sponsored projects that are on the state highway system or that involve federal funding and are advertised through Caltrans are usually prepared by the respective city or county and must conform to the requirements outlined in this section.

The border for the appropriate title sheet available in the Caltrans cell libraries for named levels or numbered levels shall be used. See Section 2-1.5 of this manual.

Title sheet is to include such information as the:

- Mapping that best depicts and locates where the project construction is to be performed
- County or counties where the project is located
- Stationing with line designation and/or post mile limits of construction on the route or routes where the project is located
- Station equations in the route alignment within the distance between begin and end points of construction and work
- Post mile equations (with a numerical difference of a 0.1 mile or more) within the begin and end points of construction
- Signature and license seal information of the person assigned responsibility for coordinating the effort to produce a complete set of project plans for construction
- Printed name of the individual providing oversight of the person assigned responsibility for coordinating the effort to produce a complete set of project plans

The "Checklist for Title Sheets" contained elsewhere in this section lists the various elements to be included on the title sheet.

Additional title sheet elements to be included by DES-OE for AAOE projects and District Office Engineer (DOE) for AADD projects after PS&E submittal-consist of:

- Index of plans (all sheets in the project plan set, including applicable revised standard plans); group sheets by type
- Sheet numbers and total sheets
- Project federal funding identification number, if federal funds are involved
- Plans Approval Date

The information on the title sheet shall be limited to that identified in the previous paragraph and the "Checklist for Title Sheets." Features such as typical cross sections, construction details, and drainage details, construction area signs, and quantity summaries shall not be shown on the title sheet. The permanent type of work to be performed on the project (widening, surfacing, etc.) is not to be identified by either labeling or textural symbols, such as patterns or hatching. The type of work is described in the project special provisions. The type of work may be added to the title sheet as part of the As-Built change process.

No more than one sheet shall be used to present necessary title sheet information for any one project, unless a table is needed to identify the project's multiple locations of construction and room is not available on the title sheet for the table. When this condition exists, the listing of locations of construction is to be shown on a separate sheet. Refer to Section 2-1.7 of this manual for additional instructions regarding "Locations of Construction" tables.

Title Sheet Mapping

The mapping for the title sheet is to be in a format that best depicts and locates the project construction limits. As applicable to the project, the map is to be in the form of a strip map similar to that used on Title Sheet Examples "D" through "I," "L" and "M" or other mapping similar to that used on Title Sheet Examples "J," "K," and "N."

Strip Map

The strip map should be a convenient size that best fits within the title sheet border. The strip map does not need to be at a specific scale and should be identified as "No Scale." Layouts, as described elsewhere in this manual, shall not be used as a strip map on the title sheet. The coverage of the strip map should include the area within the right of way of each route where construction is to take place and the area immediately adjacent to the right of way necessary for proper orientation.

Title sheets from prior projects, USGS quadrangle maps, and the Department's road system (county road) maps are good sources for the information required as the base for the strip maps. Do not use AAA maps or Thomas Brothers Guide mapping because of copyright laws. District post mile maps are unsuitable and shall not be used.

In those cases where a transportation corridor is constructed in a number of adjacent projects, consideration should be given to the preparation of an overall strip map of the corridor. A portion of this overall strip map should be used for the appropriate project. Since each project is unique, the size of a strip map should only show slightly more than the limits required for each specific project.

Title sheets shall be oriented so that stationing progresses from left to right. On projects where stationing is in the opposite direction from post miles, the title sheet strip map is to be shown with stationing increasing from left to right to orient the strip map the same as the plan sheets. However, the title sheet project description, begin and end of construction, and begin and end of work shall be in order of post miles.

The strip map is to show, as applicable to the project:

- City limit lines, county lines, state and international boundaries
- Existing streets, public roads and highways
- Canals, rivers, lakes, bridges, parks, and prominent geographic features shown by line work, (these items shown for orientation purposes)
- Special topographical features such as transmission lines and aqueducts
- Major improvements such as courthouses, post offices, hospitals, schools, large industrial sites, and other private facilities only when they have a direct effect on the project and will be referred to in the project special provisions
- Names of roads or other features referred to in the title sheet project description, the project special provisions, and other contract-related documents
- Highways of major importance should show destinations at map edges
- Physical features labeled with their official titles
- Railroads (Refer to "Railroad Involvement" in Section 2-1.1 of this manual for additional information)

If a strip map is used for the title sheet mapping, as shown on Title Sheet Examples "D" through "F" (each length of construction on each route is greater than 0.2 mile), then begin and end points of construction and begin

and end points of work are to be shown on each route where construction is to be performed. A heavy solid line is to be used to designate the length of construction for each roadway, ramp, connector, crossroad, frontage roads, etc. involved in constructing the project.

If a strip map is used for the title sheet mapping, as shown on Title Sheet Example "I" (four locations on one route where each location's length of construction is less than 0.2 mile or 0.2 mile or greater), the beginning of the first location is identified as the begin point of construction and the end of the last location as the end point of construction. A heavy solid line is to be used to designate the length of construction for each location. Begin point of work is shown proceeding the begin point of construction. End point of work is shown following the end point of construction.

Where begin and end points of project construction are identified on the title sheet strip map by stationing and post mile, the strip map must show:

- Alignment of the route or routes where construction is to be performed. Alignment lines stationed at intervals of 50, 20, or 10 stations depending upon the size of the strip map
- Begin and end points of both work and construction identified by alignment line designation and stationing
- Begin and end points of construction also identified by post mile
- Station equations (back and ahead, change in line designation) in the main route alignment line (that occur within the limits of the identified points of begin and end construction)
- Post mile equations within begin and end points of construction if the numerical difference of the post mile equation is 0.1 mile or more

- Station equations at the intersection of the main route alignment with other state route alignments if the route intersections occur within the begin and end points of construction of the main route alignment and there is construction on the intersecting route. Refer to Title Sheet Examples "E" and "F"
- A post mile equation at the intersection of the main route alignment with other state route alignments if the route intersections occur within the begin and end points of construction of the main route alignment and no construction is to be performed on the intersecting route. Refer to Title Sheet Example "D"

Where only post miles are used to identify begin and end points of work and construction on the strip map, show:

- Post mile equations within the begin and end points of work and construction if the numerical difference of the post mile equation is 0.1 mile or more
- A post mile equation at the intersection of the main route alignment with other state route alignments, if the route intersections occur within the begin and end points of construction of the main route alignment

If a strip map is used for the title sheet mapping, as shown on Title Sheet Examples "G" and "H," (each length of construction on an individual route is less than 0.2 mile), then each location of construction is considered to be a spot location and each location is identified as a "Location of Construction" with one post mile value. Begin and end points of construction are not shown but begin and end points of work are shown. A heavy solid line is to be used to designate each location of construction.

A title sheet strip map similar to Title Sheet Example "M" is to be used to identify the location of building construction that is on or adjacent to a state highway.

For additional instructions regarding identification of begin and end points of construction and begin and end points of work shown on the strip map, see the subsection titled "Begin and End Points of Project Construction and Work" within this Section 2-2.2.

Mapping other than Strip Map

Mapping other than strip maps such as the Department's road system (county road) maps are to be used for title sheet mapping for projects consisting of three or more locations on two or more routes, or projects consisting of three or more locations in two or more counties (Case 3 and 4 projects). Follow the instructions in Section 2-1.7 of this manual to identify construction on Case 3 and Case 4 projects. Refer to Title Sheet Example "J" for a representation of a Case 3C project. Refer to Title Sheet Example "K" for a representation of a Case 3D project.

Title sheet mapping similar to Title Sheet Example "N" is to be used to identify the location of building construction that is off of a state highway.

Identifying Post Miles

Post miles shall be shown in increments of 0.1 mile on the title sheet, except when shown in a table of "Locations of Construction." Post miles may be shown to increments of hundredths of a mile in a table of "Locations of Construction" or on layout sheets where only post miles are used to identify construction on the project. Refer to Section 2-1.7 of this manual for instructions regarding tabulation of locations of construction.

Post mile equations, within the limits of construction, which reflect a change in prefix only, need not be shown (i.e. R32.2 where "R" indicates realignment of a route).

Post mile prefixes and their use are as follows:

- C-commercial lanes
- D-duplicate post mile at meandering county lines
- G-reposting duplicate post mile at the end of a route
- H-realignment of D mileage
- R-first realignment
- M-realignment of R mileage
- N-realignment of M mileage
- L-overlap post mile
- S-spur
- T-temporary connection

The "Highway Sequence Listing" formerly referred to, as the "California State Highway Log" and the "California Log of Bridges on State Highways" should be used to identify post mile of reference points used in a project. The "Highway Sequence Listing" is available at this internal website:

<http://onramp.dot.ca.gov/tsi/ohsip/tasas/seqlisting.html>

The "California Log of Bridges on State Highways" is available at this external website:

<https://smi.onramp.dot.ca.gov/offices/bridge-management/bridge-inventory>

Identifying Various Types of Structures

Structures shall be shown by symbol and identified by name and type. The various types of structures are: overcrossing, undercrossing, separation, viaduct, bridge, underpass, overhead, and a combination of bridge and overhead. See Figure 62.2 of the Highway

Design manual for a depiction of the various types of structures.

The structure number shall only be included with the structure name and type of structure when construction or work is to be performed on the structure as part of the overall project (this includes new bridges or walls that have an assigned bridge number). The actual structure plans shall be prepared or coordinated by the Office of Structure Design. Refer to the Bridge Design Details Manual for information on developing structure plans.

If a project involves the construction of a large number of structures (typically more than 10) and there is not sufficient room on the strip map to display the individual structure names and structure numbers at the location of each structure, then each structure is to be identified graphically with a leader line and specific numeric or alpha designation enclosed in a geometric shape such as a hexagon. Where this occurs, the structures are to be listed together in tabular format (with the table labeled as "IDENTIFICATION OF PROJECT STRUCTURES") on the title sheet with their numerical or alpha designations and their corresponding structure names and structure numbers.

In those rare instances, where a project involves the construction of a large number of structures and there is not sufficient room on the title sheet to display the individual structure names and structure numbers at the location of each structure or to identify each structure graphically with a leader line and specific numeric or alpha designation with the structures listed together in tabular format, then each structure is to be identified graphically with a leader line and specific numeric or alpha designation enclosed in a geometric shape such as a hexagon and a table with a heading of "IDENTIFICATION OF PROJECT STRUCTURES" must be included in the

project plans as a separate plan sheet. The table must list each structure with their numerical or alpha designations and their corresponding structure names and structure numbers. The name of the sheet is to be "IDENTIFICATION OF PROJECT STRUCTURES." The sheet identification code to be used is "IPS-1".

The Identification of Project Structures sheet is to immediately follow the Title Sheet and the "Locations of Construction" sheet if used. When the Identification of Project Structures sheet is used in the project plan set, a note is to be placed on the Title Sheet directing attention to the sheet. Example: "THE TABLE OF IDENTIFICATION OF PROJECT STRUCTURES IS SHOWN ON THE IDENTIFICATION OF PROJECT STRUCTURES SHEET."

State Location Map

The county or counties in which the project is located shall be indicated on the State Location Map as shown on the sheet entitled "Title Sheet Location Map Examples," in this manual. The State Location Map is part of the title sheet border.

Index of Plans

For AAOE projects, DES-OE will add the index of plans (formerly identified as index of sheets) to the title sheet prior to advertisement. For AADD projects, DOE shall complete the index of plans.

In those rare instances, where the project involves a very large number of sheets and there is not sufficient room on the title sheet to list all sheets in the index of plans, the index of plans may be placed on a separate sheet. The name of the sheet is to be "INDEX OF PLANS." The sheet identification code to be used is "IOP-1."

The "Index of Plans" sheet is to immediately follow the Title Sheet and precede the "Locations of Construction" sheet and the "Identification of Project Structures" sheet, if they are used in the project plan set (see Section 2.1 of the CADD Users Manual). When the "Index of Plans" is placed on a separate sheet of the project plan set, a note is to be placed on the Title Sheet directing attention to the sheet. Example: "THE LISTING OF THE INDEX OF PLANS IS SHOWN ON THE INDEX OF PLANS SHEET." See Index of Plans Sheet, Example "65 Index."

Listing of Standard Plans

The list of project applicable standard plans and revised standard plans must be included in the project special provisions.

Signature and Registration Information

The signature and registration information shall be added to the title sheet as provided in Section 2-1.6 of this manual.

Project Identification Block

The project identification information shall be added to the title sheet as provided in Section 2-1.7 of this manual.

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Title Sheet Header

The title sheet header precedes the title sheet project description on the title sheet. The header begins with the phrase "PROJECT PLANS FOR" and continues with a descriptor indicating the type of facility involved and whether construction, building construction, etc. is to be performed.

The most common descriptors are:

- CONSTRUCTION ON STATE HIGHWAY
- CONSTRUCTION ADJACENT TO STATE HIGHWAY
(Adjacent means "**not within**" the Caltrans right of way, such as a Park-N-Ride that is adjacent to the right of way but not within the right of way)
- CONSTRUCTION ON AND ADJACENT TO STATE HIGHWAY
- BUILDING CONSTRUCTION ON STATE HIGHWAY
- BUILDING CONSTRUCTION
(Used where building construction is not on state highway, rural or urban locations)
Example: BUILDING CONSTRUCTION IN YUBA COUNTY IN MARYSVILLE AT THE DISTRICT OFFICE 703 B STREET) See title Sheet Example "N"
- CONSTRUCTION
(Used where construction is not on state highway and the work is not building construction, rural or urban locations)

Example: CONSTRUCTION IN SAN BERNARDINO COUNTY IN SAN BERNARDINO AT SAN BERNARDINO MAINTENANCE FACILITY 175 WEST CLUSTER STREET

- WETLAND CONSTRUCTION NEAR
(See Title Sheet Example "U")
- TRAFFIC MANAGEMENT CENTER
(This would be a rare instance where there is work only with the electrical equipment that services the Traffic Management Center. It occurs in a building that is not on the state highway system and there is no work to the building).

Note: These descriptors should be added to the Office Engineer database, both for AAOE and AADD projects.

Additional descriptors are:

- CONSTRUCTION ON CITY STREET
- CONSTRUCTION ON COUNTY ROAD
- CONSTRUCTION ON COUNTY HIGHWAY
- CONSTRUCTION ON STATE HIGHWAY AND CITY STREET
(See Title Sheet Example "W")

Division of Design, Office of CADD and Engineering GIS Support should be consulted when a project requires a descriptor not shown.

Title Sheet Project Descriptions

The title sheet project description, as described within this section, must be included on the title sheet before PS&E submittal to DES-OE or District Office Engineer (DOE).

General

The title sheet project description contains the following, as described herein:

- A listing of the county or counties where the project is located (do not abbreviate county names)
- A listing of the city or town where the project is located, except as provided herein
- A description of the limits of construction (begin and end points of construction or the locations of construction), as applicable to the project. Refer to Title Sheet examples, instructions within this subsection, "Title Sheet Project Descriptions," and Section 2-1.7 of this manual
- References to nearest existing identifiable point such as, a road, street, or bridge to describe the project construction limits. State and county lines are also acceptable references since they are posted on the ground. Since city limits may change, a specific tie to a city limit is not to be used. The referenced identifiable point shall be shown and labeled on the title sheet mapping. If the referenced city is more than 10 miles away, make sure it is listed as the "destination city." The "Highway Sequence Listing" formerly referred to as "California State Highway Log" and the "California Log of Bridges on State Highways" should be used to identify post mile references to existing identifiable points used in the title sheet project description. The "Highway Sequence Listing" is available at this internal website:

<http://onramp.dot.ca.gov/tsi/ohsip/tasas/seqlisting.html>

The "California Log of Bridges on State Highways" is available at this external website:

<https://smi.onramp.dot.ca.gov/offices/bridge-management/bridge-inventory>

- Distance references to identifiable points shall be stated in increments of 0.1 mile. If a distance reference tie is 1.0 mile or less, use the term "mile," if a reference tie is 1.1 miles or greater, use the term "miles"
- When referring to an identifiable point, use full name descriptions (example: "SANTA ANA RIVER BRIDGE," "NORMANDIE AVENUE OVERCROSSING," etc.)
- Do not use abbreviations in the title sheet project description, unless it is part of the proper name for a specific name of a place or geographic feature (example: St. LOUIS AVENUE)

Do not use punctuation marks, except commas, when the listings of three or more counties are in the title sheet project description

- Do not use the word, "Interchange," in the title sheet project description. If a highway crosses over another highway by use of a grade separation structure (no at-grade crossing), they are identified as a route separation (example "ROUTE 710/405 SEPARATION"). Where a state route intersects another state route at an at-grade crossing (no grade separation structure), then a reference tie would be to the intersected route: (examples: FROM 0.2 MILE WEST OF ROUTE 71 TO ROUTE 71, or AT 0.2 MILE EAST OF ROUTE 71, etc.). Do not use the words, "Junction" or "Intersection," to describe highways intersecting each other, except in those rare instances where a break in a route creates two separate intersect points of a highway with another highway. In these instances, the intersect point may be described using the word, "Junction," (example: "NORTH JUNCTION ROUTE 79" or "SOUTH JUNCTION ROUTE 79" depending on which is used as a geographic reference point)
- Do not use freeway names, such as "Golden State Freeway," in the title sheet project description. Do not label routes as either "State Route" or "Interstate Route" and do not use "route shields." If labeled incorrectly, this can lead to (and has in the past) the denying of federal funding
- Use structure numbers only if there may be some confusion as to which structure is referred to (example: bridges crossing the same waterway with the same name but different numbers)

Listing County or Counties Where the Project is Located

- List the county or counties where the project is located as the first part of the title sheet project description (example: "IN SHASTA COUNTY"). If the project is in two or more counties list all counties involved (example: "IN SANTA CLARA AND SANTA CRUZ COUNTIES"). Do not abbreviate county names
- The listing of a county or counties in the title sheet project description is based on the location of "Begin and End points of construction" not the "Begin and End points of work".

Listing City or Town Where the Project is Located

- List the city or town where the project is located as the next part of the title sheet project description, as described herein.
 1. If the project is entirely within the city limits of an incorporated city, use the term "in" (example: "IN OAKLAND"). Check in the front of the current THOMAS BROTHERS guide under "CITIES AND COMMUNITIES INDEX" or go to this web address to determine if the city is incorporated:

https://en.wikipedia.org/wiki/Category:Incorporated_cities_and_towns_in_California
 2. If the project is both inside and outside the city limits of an incorporated city, use the phrase "in and near" (example: "IN AND NEAR OAKLAND")
 3. When the project is at an unincorporated city, town or name place, use the term "at" not "in" (example: "AT KRAMER"). Check in the front of the current THOMAS BROTHERS guide under "CITIES AND COMMUNITIES INDEX" or go to this web address to determine if the city or town is unincorporated:

https://en.wikipedia.org/wiki/Category:Unincorporated_communities_in_California
 4. If the project is not within a town or city, make reference to the nearest city or town shown on the current State highway or county road map that is on the route where construction is to take place. The nearest city or town that can be referenced may be in an adjoining county not listed in the title sheet project description, if no other available city or town is within the county where the project construction is to take place. Use the term "near" (example: "NEAR COTTONWOOD")
 5. If the project location is more than five miles from a city or town, use the term "about" and a distance (example: "ABOUT 8 MILES WEST OF TURLOCK")
 6. When referring to a city, do not use the phrase "the city of" except in the case of "IN THE CITY AND COUNTY OF SAN FRANCISCO" specifically

7. If the Begin Construction limits falls within one city or town and the End Construction limits falls within another city or town, list both cities or towns in the title sheet project description. If there are three or more cities or towns within the Begin and End Construction limits of the project, only the city or town associated with the Begin Construction limits and the city or town associated with the End Construction limits are to be listed in the title sheet project description. See Title Sheet Example "Q"
8. Omit city or town names from the title sheet project description if:
 - a. The project consists of three or more locations on the same route and construction is over a lengthy section of highway (greater than six miles), or
 - b. The project consists of three or more locations spread over two or more routes or two or more counties

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Project Case Designation Numbers

For the purpose of referencing instructions related to the development of each title sheet project description and its associated project identification block, the various types of projects have been assigned case designation numbers. These case identification numbers apply to both this section of the manual and Section 2-1.7, "Project Identification Block and County Abbreviations," of this manual.

Project Construction is on One Route

Where the project is only on one route, the route number is not listed in the title sheet project description and the following applies:

Case 1A Project - One location on one route in one county with a continuous length of construction that is 0.2 mile or greater

Describe begin and end points of construction by using the "From...To..." format.

Example:

**IN LOS ANGELES COUNTY
NEAR NEWHALL FROM 0.1 MILE SOUTH OF
WELDON CANYON OVERCROSSING TO 0.3 MILE NORTH
OF CALGROVE BOULEVARD UNDERCROSSING**

Case 1B Project - One location on one route in more than one county with a continuous length of construction that is 0.2 mile or greater

Describe begin and end points of construction by using the "From...To..." format.

Example:

**IN SAN MATEO COUNTY AND
THE CITY AND COUNTY OF SAN FRANCISCO
FROM 0.2 MILE NORTH OF JOHN DALEY BOULEVARD OVERCROSSING
TO 0.4 MILE NORTH OF BROTHERHOOD WAY UNDERCROSSING**

(Note: This is the rare instance when the phrase, "IN THE CITY," is used in the project description, because the county and city limits of San Francisco are the same.)

Case 1C Project - Two locations on one route in one county with both locations having a length of construction that is 0.2 mile or greater in length

Describe begin and end points of construction for each location using the "From... To..." format. The distance between the end point of construction of the first location and the begin point of construction of the second location is to be equal to or greater than 0.2 mile when using this type of title sheet project description. (If the gap between locations of construction is less than 0.2 mile, use the "From... To..." format to describe the begin point of the first location as the begin point of construction and the end of the last location as the end point of construction).

Example:

**IN LOS ANGELES COUNTY
NEAR NEWHALL FROM 0.1 MILE SOUTH TO 0.3 MILE NORTH OF
WELDON CANYON OVERCROSSING AND FROM 0.4 MILE SOUTH
TO 0.3 MILE NORTH OF CALGROVE BOULEVARD UNDERCROSSING**

Case 1D Project - Two locations on one route in one county with one location 0.2 mile or greater in length and one location less than 0.2 mile (spot location)

Describe begin and end points of construction for the location 0.2 mile or greater in length by using the "From... To..." format, describe the location less than 0.2 mile in length by using a spot location description "At..."

Example:

**IN LOS ANGELES COUNTY
NEAR NEWHALL FROM 0.1 MILE SOUTH TO 0.3 MILE NORTH
OF WELDON CANYON OVERCROSSING AND
AT CALGROVE BOULEVARD UNDERCROSSING**

Case 1E Project - Two locations on one route in one county with individual lengths of construction less than 0.2 mile (spot locations)

Describe the locations by using two spot location descriptions "At... and At..."

Example:

**IN FRESNO COUNTY
IN FRESNO AT BIOLA JUNCTION OVERHEAD
AND AT HERNDON CANAL BRIDGE**

Case 1F Project - One location on one route in one county with an individual length of construction less than 0.2 mile (spot location)

Use spot location description "At..."

Example:

**IN MENDOCINO COUNTY
NEAR MENDOCINO
AT BIG RIVER BRIDGE**

Case 1G Project - One or more locations in one county with all locations within a 0.6-mile radius of the center of a route separation or Interchange.

For example; a landscape project involving work just on freeway entrances and exits would fall under the Case 1G type project.

Use spot location description "At..."

Example:

**IN LOS ANGELES COUNTY
IN LOS ANGELES AT ROUTE 5/118 SEPARATION**

Case 1H Project - Three or more locations on the same route in one county where each location's length of construction is less than 0.2 mile; 0.2 mile or greater; or a combination of these lengths

Describe the begin point of the first location as the begin point of construction and the end of the last location as the end point of construction. The phrase "AT VARIOUS LOCATIONS" shall be used prior to describing the begin and end points of construction.

Example:

**IN LOS ANGELES COUNTY NEAR NEWHALL
AT VARIOUS LOCATIONS FROM 0.1 MILE SOUTH OF
WELDON CANYON OVERCROSSING TO 0.3 MILE NORTH
OF CALGROVE BOULEVARD UNDERCROSSING**

(For additional instructions regarding this case of project, refer to "Case 1H Project" in Section 2-1.7 of this manual.)

Project Construction is on Two Routes

Where the project is on two routes, the route numbers are listed in the title sheet project description and the following applies:

Case 2A Project - Two locations - Each location is on a different route in one county. The length of construction for each location is 0.2 mile or greater.

Indicate the corresponding route number before describing begin and end points of construction for each location using the "From... To..." format.

Example:

**IN SAN DIEGO COUNTY IN EL CAJON
 ON ROUTE 8 FROM 0.3 MILE WEST OF MOLLISON
 AVENUE UNDERCROSSING TO MOLLISON AVENUE
 UNDERCROSSING AND ON ROUTE 67 FROM 0.2 MILE
 TO 0.5 MILE NORTH OF ROUTE 67/8 SEPARATION**

Case 2B Project - Two locations - Each location is on a different route in one county. The length of construction on one route is 0.2 mile or greater and the length of construction on the other route is less than 0.2 mile.

Indicate the corresponding route number before describing the begin and end points of construction for the location equal to or greater than 0.2 mile in length by using the "From...To..." format and indicate the corresponding route number before describing the location less than 0.2 mile in length by using a spot location description "At."

Example:

**IN SAN DIEGO COUNTY IN EL CAJON
 ON ROUTE 8 FROM 0.3 MILE WEST OF MOLLISON AVENUE
 UNDERCROSSING TO MOLLISON AVENUE UNDERCROSSING
 AND ON ROUTE 67 AT BROADWAY UNDERCROSSING**

Case 2C Project - Two locations -Each location is on a different route in one county. Each construction location is less than 0.2 mile in length.

Indicate the corresponding route number before describing each location of construction. Use a spot location description "At..." for each spot location.

Example:

**IN SAN DIEGO COUNTY IN EL CAJON
ON ROUTE 8 AT MOLLISON AVENUE UNDERCROSSING
AND ON ROUTE 67 AT BROADWAY UNDERCROSSING**

Case 2D Project - Two locations - Each location is on a different route. Each route is in a different county. The length of construction for each location is 0.2 mile or greater.

List the county that contains the lowest numerical route on the project first, then list the other county. Routes are to be listed in numerical order and are to match their associated county. Indicate the corresponding route number before describing the begin and end points of construction for each location by using the "From...To..." format

Example:

**IN SAN BERNARDINO AND RIVERSIDE COUNTIES
ON ROUTE 18 FROM 0.1 MILE SOUTH OF GRANITE VIADUCT
TO 0.2 MILE SOUTH OF DOGWOOD VIADUCT AND
ON ROUTE 71 FROM SAN BERNARDINO COUNTY LINE
TO 2.0 MILES SOUTH OF SAN BERNARDINO COUNTY LINE**

Case 2E Project - Two locations - Each location is on a different route. Each route is in a different county. The length of construction on one route is 0.2 mile or greater and the length of construction on the other route is less than 0.2 mile.

List the county that contains the lowest numerical route on the project first, then list the other county. Routes are to be listed in numerical order and are to match their associated county. Indicate the corresponding route number before describing the begin and end points of construction for the location greater than 0.2 mile in length by using the "From...To..." format and indicate the corresponding route number before describing the location less than 0.2 mile in length by using a spot location description "At."

Example:

**IN SAN BERNARDINO AND RIVERSIDE COUNTIES
ON ROUTE 18 FROM 0.1 MILE SOUTH OF GRANITE VIADUCT
TO 0.2 MILE SOUTH OF DOGWOOD VIADUCT AND
ON ROUTE 71 AT 1.0 MILE SOUTH OF SAN BERNARDINO COUNTY LINE**

Case 2F Project - Two locations - Each location is on a different route. Each route is in a different county. Each construction location is less than 0.2 mile in length.

List the county that contains the lowest numerical route on the project first, then list the other county. Routes are to be listed in numerical order and are to match their associated county. Indicate the corresponding route number before describing each location less than 0.2 mile in length by using a spot location description "At."

Example:

**IN SAN BERNARDINO AND RIVERSIDE COUNTIES
ON ROUTE 18 AT DOGWOOD VIADUCT AND ON ROUTE 71
AT 1.0 MILE SOUTH OF SAN BERNARDINO COUNTY LINE**

For Case 3 and 4 type projects

Project Construction is:

- **At three or more locations on two or more routes**
- **At three or more locations in two or more counties**

For these projects, the route numbers are not listed in the title sheet project description. Use the phrase "AT VARIOUS LOCATIONS" for the project limits following the reference to the county or counties. If the project is located in two or more counties, list counties in alphabetical order. Omit city or town names from the title sheet project description.

Example of title sheet project description where the project consists of three or more locations in two counties:

**IN SANTA CLARA AND SANTA CRUZ COUNTIES
AT VARIOUS LOCATIONS**

Refer to "Project Construction at Three or More Locations on Two or More Routes and at Three or More Locations in Two or More Counties" in Section 2-1.7 of this manual for additional instructions related to these multiple location projects designated as Case 3A, Case 3B, Case 3C, Case 3D and Case 4 projects.

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Begin and End Points of Project Construction and Work

General

The post miles shown in the Project Identification Block are the post miles for the limits of construction (**not work**).

If the limits of project construction is continuous (each length of construction on each route is equal to or greater than 0.2 mile), as shown on Title Sheet Examples "D" through "F," and "L," then begin and end points of construction and begin and end points of work are to be shown on each route where construction is to be performed. A strip map is used for the title sheet mapping.

If the limits of project construction is on one route and consist of more than one location of construction as shown on Title Sheet Example "I" (four locations on one route where each location's length of construction is less than 0.2 mile or 0.2 mile or greater) and Title Sheet Example "Y," the beginning of the first location is identified as the begin point of construction and the end of the last location as the end point of construction. Begin point of work is shown proceeding the first location of construction. End point of work is shown following the last location of construction. When there is one identified begin and end point of work that encompasses multiple locations on one route, routine maintenance is not performed (see later in this section for some points to consider when identifying begin and end points of work on a title sheet). A strip map is used for the title sheet mapping.

If the project construction limits are on one route and consist of more than one spot location of construction, as shown on Title Sheet Example "H," each spot location is identified as a "Location of Construction."

Begin and end points of work are shown for each location of construction. A strip map is used for the title sheet mapping.

If project construction consists of a spot location or more than one spot location on one route, as shown on Title Sheet Examples "G," "H," and "M," then begin and end points of construction are not shown and are replaced with the phrase "Location of Construction" for each spot location of construction. Begin and end points of work are to be shown on each location (unless all work is a building project which does not impact the motoring public as shown on Title Sheet Example "M"). A strip map is used for the title sheet mapping.

If project construction consists of multiple locations of construction, as shown on Title Sheet Examples "J" and "K", then both begin and end points of construction and work are not shown. Refer to Section 2-1.7 of this manual for the methods of identifying project construction on multiple location projects. County route mapping is used for the title sheet mapping.

If project construction consists of building construction in a city or urban location, as shown on Title Sheet Example "N," then both begin and end points of construction and work are not shown and the phrase "Location of Construction" is used to identify the location of construction. Street mapping is used for the title sheet mapping.

The work involved in the installation of construction area signs at intersecting cross roads or on streets adjacent to the route or routes on which construction is to be performed shall not be reflected in the described project limits of construction or work.

Diverting traffic to alternate routes to reduce traffic delays within the limits of project construction, including placement of traffic advisory or other informational signs well beyond the limits of the project, shall not be reflected in the identified limits of project construction or work nor shall these signs be shown on the title sheet. Traffic advisory or other informational signs used on the project for transportation management are to be shown on the motorist information project plan sheets (see Section 2-2.15).

Other sheets of the plans (layouts, drainage plans, etc.) shall not show construction of a permanent nature beyond begin and end points of construction shown on the title sheet.

Where construction on a route is to be performed in adjacent separate projects, the limits of construction and associated title sheet project descriptions for the adjacent projects must not overlap. To minimize description overlaps, construction involved in transitioning from the alignment of new traffic lanes to the existing alignment of traffic lanes (example: transition traffic striping or construction of a temporary route connection) may be included within the identified limits of work instead of the identified limits of construction. Limits of construction on adjacent projects cannot overlap, but limits of work can.

Begin and End Points of Construction

The identified begin and end points of construction shall be the physical limits of the permanent bid items to be performed on the individual project. This construction is that which will remain in place at the completion of the contract. Identification of the permanent bid items does not necessarily include additional minor roadway work, which includes shifting of traffic lanes laterally in advance of begin or end of construction. In these instances, advance temporary lane striping and its replacement

striping would more properly be within the points of begin and end work.

Some examples of what could be the permanent type of construction on a project are:

- New highway alignment
- Widening existing highway (adding new traffic lane(s) or shoulder)
- Reconstruction of the existing pavement structure (structural section)
- New surfacing over existing pavement
- Grinding or grooving of existing pavement
- New median barrier
- Sound walls
- Retaining walls
- Highway planting and irrigation systems
- Electrical systems, etc.

The begin and end points of construction are to be:

- Referenced by post mile and station, where the construction is identified on the project layout sheets by stationing
- Referenced only by post mile, where construction is only identified by post miles on the project layout sheets or plan view sheets
- Referenced only by post mile, where construction is only identified by post miles and the project has no plan view sheets (example: pavement resurfacing)

Begin and End Points of Work

The begin and end points of work shown on the title sheet for the route or routes involved shall include the temporary work to be performed in advance of and beyond the identified points of begin and end construction. This work, such as lane closures and advance construction area signing (i.e. the first "ROAD WORK AHEAD" sign) will not remain in place at the completion of the contract. The temporary shifting of traffic lanes laterally in advance of begin and end of construction properly falls within begin and end work.

Begin and end points of work shall be:

- Referenced by station, where the construction and work is identified on the layout sheets by stationing.
- Referenced only by post mile, where construction is only identified by post miles on the project layout sheets or plan view sheets
- Referenced only by post mile, where construction is only identified by post miles and the project has no plan view sheets (example: pavement resurfacing or seal coat projects)

Do not use wording such as "1000 feet beyond End of Construction" to define work limits.

If the begin or end construction limits coincide with a county line, the begin or end work limits are to be shown in the adjacent county in order to properly identify the necessary distance for the advance construction area signing.

If the begin or end construction limits coincides with a state line (e.g. Oregon, Nevada or Arizona) the begin or end work limits are to be shown in the adjacent state in order to properly identify the necessary distance for the advance construction area signing (see Title Sheet

Example "T"). The neighboring state needs to be informed of the project prior to construction.

In the rare situation where the begin or end construction limits coincides at the border with Mexico, the construction limits will be the same as the work limits.

For each begin and end points of work that is identified on the Title Sheet, advanced warning signs will be placed. When there is more than one location of construction on a single route, consideration of identifying the number of begin and end points of work needs to first be discussed with the district Traffic Management System engineer before labeling begin and end work limits on the Title Sheet. The begin and end work limits can either be shown for each location (see Title Sheet Example "H") or can encompass all locations (see Title Sheet Examples "I" and "Y"). Title Sheet Example "P" also shows that begin and end work limits can be located on routes where there is no construction taking place.

Caltrans maintenance crews will NOT conduct routine maintenance within the advance warning signs (to avoid any interference with the contractor), so careful consideration needs to occur when there are gaps between locations of construction. If advance signing encompass the gaps (regardless of the distance between locations of construction), routine maintenance will NOT be conducted between all identified begin and end work limits.

Identification of Construction and Work by Post Mile

Post miles shall be shown in increments of 0.1 mile on the title sheet, except when shown in a table of "Locations of Construction." Post miles may be shown to increments of hundredths of a mile in a table of "Locations of Construction" or on layout sheets where only post miles are used to identify construction on the project. Refer to Section 2-1.7 of this manual for instructions regarding tabulation of locations of construction.

The post mile values shown in the upper right corner of the title sheet shall be the post mile values of the begin and end points of construction as shown on Title Sheet Examples "D," "E," "I," and "L." If the construction to be performed is at a spot location (less than 0.2 mile), a single post mile value shall be used, as shown on Title Sheet Examples "G" and "M." If the construction to be performed is at two spot locations (each less than 0.2 mile), two individual post mile values shall be used, as shown on Title Sheet Example "H."

Identification of Construction on Intersecting Streets or Roads

If construction is to be performed on cross roads or streets that intersect or are adjacent to the construction on the state route or routes, the begin and end points of construction on these roads or streets shall be identified as "Limits of Work."

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CHECKLIST FOR TITLE SHEET

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- Dist, county and route (upper right corner of sheet) TX=8.75, FT=3, WT=2, LV=border_PROJ-ID-BLOCK-anno (10). For building work, use location code in space usually reserved for route number. There is a special border sheet for building work called AC = BTITLE
- Post mile (upper right corner of sheet) TX=8.75, FT=3, WT=2, LV=border_PROJ-ID-BLOCK-anno (10).
- County or counties in which project is located shown on the small-scale State location map by outlining county borders and filling in the area within the county border with hachure marks if enough space is available.
- Location arrow on State map (upper right corner of sheet) AC=LOCARR, LV=pp_PRESENTATIO (10).
- Standard north arrow AC=NARR, LV=pp_PRESENTATION(10).
- Contract No. 00-000004 (lower right corner of sheet) TX=12, FT=43, WT=0, LV=border_PROJ-ID-BLOCK-anno (10). The number "4" represents the "Phase".
- Project Identification Number 0000000000 (lower right corner of sheet) TX=12, FT=43, WT=0, LV=border_PROJ-ID-BLOCK-anno (10). The first two digits represent the district, the next eight digits represent the Project Number. Due to a decision by DES-OE the Phase is not listed with the Project Identification Number.
- Unit and Project Number and Phase (lower right corner of sheet) TX=7, FT=3, WT=1, LV=border_SHEET(10).
- "NO SCALE" TX=8.75, FT=3, WT=2, LV=border_INSIDE-BORDER-anno (10).
- Signature and date of signature are included on Level border_SIGNATURE (63). Current registration seal information is to be included on Level border_SEAL (10) (lower right corner of sheet). **Drafting reviewers will attach signatures when project goes to PS&E.** The text size for date and information inside of seal is to be TH=7, TW=5, but the width can be squeezed to fit the area. If both names are long, the first name can be above the last name. FT=3, WT=1.
- Information inserted in project development name block spaces in left margin of sheet. See Figures 2-6 and 2-7 in Section 2-1.6 of this manual for additional instructions.
- Title sheet project description – TX=14.5, FT=43, WT=0, LV=border_INSIDE-BORDER-anno (10), UPPER CASE or if space is limited use TX=12, FT=43, WT=0, LV=border_INSIDE-BORDER-anno (10), UPPER CASE. No abbreviations allowed.
- Strip map of the project or if a project consists of three or more locations on two or more routes or consists of three or more locations in two or more counties, then county road mapping is used to identify routes with construction work.
- Identify routes shown on the strip map where project construction is continuous, as shown on Title Sheet Examples "D." If project construction consists of multiple locations on multiple routes or in multiple counties (county mapping used) or in an urban location (street mapping used) or a rural location, identification of some routes not pertinent to the construction may not need to be shown. Do not use route shields. **Do not use the term "state route" or "interstate route," only label it as "route."** The following typically applies to route identification where work is being performed: TX=8.75, FT=3, WT=2, LV= pp_TITLE-SHEET-anno (60). WT=1, LV=pp_TITLE-SHEET-anno (60),

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CHECKLIST FOR TITLE SHEET

(Page 2 of 3)

on routes where no work is being performed, the following should apply: TX=7, FT=3, see Title Sheet Examples "J" for application of text size.

- BEGIN AND END CONSTRUCTION (identified by post mile, station and alignment designation where construction is identified on the project layout sheets by stationing, identified only by post mile where construction is identified on the project layout sheets or plan view sheets by post miles, or by post miles where the project has no plan view sheets), TX=12, FT=43, WT=0, LV=pp_PRESENTATION (60), ALL UPPER CASE. For projects that do not need to show begin and end points of construction, see "Begin and End Points of Project Construction and Work" within this Section 2-2.2.
- Station equations shown in the main route alignment line where stationing used on title sheet to identify begin and end of construction and work.
- Post mile equations shown within begin and end points of construction if the numerical difference of the post mile equation is 0.1 mile or more.
- Begin and End Work (identified by station and alignment designation where construction is identified on the project layout sheets by stationing, identified only by post mile where construction is identified on the project layout sheets or plan view sheets by post miles or by post miles where the project has no plan view sheets.) TX=10, FT=3, WT=2, LV=pp_PRESENTATION (60), Upper and Lower Case. For projects that do not need to show begin and end points of work, see "Begin and End Points of Project Construction and Work" within this Section 2-2.2.
- Destinations of Route(s) with arrow at strip map edges. Upper- and Lower-Case lettering. AC=T1ARR Example:
To Los Angeles →
- City/county/state/international boundary limits, as well as TERO – Indian reservation land boundary.
- Station and/or post mile equation at county lines where construction extends into another county.
- Names of incorporated cities (ALL UPPER CASE) TX=10, FT=43, WT=0, LV=pp_TITLE-SHEET-anno (60). See instructions under the subheading "Title Sheet Project Descriptions" within this Section 2-2.2 to determine if a city is incorporated.
- Names of unincorporated areas (Upper- and Lower-Case Lettering) TX=10, FT=43, WT=0, LV=pp_TITLE-SHEET-anno (60). See instructions under the subheading "Title Sheet Project Descriptions" within this Section 2-2.2 to determine if a city or town is unincorporated.
- If a state (Nevada, Oregon or Arizona) or country (Mexico) appears on the title sheet, use: TX=11, FT=43, WT=0, LV=pp_TITLE-SHEET-anno (60).
- Bridge shown by symbol.
- Name and type of bridge or other transportation related structure (e.g., Thomas Street Overcrossing or Undercrossing).
- Bridge numbers (if work is to be performed on bridge or other transportation related structure and plans prepared by either the Office of Structure Design or a structural consultant are included).
- Street names – TX=7, FT=3, WT=1, LV=pp_TITLE-SHEET-anno (60). Make

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sure street names are shown where streets cross the project or where work is being performed. Identify all geographic features that appear in the title sheet project description such as streets, bridges, etc. Use abbreviations as shown in the Standard Plans but match the text case of the abbreviation to the name of the geographic feature (example: St. LOUIS AVENUE).

- Label names of waterways and bodies of water. Waterways (rivers, creeks, canals): Upper and Lower Case, TX=7, FT=3 at 25° slant, WT=1, LV=pp_TITLE-SHEET-anno (60). Bodies of water: Lakes, Reservoirs, Ponds: Upper and Lower Case, TX=7, FT=3 at 25° slant, WT=1, LV=pp_TITLE-SHEET-anno (60). BAYS – ALL UPPER CASE, TX=8.75, FT=3 at 25° slant, WT=2, LV=pp_TITLE-SHEET-anno (60). OCEAN – ALL UPPER CASE, TX=12, FT=3 at 25° slant, WT=2, LV=pp_TITLE-SHEET-anno (60).
- Prominent geographic features shown by line work, do not use symbols for geographic features, such as airports (these items shown for orientation purposes).
- Railroads are shown and labeled for geographic reference. Spell out railways in Upper and Lower Case. TX=7, FT=3, WT=1, LV=pp_TITLE-SHEET-anno (60) (Refer to "Railroad Involvement" in Section 2-1.1 of this manual for additional information).
- Mandatory material and disposal sites (Use of mandatory sites is to be avoided where possible). If the sites are not within project limits, include in Materials Handout and not on the title sheet.
- Environmentally sensitive area (ESA) limits shown.

After PS&E submittal and review:

- Index of Plans, insertion of RSPs, sheet number and total number of sheets, project federal funding identification number if federal funds are involved and plans approval date.

See Title Sheet Example "C" for placement and text sizes.

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2-2.3 Typical Cross Sections

This sheet shows the structural elements of the roadway. Geometric elements are to be shown on the Layout sheets, not on the typical Cross Sections sheets. Typical cross sections are a graphic representation of existing conditions, the pavement structure (structural section) and some of the proposed items of work within the station limits shown (not every item need be shown, but the major items or the majority of work from the layouts). When the project consists of only a few sheets of plans and only one typical cross section is required, this cross section may be shown on the layout sheets. Determination of the number of typical cross sections necessary to be shown is based on the change in the types of materials used, widths and depths of material used, but not changes in the types of barrier, dike or side slopes of the roadbed.

As applicable to project construction, typical cross sections are to be provided for mainlines, ramps, frontage roads, detours, etc. In all cases typical cross sections shall be presented from the perspective of looking “up-station.”

Pavement structure textural symbols, such as patterns or hatching, are not be used on the typical cross section. Existing sections are to be shown as dashed lines.

In most circumstances, the vertical scale of the sections is to be exaggerated to clearly show the thickness of the various layers of the pavement structure. Thicknesses of the layers, within any one typical section, are to be shown proportionally. The vertical dimensions of the typical cross sections are to be expressed in hundredths of a foot. Where a new pavement structure is to be

constructed, the thickness of each layer is to be rounded to the nearest 0.05-foot.

Horizontal roadway dimensions on a typical cross section are to be expressed in decimal feet, not feet and inches. Horizontal roadway dimensions are not to be shown smaller than a hundredth of a foot for existing widths and to the nearest tenth of a foot for new construction. If the lane or shoulder width is a whole number, show the width without decimals of a foot. (Example: A 12-foot lane is shown as 12' not 12.0' or 12.00').

Horizontal roadway dimensions are to be referenced to the alignment line used for construction. The cross slope of the roadbed surface is to be identified by percent and an arrow showing downward direction of slope, or where applicable, show as "MATCH EXISTING SLOPE" with an arrow showing downward direction of slope. If dimensions vary, give minimum and maximum values. Side slopes are to be identified as a horizontal to vertical ratio and can be further described with "OR FLATTER." See Section 2-1.3 for additional instructions to describe side slopes. Hinge points for side slopes are to be identified. Do not show every change to side slopes on the typical cross sections, but rather show the side slopes that occur most within the limits of each cross section.

Cut and fill lines are to be shown on the layout sheets. Quantities of roadway excavation and embankment are to be listed with the roadway profiles, see "Profile Content" in Section 2-2.5 of this manual for additional instructions. Design cross sections are used to determine the quantities of earthwork for roadways (roadway excavation, embankment, and imported borrow), not the Typical Cross Sections sheets.

Except for indeterminate right of way as described in the subsection titled "Right of Way" in Section 2-1.1 of this manual, right of way lines are to be shown:

- As a reference when 15 feet or less from the catch point.
- When the right of way is constant enough to be shown with one distance or a range. If a range is shown, give minimum and maximum values.

Right of way lines shown on the typical cross sections do not replace or supersede showing right of way lines on the layout sheets (or other plan view sheets). The right of way note described in Section 2-1.1 is not required on the Typical Cross Sections sheets unless there are no plan view sheets that show right of way. In this case only show the right of way note on the first sheet of the Typical Cross Sections.

The design designation, as defined in the Highway Design Manual Topic 103, shall be shown on the first sheet of the Typical Cross Sections for all new, reconstruction, or rehabilitation projects. See "Typical Cross Sections Examples" for the method of expressing the design designation.

Where geosynthetic pavement interlayer is included as part of the pavement structure, show the limits of the interlayer.

In addition to the pavement structure materials, items generally shown on a typical cross section include edge drains, barriers, ditches, shoulder backing, curb, and dikes. When these and similar items are shown, identify the type if only one type is used, otherwise identify generically (example: HMA DIKE). If items are shown on various typical cross sections, include a note on the

first Typical Cross Sections sheet such as: "EXACT LOCATIONS AND TYPES OF DIKE AND CURB ARE SHOWN ON THE LAYOUTS AND IN THE SUMMARY OF QUANTITIES SHEETS."

When there are multiple typical cross sections to be shown on a Typical Cross Sections sheet, the section with the lowest stationing limits is shown on the bottom portion of the sheet and the additional sections are to advance up the sheet in the direction of greater stationing. Where a typical cross section covers more than one range of stationing, the station labeling is to be stacked one above the other, with the lowest stationing at the top of the stack. If the typical cross sections for a route or road can be displayed in columns, start typical cross sections in the left column and go up the sheet, then proceed to the right column.

All of the typical cross sections for a route (or alignment line) should be grouped together before showing the typical cross sections for another route, ramp, frontage road or detour.

The beginning and end stations of each typical cross section would typically break at full 100-foot stations or at whole-foot stations, unless the break in the typical sections requires more detailed accuracy.

Stationing of sections to the hundredths of a station would occur where the stationing break in the pavement structure (structural section) is at an equation in the alignment or at a physical feature that requires the accuracy to hundredths of a station.

Stationing on multiple typical cross sections shall not overlap.

Pavement width transitions (traveled way or shoulders) must be shown and identified with the appropriate dimensioning.

Pavement structure designation numbers, if used, are to be consistent with those shown on the layout sheets of the plans.

Where new surfacing is to be placed on existing pavement, the bottom of the new surfacing which is to be in contact with the existing pavement is to be shown as a solid line.

The existing pavement structure, the type of material, thickness and width must be identified, even for a simple overlay project. Where the existing pavement structure was previously shown in metric units, the thickness of each layer shown shall be a conversion of the metric unit values (millimeters) to the U.S. customary unit value (hundredths of a foot).

CHECKLIST FOR TYPICAL CROSS SECTIONS (Page 1 of 2)

- District, county and route TX=7.0, FT=3, WT=1, LV=border_PROJ-ID-BLOCK-anno (10) (upper right corner of sheet).
- Post Miles TX=7.0, FT=3, WT=1, LV=border_PROJ-ID-BLOCK-anno (10) (upper right corner of sheet).
- Unit and Project Number and Phase (lower right corner of sheet) TX=7.0, FT=3, WT=1, LV=border_SHEET (10).
- Signature and date of signature release are included on LV=border_SIGNATURE (63). Current registration seal information is to be included on LV=border_SEAL (10), (upper right corner of sheet). The signature is added as the last step before the project goes to PS&E. The text size for the date and information inside the seal is to be TH=7, TW=5, FT=3, WT=1 but the width can be squeezed to fit the area. If both names are long, the first name can be above the last name.
- Information inserted in plan sheet development name block spaces in left margin of border sheet. See Figures 2-10 and 2-11 in Section 2-1.6 of this manual for additional instructions.
- Label sheet(s) "NO SCALE" (TX=8.75, FT=3, WT=2, LV=border_INSIDE-BORDER-anno (10). Draw sections proportionally.
- Label the profile grade line "PG" and identify the line designation (example: "A1" LINE).
- The following note is required on the first sheet of the Typical Cross Sections, if a pavement structure is to be constructed:
 1. DIMENSIONS OF THE PAVEMENT STRUCTURES (STRUCTURAL SECTIONS) ARE SUBJECT TO TOLERANCES SPECIFIED IN THE STANDARD SPECIFICATIONS.
- The following note is required on the first sheet of the Typical Cross Sections when superelevation diagrams are included as part of the contract plans.
 1. SUPERELEVATIONS ARE SHOWN ON THE SUPERELEVATION DIAGRAMS.
- Design designation– Show on first sheet of Typical Cross Sections only. For additional instructions refer to the Typical Cross Sections example sheet, "Generic Project Typical Cross Section, Basic Required Information."
- Legend and list of abbreviations, on first sheet of Typical Cross Sections (do not include standard plans abbreviations as part of the listed abbreviations).
- Alignment line or station line and layout line for walls and barriers.
- Stationing limits below each section, sections with lowest stationing limits of each route at bottom of sheet with greater stationing sections stacked above.

CHECKLIST FOR TYPICAL CROSS SECTIONS (Page 2 of 2)

Dimensions are to be shown on Construction Detail sheets.

- Typical Cross Sections for route, ramp, and local roads grouped separately.
- Pavement width transitions shown where necessary to clearly show how the roadbed transitions.
- Profile grade point, widths of lanes, shoulders, medians, sidewalk, gutter, ditches, etc. Show variable dimensions with limits.
- Percent of cross slopes, traveled way, shoulders, paved median, gutter, etc. with an arrow showing downward direction of slope.
- Slope rounding (where applicable). May be shown as a detail.
- Benching and strutting (where applicable).
- Right of way lines: Show as applicable to the specific project. Refer to the text of this section for instructions.
- Type, class and thickness of pavement, base and subbase.
- Pertinent existing features, including existing pavement structures, barrier, railing, ditches, shoulder backing etc.
- Seal coats, except fog seals.
- Dike with type identification if only one type, otherwise use generic (example: HMA DIKE).
- Curb types with type identification if only one type, otherwise use generic (example: CONCRETE CURB). Do not show dimensions, even for modified curbs or curb details from a local agency.

- Subsurface drains (where applicable).



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2-2.4 Project Orientation

Key Map and Line Index

A Key Map and Line Index sheet may be required on large or complex projects (i.e. multiple routes, line designations and/or interchanges). Key maps are generally not used on projects with one route, or when the locations of the sheets are sequential. The Key map and Line Index sheet is an aid to clarify relative sheet locations, routes and orientation of alignment lines, or the order of layout sheets when not obvious. The Key Map and Line Index sheet shows all sheet arrangements, routes and alignment lines. The base map or title sheet strip map, which contains all the alignment lines, is an option for developing the Key Map and Line Index sheet. The scale can be adjusted to fit the sheet. Gaps and breaks may be shown where these occur within the project limits.

The Key Map and Line Index sheet identifies the main plan view sheets. Sheets such as Layout, Water Pollution Control, Erosion Control, Contour Grading, Drainage, Utility, Pavement Delineation and Sign Plans are to be shown as needed. The location and orientation of plan view sheets are to be identified with a “clip frame.” Label each clip frame with each plan view sheet identification and number that shares it. A Key Map and Line Index sheet does not replace the need for having Layout sheets.

Sheets such as Stage Construction and Traffic Handling are not to be shown on the Key Map and Line Index sheet as construction areas are not to be repeated within a specific type of plan view sheet. It may be advantageous to have a separate key map for the stage construction section showing the limits for each stage of the project. It may also be advantageous to have

a separate key map for a project with many walls showing an overview of all the various wall locations.

Because of the many landscape plan view type sheets available for use, a Landscape Key Map may be beneficial in identifying the various types of landscape work. Because of the many electrical systems that may be included in an electrical systems bid item or that may be located in the same place, and because electrical systems work is often at spot locations, an Electrical Systems Key Map may be beneficial in identifying electrical systems work. If staging occurs within the Electrical Systems Plans, systems or shared components must not be shown more than once as “proposed work,” but may be shown as existing or already constructed work when appropriate, see Section 2-2.23. If a key map is used for Landscape or Electrical Systems sheets in a project that also has a key map for roadway or wall plan sheets, coordinate the size and orientation of all the key maps with the roadway project engineer for consistency to the extent possible.

Aerial Identification

An Aerial Identification sheet may be useful in some projects that need to photographically convey unique or specific features to the bidders, the contractor and the Resident Engineer. Only those areas of the project that require a photographic visual should be shown (i.e., toll plaza at the San Francisco/Oakland Bay Bridge). Please note, showing aerial photographs of the entire project is unnecessary.

Aerial photographs are most useful for preliminary plans. The use of aerial photographs in contract plans should be based on engineering need, not aesthetics. Aerial photographs are not a substitute for

required survey and design information necessary to construct a project. Alignment lines, topography, right of way, and contract work are more clearly shown without aerial photographs.

Aerial photographs are not to be used as background for plan sheets such as layouts, drainage, utilities, pavement delineation, etc. They are to be limited only to the Aerial Identification sheets or detail sheets that require emphasis of a specific detail or unique location. In most circumstances, aerial photographs clutter plan sheets and show more physical features (trees, roof tops, grasses, rocks, dirt, etc.) than necessary, obscuring the more important engineering information and items of work.

When Aerial Identification sheets are necessary, station lines and right of way must be shown. If the limits of the project are identified by post miles, key post miles must be shown for ease of location identification. Locations of importance to the project should be identified within a boundary encompassing the specific area and clearly labeled. The same labeling should be carried over to the plan sheets when identifying contract work within that specific area of importance.

The date the aerial photograph was taken and the source of it must be included as a note on the first Aerial Identification sheet. Old or outdated photographs can mislead bidders and contractors about actual field conditions, leading to possible claims and disputes.

The boundary of the aerial photograph should extend far enough beyond the right of way to provide for orientation only. The aerial photograph should never extend to the limits of the maximum clip frame. If there is work beyond the right of way or there are specific

areas identified to assist in the construction of the project, then the aerial photograph should include those designated areas. Specific areas shown beyond the right of way should be directly involved in the construction of the project and be identified in the Right of Way Certification. Aerial mapping should not be plotted at a specific scale and should be identified as “NO SCALE.”

Use of aerial photography on specific plan sheets requires approval from the Division of Design, Office of CADD and Engineering GIS Support, during the development of base maps in the preliminary design stages (usually by 60% completion) NOT at PS&E submittal. Obtain an email from the Division of Design, Office of CADD and Engineering GIS Support unit and include it in the project history file.

Project Control

A Project Control sheet shall be included in the project plan set when survey and/or photogrammetric data are required for the design of the project. The sheet name is “Project Control.” The sheet identification code for the plan sheet is “PC.”

This sheet shows the horizontal and vertical control used to collect the data. This sheet uses a strip map similar to the title sheet, which identifies the horizontal and vertical control points within the vicinity of the project. A project control monument is a natural or man-made object that represents or references a point of known location and/or elevation. The horizontal datum identified by the California Coordinate System (CCS), Epoch date, and zone, i.e. *CCS83 (2010), epoch 2011.00, Zone 6*, and the vertical datum, i.e. *NAVD88*, must be shown on this sheet. The following note must be included on the sheet, "FOR COMPLETE PROJECT

CONTROL DATA, SEE THE SURVEY RECORDS ON FILE IN THE SURVEYS DEPARTMENT AT THE DISTRICT OFFICE." This note is a cell in the Caltrans cell library (note33). Close coordination with the Survey Department is required to prepare this sheet.

The project control information should be shown on a single plan sheet. The strip map does not need to be plotted at a specific scale and should be identified as "NO SCALE." The following statement is to be shown at the bottom center of the plan sheet, "APPROVED FOR PROJECT CONTROL INFORMATION ONLY." This statement is a Caltrans cell (note36).

The Caltrans standard is to show the northing and easting coordinate values, elevation, station designation, order of accuracy and description in a tabular format with a symbol on the strip map representing the control point.

Monumentation

A monument is a natural or man-made object that is fixed permanently in the land and referred to in a legal description or map identifying the land, controlling the location of a boundary, corner, road, street, highway, or provides horizontal or vertical survey control. Monumentation is the overall process required to meet the legal and ethical requirements relating to perpetuation of the land-net and establishment of the Department's right of way. Monumentation includes locating and perpetuating existing monuments, setting new right of way monuments, and the preparing and filing of maps that completely and accurately depict the relationship between the land-net, the right of way and the project control survey.

Existing monumentation that will be destroyed or impacted during construction must be properly documented and perpetuated in accordance with State law and Chapter 10 of the Survey Manual. If the contractor is required to perpetuate the monumentation, the monuments are to be shown and identified on the Layout sheets.

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2-2.5 Layouts, Profiles and Superelevation Diagrams

General

A layout sheet is defined as one of the following:

- Full Plan Sheet
- Combined Plan and Profile Sheet
- Combined Plan, Profile and Superelevation Diagram Sheet

The layout is the base plan sheet for the project. Other plan sheets such as drainage, signing, pavement delineation, etc., are necessary when there is not sufficient space to clearly show all work on the layouts or a second engineer is taking responsibility and signing for a specific type of work.

Layouts contain the general project data such as the horizontal alignment lines, right of way lines, easements, proposed construction not shown on other plan sheets and pertinent existing facilities.

At interchange areas it may be necessary to show plan and profile on separate sheets. In metropolitan areas and at rural interchanges, separate full layout plan sheets may be necessary to show all the required data. Where a full plan sheet is needed for plan layout, full profile sheets are to be used to show mainline profiles and the superelevation diagram. As a Caltrans best practice, profiles of supplemental lines, such as frontage roads, crossroads, ramps and other roads should have their own full profile sheets with the superelevation diagram.

For layout sheets, a horizontal plotting scale of 1" = 50' (Caltrans base scale) should be used in urban areas and some rural areas. A horizontal plotting scale of 1" = 100' may be used in rural areas. It is permissible to use both scales within a set of plans provided each sheet contains only one scale. Where a horizontal plotting scale of

1" = 50' is used and just a few items of work are involved, the roadway layout information may be stacked one above the other on the same plan sheet. A horizontal plotting scale of 1" = 20' is used where greater detail and clarity is required. These sheets would typically be used for road intersections, signal and lighting plans, etc. Use only the three plotting scales mentioned in this paragraph for any plan view sheet.

Layout sheets must be oriented to show mainline stationing progressing left to right with certain exceptions identified within this section. All station lines and profiles must be shown in feet only.

If arrangement of the roadway layout information is such that "stacking" is necessary (the roadway layout information stacked one above the other on the same plan sheet), the sheet is to be arranged so that the stationing progresses from the top half of the sheet to the bottom half of the sheet using match lines. The layout information on the top half of the sheet must maintain the coordinate values from the California Coordinate System (CCS). The bottom half of the sheet would not be able to maintain the coordinate values, but it easily could be relocated coordinately correct if it is moved to the top half so that the match lines properly line up.

Sheets are to be arranged to contain major construction features on one sheet. Wherever possible, the major portion of an interchange should appear on one sheet. This may necessitate breaks and match lines for the ends of minor road connections. Station equations may cause the profiles, if shown at the bottom of the layout plan, to determine sheet arrangement. Sheets should not end within a road intersection. The complete road intersection should be shown on one sheet. Diagonal placement is satisfactory to attain better coverage. Mainline stationing (or any

other route) must not overlap from one sheet to the other.

Do not show the same area twice within the layout sheets, unless (in the rare instance) a demolition sheet is necessary. The layout (demolition) sheet would show the existing conditions that need to be removed before the proposed work can begin. Demolition sheets go at the end of the layout sheets and have a sheet identification code of “L” with a sub-script “DEMOLITION.” On the layout sheet showing the proposed work, there is to be a note stating that there is a corresponding demolition sheet.

Match lines are to be placed when a route is shown on more than one sheet. The match line break is to be located halfway between station tick marks (i.e. +50) and is to be perpendicular to the alignment line. Match lines should not be placed at a full station, because the match line would obscure the station annotation and station tick mark. A “MATCH LINE” callout is not necessary when sheets are consecutive or there are not multiple match lines. References to adjoining sheets such as “MATCH LINE (L-5)” is optional but may be advisable where many match lines are shown on one sheet (such as sheets showing interchange areas, freeway to freeway connectors, etc.). Reference to a plus station at the match line “MATCH LINE +35” is also an option and should only be used if the match line is not located at “+50.”

As a general rule, if a project contains only one crossroad or crossing route where construction is to be performed, the sheet numbering order of the mainline is interrupted to show the entirety of the construction on the crossroad or crossing route. The sheet numbering for the crossroad or crossing route must begin with the next consecutive sheet number after the interrupted mainline sheet number (example: mainline, L-4; beginning sheet for crossroad or crossing route, L-5). Sheet numbers must be sequential. If the last sheet number used for the crossroad or

crossing route is L-8, the mainline sheet numbering will resume with L-9. The sheet(s) containing the crossroad or crossing route information may be rotated to attain better coverage. Stationing in most instances is to progress from left to right on a sheet, but in some instances, stationing may progress from the bottom to the top of a sheet. If a project contains more than one crossroad or crossing route, first complete the mainline presentation (or route where the majority of the work occurs) then put the crossroad or crossing route sheets at the end of the layout sheet order. There may be instances when the stationing for the crossroad or crossing route progresses from top to bottom with respect to the mainline stationing which goes left to right. This occurs only occasionally because the original stationing for the crossroad or crossing route was created in that direction.

Preparation Procedures

CADD allows the separation of drawing data by kind of data. The CADD system defines the various layers of similar data as “levels.” Geographical drawings are created by combining levels of data from a master drawing. Refer to Section 2.4 of the CADD Manual.

Existing topography may be provided by scanned maps, digitized maps, or maps from ground surveys. Photogrammetric mapping lines and symbols are shown in the Caltrans Standard Plans. Symbology for design features are also shown in the Standard Plans.

Existing facilities must be shown as dropped out (a dotted line which is achieved by using pre-defined dropout levels and the Caltrans Interplot design scripts) or with dashed lines on a non-dropout level. Proposed construction must be shown with solid lines or the appropriate symbology (not dropped out).

Caltrans symbols, abbreviations, and line symbology are shown in the Caltrans Standard Plans. The Caltrans CADD English Cell Library and the Caltrans Line Style Resource file must be used for Caltrans standard symbology. Abbreviations and symbols not listed in the Standard Plans, which are used within the layouts, must be listed along with their meanings on the first layout sheet only. Do not duplicate acronyms or abbreviations shown in the Standard Plans.

The appropriate version of the Standard Plans that supplement the entire project is identified on the Title Sheet. Thus to add the generic label “SEE STANDARD PLANS” is not necessary. But a specific page in the Standard Plans may be identified with a specific detail being labeled (either by text or symbol) for the benefit of the bidder/contractor.

The appropriate right of way note must appear on each plan view sheet where right of way is either shown on the plans or where indeterminate right of way exists.

Line weights and line styles must conform to the requirements in Section 2.7 of the CADD Users Manual. Refer to Section 2.6 of the CADD Users Manual or various examples in the PPM for text sizes and fonts. Caltrans uses uppercase text for projects with the exception of abbreviations (see Standard Plans). See Section 2-1.2 of this manual regarding placement of text.

Standards, practices and conventions used for showing information on layout sheets also apply to all other plan view sheets showing the same or similar information.

Plan Content

On extensive or complex projects, there may be too much information to show clearly on the

layouts. Design information should be grouped by type and shown on separate plans such as: drainage, pavement delineation, etc. Proposed design information, when labeled as an item of work and is used to calculate quantities, must only be labeled on one type of plan sheet. Proposed design information may be shown on another plan view or detail sheet if other items of work connect to it or if by showing it, it helps indicate any potential conflicts with existing or proposed work. If proposed design information is shown on another sheet, it must not be labeled as or misconstrued as an item of work. Subsurface facility information (utilities) may be shown on other plan view sheets (such as drainage plans or electrical system plans) if it helps bring attention to any potential utility conflicts.

Some proposed design information may be shown as existing due to stage construction or sequence of work (example: Stage 1 construction is shown as existing on plan sheets showing proposed work for Stage 2 construction, since work from the prior stage or sequence will have already been completed).

Irrigation conduits are usually shown and labeled as an item of work on the layout sheets (because they are placed when the pavement structure is constructed). But the irrigation conduit is also shown on the irrigation plans because items on the irrigation plans connect to and utilize the irrigation conduit. DO NOT label it as an item of work on the irrigation plans (as this would cause confusion to the bidder and contractor when it comes to verifying the total quantity for irrigation conduits). As a best practice, the irrigation conduit is shown on the irrigations plans as a non-dropped out line with the line weight reduced to WT=0.

Only those existing topographic features which affect bidding, construction, and maintenance, and which are essential for field orientation of the plans are to be shown. Showing too much

extraneous topographic information makes it difficult to clearly see the important design information on the layout. Confine topography to the right of way or area of construction, including the space needed for equipment. In urban areas any features pertinent to construction, such as streets, curbs, gutters, and sidewalks involved in the construction, should be shown. In rural areas where little topography exists, all topography may be shown if it does not clutter the layout. Buildings and facilities within the right of way that will be removed prior to construction are not to be shown.

Routes or roads not part of the project construction, but shown on the plans for orientation purposes, should be identified and labeled with normal size text (see checklist for layout sheet). Routes or roads where project construction is to be performed may be identified with larger size font to make them stand out on layouts which contain a large amount of information.

Label what work is to be performed on existing facilities, such as "abandon," "remove," etc., but avoid using the word "existing" in the callout as it does not convey additional information to the bidder or contractor. Use "existing" only when it is an integral part of the bid item description (e.g., "install sign panel on existing frame"). Avoid using the words "construct," "place," etc., for new construction, as they do not convey additional information to the bidder or contractor. Use "place" only when it is an integral part of the bid item description (e.g., "place hot mix asphalt dike (Type B)"). Necessary dimensions are to be included. Use plus stations at begin and end of roadway items shown on the layouts (this also applies to other plan view sheets). If the length of an item is included in the callout, use decimal feet.

All projects require a Project Engineer Utility Certification signed by a registered civil engineer, even if the project is a landscape or

electrical systems project only. As a Caltrans best practice, utility plans are to be prepared for all projects that have any utilities within the project limits. The utility plan sheets are usually signed by the same registered civil engineer signing the Project Engineer Utility Certification.

For small projects where all information can be clearly shown on one type of sheet, the subsurface and aerial facilities may be shown on the layout sheets instead of having separate utility sheets.

Unless specifically exempted by the Division of Design, Chief, all utility facilities known to the designer within the areas where project work is to be performed (including State-owned underground utilities, underground utilities owned by others and aerial facilities), must be shown on the utility plans.

High priority shall be shown as provided in Chapter 17 of the Project Development Procedures Manual (PDPM).

Accuracy of the locations of State-owned underground utilities is not to hinder the disclosure of underground facility information. The location of these facilities is to be shown to the best degree of information available.

Alignment (stationing/geometry) data from when the highway was constructed or realigned is to be used for all projects, as right of way record maps and other historical records usually perpetuate the original stationing and line designation. Refer to As-Built plans to avoid the creation of new stationing and line designations that have no connection to the right of way record maps and other historical records. If a project was constructed with Metric stationing, work with the districts surveys office to determine the most appropriate English stationing to utilize (stationing should start with 3 digits left of the "+" symbol i.e. 100+00).

Where the ramp stationing ties into and is offset to the mainline, the ramp stationing is to be the same value as the mainline, but with a ramp line designation.

For minor projects that do not require staking (such as seal coat or surface course) or projects where there are many locations of work (such as some electrical system projects), post miles may be shown on the plans instead of stationing. Post miles are to be shown to at least a tenth of a post mile or a hundredth depending on the accuracy required. But either stationing (in most all cases) or post miles must be shown on all plan view sheets for all projects.

Alignment data for all stationing lines (mainlines, ramps, crossroads, frontage roads, relocated local streets, etc.) must be shown. Stationing equations, distances and bearings of all tangents, stations of all curve points and curve data must be shown.

All curve data numbers must be consecutive for each station line. Do not restart curve data numbers over when going to the next layout sheet. Curve data numbers for different station lines may have gaps in the numbering from other station lines, thus allowing for possible last-minute changes without having to renumber curve data from any other station line than the one changed. Do not duplicate curve numbers shown on any of the layout sheets.

Coordinate values may be included on the layouts within the curve data tables for selected points (BCs and ECs) along the stationing line. A few coordinate points identified with “tick marks” (tied to a physical feature that can be located in the field) may be displayed within the layout plans to help assist surveys when staking the project. Showing coordinate values does not take the place of supplying the required electronic files to surveys and construction containing station lines, staking, and surveying information needed for construction.

If the contractor is required to perpetuate the monumentation, the monuments are to be shown and identified on the layouts, using a unique symbol, identified in the legend. Project Control should be shown on the Project Control Plan sheet (see Section 2-2.4 of the PPM). If monumentation information is included on the layouts, place a note on the first sheet of the layouts to indicate the basis of the horizontal control used. If elevations are shown indicate the basis of the vertical control used. If a Project Control sheet is included in the contract plans, reference the sheet in a note on the layouts. If the project does not have any plan view sheets, identify the monumentation points in tabular format on the construction detail sheets.

Show and label right of way lines, easement lines, right of entry and state, county and city lines. Show and label, township, range and section lines and corners, recorded subdivisions, Spanish grants, state and national parks, swampland and tideland surveys but only when it is of benefit and assists in the construction of the project. Show and label any environmentally sensitive areas (ESA).

The "Checklist for Layout Sheet" contained elsewhere in this section lists the various elements included on the layout sheet.

Profile Content

Data shown on the profile sheet is produced from the roadway software. The proper display for callouts and annotation is handled in the drafting software. The most common vertical scales are:

- 1" = 10' - Rural sections in hilly and mountainous terrain with considerable rise and fall.

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- 1" = 5' - Rural or urban areas with gently rolling terrain with less than two percent general ground slope.
- 1" = 2' - Rural or urban areas in level terrain where precise grade and gutter design is required.

Horizontal to vertical scale ratios producing profile grade line plots steeper than 1:1 are to be avoided. Scale ratio of H/V = 10 is most commonly used. The profile grade is shown by percentage. Use two decimal accuracy for new profiles and three decimal accuracy for widening projects that match the existing profile (usually at 100' intervals).

Datum elevations are to be placed on top of the horizontal grid line they represent at both sides of the profile grid. Placing datum elevations on all grid lines on the sheet is not necessary. Only a few elevations slightly above and below the profile line are needed.

The basis of the vertical control is to be shown by a note on the first sheet of profiles.

The original groundline must be checked for obvious errors in plotting and missing break points at ditches, levees, etc.

The original groundline and profile grade line should not crowd the top or bottom of the sheet.

On combined plan and profile sheets the profile stationing must line up with the stationing as shown in the plan portion. The plan portion is always on the top half of the sheet while the profile is on the bottom half. If plan and profile are combined for a particular route (line designation), then it must be presented the same for that entire route. For the same route (line designation), do not have some sheets with just the plan view and some sheets with the combined plan and profile.

On full profile sheets the horizontal scale need not correspond to the plan scale on the layouts, but it is recommended. If there are superelevation diagrams it is recommended that they are shown on the same sheet with the corresponding profile. The superelevation diagram is always on the top half of the sheet while the profile is on the bottom half. If the superelevation diagram is shown with the corresponding profile for a particular route (line designation), then it must be presented the same for the entire route. For the same route (line designation), do not have some sheets with just the profile and some sheets with the combined superelevation diagram and profile.

Where profiles are "stacked" on one profile grid sheet, they are to be arranged so that stationing progresses from the top half of the sheet to the bottom half of the sheet. If "stacked" use one of the split grid sheets that is available in the Caltrans cell library (prf15, prf10s & prf20s). The stationing and the earthwork quantities are to be shown separately for each half.

Profile stationing must not overlap. Equation stations may control coverage and arrangement. A gap in the profile line should be shown between the back and forward stations of the equation. The preferred method of showing the gap is to stop the profile line at the back station of the equation on the profile sheet and resume showing the profile line at the forward station of the equation on the next profile sheet, unless impractical to do so. Where the equation station gap is shown on the same profile sheet:

- The beginning of the gap must be at the back station of the equation and the end of the gap must be at the forward station of the equation.
- The actual distance through the equation between adjacent full stations is to be shown.

To provide a complete picture, the original groundline is to extend a few stations beyond the beginning and end of the project if this does not require an additional sheet. Future grade lines (usually prompted by the staging of construction contracts) are to be labeled and shown as short dashed lines. Other grade lines, such as ditches, gutters, and pipes, are to be shown by symbology as depicted in the Standard Plans and labeled appropriately.

If the profile grade (PG) line is not on the station line (the Typical Cross Sections sheets are always to show the relationship between the PG and station line), or the construction layout line for a wall, a note is to be added to indicate the position of the profile grade, such as "PROFILE GRADE AT INNER ETW" or for example "PROFILE GRADE IS 3' LEFT OR RIGHT OF STATION LINE."

The names of all major intersected streets, railroads, grade separation structures, streams, and other station lines are to be labeled vertically (bottom to top) along the profile.

Roadway excavation and embankment quantities are to be listed along the bottom of the profile (on full profile, plan and profile and stacked profile sheets). These quantities may be listed by station, or individual cuts and fills (division points of cut and fill quantities may not be at same station limits). One of the reasons for listing excavation and embankment quantities is to help bidders and the contractor determine haul distances and understand the scope of the earthwork. Where the roadway crosses a stream or crossroad, the point of crossing should be a division point for listing cut and fill quantities. Where quantities for major ramps or other roads have been calculated separately, they are to be listed with their respective profiles rather than lumping them with the main line. In such a case, a cross-reference note is to be used. Sheet totals are to be shown in the lower right corner when

quantities are listed by station. Where an individual cut or fill area carries over to the next sheet, the total for the individual cut or fill is to be carried over and shown on the next sheet.

The "Checklist for Profile" contained elsewhere in this section lists the various elements included on the profile sheet.

Superelevation Diagram

A superelevation diagram is a graphic representation of the crown slopes, superelevations, and superelevation transitions of the pavement and shoulders. See generic superelevation diagram example “sheet 5 of 5” for which transition points need to be shown (as identified in the Highway Design Manual). In all cases the superelevation diagram (whether for the mainline or all ramps) must be presented from the perspective of looking “up-station” for the mainline.

The axis of rotation for each line designation is the PG line as identified on the typical cross section sheets. A Caltrans best practice is to have the axis of rotation at the highest point on the roadbed when in a tangent section for that roadbed. See generic superelevation diagram examples “sheets 1 of 5, 2 of 5 & 3 of 5” for explaining the relationship between the typical cross sections and the superelevation diagram.

Identifying the PG/axis of rotation for ramps (with respect to the typical cross sections and superelevation diagram) is shown on generic superelevation diagram example “sheet 4 of 5.” The stationing for ramps must follow the direction of the mainline stationing (not the direction of the flow of traffic).

Clearly label the various planes (traveled way and shoulders) begin and end horizontal curve and transition points (with a triangle). See generic superelevation diagram example “sheet 5 of 5” for the complete drafting presentation of a superelevation diagram.

Vertical curves at the beginning and end of superelevation transitions do not need to be shown.

Certain combinations of profile grade line, vertical curves, superelevation transitions, and

variable pavement widths may produce undesirable pavement edge profiles. Where these combinations occur, it is essential during design to generate edge of traveled way and edge of shoulder profiles and adjust bumps and drainage pockets to eliminate ponding. These edge of traveled way and edge of shoulder profiles should be drawn to an exaggerated vertical scale and submitted (separately from the superelevation diagrams in the final contract plans) to the Resident Engineer and surveys for use in staking.

The "Checklist for Superelevation Diagram" contained in this section lists the various elements included on the superelevation diagram sheet.

**CHECKLIST FOR LAYOUT SHEET
(Page 1 of 3)**

- District, county and route TX=7.0, FT=3, WT=1, LV= border_PROJ-ID-BLOCK-anno (10) (upper right corner of sheet)
- Post Miles TX=7.0, FT=3, WT=1, LV= border_PROJ-ID-BLOCK-anno (10) (upper right corner of sheet)
- Unit and Project Number and Phase (lower right corner of sheet) TX=7.0, FT=3, WT=1, LV= border_SHEET (10)
- Signature and date of signature are included on LV= border_SIGNATURE (63). Current registration seal information is to be included on LV=border_SEAL (10), (upper right corner of sheet). The signature is added as the last step before the project goes to PS&E. The text size for the date and information inside the seal is to be TH=7.0, TW=5.0, FT=3, WT=1, but the width can be squeezed to fit the area. If both names are long, the first name can be above the last name
- Standard north arrow (AC = NARR LV= pp_PRESENTATION, WT=1)
- Scale (TX=8.75, FT=3, WT=2, LV= border_INSIDE-BORDER-anno (10)) place below the sheet name (centered)
- Information inserted in plan sheet development name block spaces in left margin of border sheet. See Figures 2-10 and 2-11 in Section 2-1.6 of this manual for additional instructions
- Right of way must be shown on all layout sheets unless it is indeterminate. The following note must be shown on each layout sheet where right of way is shown: "FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE." Include this note on any other plan view sheet that shows right of way lines
- If right of way is indeterminate, the following note must be shown on each plan view sheet where there is indeterminate right of way:
- "RIGHT OF WAY LIMITS ARE INDETERMINATE AND ARE NOT SHOWN. THE CONTRACTOR MUST CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE FOR CONDITIONS OF USE PRIOR TO COMMENCING WORK."
- First sheet of layouts contains notes, legends, symbols, and a list of abbreviations (do not include standard plan abbreviations as part of the listed abbreviations)
- Bearing and distance of tangent sections must be identified on all stationed lines and are typically placed above the alignment line
- Station equations
- Identify routes within the project limits. Line designations and routes must be identified and are typically placed above the alignment line. Do not use route shields. The following typically applies to route identification where work is performed: TX=8.75, FT=3, WT=2, LV= align_MAIN-anno (16). On routes where no work is being performed, the following may apply: TX=7.0, FT=3, WT=1, LV=align_MAIN-anno (16). On very complex projects, where the layouts contain a large amount of information, the following may apply to identify

**CHECKLIST FOR LAYOUT SHEET
(Page 2 of 3)**

routes where work is performed:
TX=10.0, FT=43, WT=0, LV=
align_MAIN-anno (16).

- Curve data (all curve data numbers must be consecutive “for each station line” throughout the layout sheets). Northing and easting values for BCs and ECs are optional, but if shown, the basis of the horizontal control used must be identified on the first layout sheet
- Edge of traveled way and shoulders
- Edge of pavement (EP) is to be shown as a thicker weight line (usually WT=2) to more clearly define the EP
- Dimension the total width of traveled way for each direction plus the shoulders (not necessary to dimension each lane, reserve that for the pavement delineation sheets)
- Access control lines that have access control tick marks are not to appear on the contract plans. Access control lines belong on right of way record maps
- Fences and gates
- Township, range and section lines and corners, state and national parks, swampland and tideland surveys but only when it is of benefit and assists in the construction of the project
- City and county limit lines labeled appropriately
- Guard railing, barriers and crash cushions
- Drainage, striping, and signing, (unless shown on separate sheets)
- Utilities are to be shown on utility plan sheets, unless the project is small and all information can clearly be shown on the layouts
- Bridge names and numbers (show bridge number only when work is to be performed on bridge and bridge plans are included) TX=8.75, FT=3, WT=2, LV=pp_LEGEND-anno (23).
- Waterways (stream, creek, river, etc.) and direction of flow TX=7.0, FT=3 at 25° slant, WT=1, LV=pp_LEGEND-anno (23) upper/lower case text
- Retaining walls and sound walls shown and labeled on layouts for length and layout line offset from highway alignment line
- Mandatory material and disposal sites (use of mandatory sites is to be avoided where possible). If the sites are not within project limits, include in Materials Handout and not on the layouts
- Road approaches
- As an option, Northing and Easting value of a fixed, known object that physically can be located in the field. Shown for referencing to the correct location and zone in the California Coordinate System

**CHECKLIST FOR LAYOUT SHEET
(Page 3 of 3)**

- For grade separations, most of the features associated with the underneath roadbed (usually depicted by some type of line) should be clipped for that portion directly underneath the above route. For the options of what should be clipped (or in some cases dashed), see the examples for Layouts “Generic Plan View Sheet for Grade Separations.” These options only apply to that portion of the route (or stream/river) that is directly underneath the above route
- Stage construction, traffic handling or detours (unless shown on separate sheets)
- Limits of pavement removal
- Existing pavements
- Curbs and dikes
- Sidewalks, driveways, curb ramps (type)
- Grinding, cold planing, and replace asphalt concrete surfacing, etc. Thickness of existing pavement must be identified on the typical cross sections
- Monument points when the contractor is required to perpetuate monumentation
- Topography (when pertinent)
- Cut and fill lines
- Easement and permits
- Environmentally sensitive area (ESA) limits shown
- Edge drain locations, including types of outlets, vents and cleanouts. If layouts are cluttered edge drains can be shown on drainage plans. If drainage plans are also cluttered, edge drains can be shown on separate edge drain plans.

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**CHECKLIST FOR PROFILE SHEET
(Page 1 of 2)**

- Original ground lines labeled as “OG”. Original ground line should extend a few stations beyond the beginning and end of profiles on the first and last sheet
 - Future grade lines (used for staged contracts) shown as short dashed lines and labeled
 - Profile grade line labeled as “PG” with the grade percent. Use 2 decimal places for new profiles and 3 decimal places when matching existing profile
 - Line designation and route identified in the title
 - Vertical curve lengths labeled (in feet). Grade tangents must be shown at point of reverse vertical curvature (PRVC) or point of compound vertical curvature (PCVC)
 - Elevations - shown at BVCs, EVCs, PRVCs, and PCVCs, equations, broken profiles for datum changes, VPIs, and conforms at existing pavement. No additional elevations need be shown on vertical curves
 - Earthwork quantities (listed by station, or individual cuts and fills) – sheet total
 - Top rail elevation (railroad)
 - Station and elevation of begin and end bridge. Identify offset if not on “PG”
 - Label bridge name and number (show bridge number only when work is to be performed on bridge and bridge plans are included)
 - Street or road alignment line and identify the stationing where it crosses the main profile grade line
 - Road and driveways identified where they connect to the affected route
 - Elevation at both edges of sheet (on top of the horizontal grid line) TX=8.75, FT=3, WT=2, CO=0, LV= border_INSIDE-BORDER-anno (60).
 - Plus station for points
 - Station equations
 - Benchmarks (showing an elevation is optional)
- Where the profile and superelevation diagram are shown together do the following:*
- It is a Caltrans best practice to show the superelevation diagram with the corresponding profile. The superelevation diagram must be placed directly above the profile so that the stationing (TX=7.0, WT=1, CO=0, LV= border_INSIDE-BORDER-anno (60)) lines up
 - Stationing is to be shown directly below the superelevation diagram. Station and earthwork quantities (TX=7.0, WT=1, CO=0, LV= border_INSIDE-BORDER-anno (60)) are to be shown below the profile.
 - When the superelevation diagram and profile are on the same sheet, the sheet title is to be “PROFILE AND SUPERELEVATION DIAGRAM.” The sheet Identification is “PS”
 - For specific superelevation diagram elements to be shown, see “Checklist for Superelevation Diagram”

**CHECKLIST FOR PROFILE SHEET
(Page 2 of 2)**

Where the profile is shown by itself or if both profile and superelevation diagram are shown together, include the following information on those sheets:

- District, county and route TX=7.0, FT=3, WT=1, LV=border_PROJ-ID-BLOCK-anno (10) (upper right corner of sheet)
- Post Miles TX=7.0, FT=3, WT=1, LV=border_PROJ-ID-BLOCK-anno (10) (upper right corner of sheet)
- Unit and Project Number and Phase (lower right corner of sheet) TX=7.0, FT=3, WT=1, LV= border_SHEET (10).
- Signature and date of signature are included on LV= border_SIGNATURE
- (63). Current registration seal information is to be included on LV=border_SEAL (10), (upper right corner of sheet). The signature is added as the last step before the project goes to PS&E. The text size for the date and information inside the seal is to be TH=7.0, TW=5.0, FT=3, WT=1, but the width can be squeezed to fit the area. If both names are long, the first name can be above the last name
- Information inserted in plan sheet development name block spaces in left margin of border sheet. See Figures 2-10 and 2-11 in Section 2-1.6 of this manual for additional instructions
- Scale – vertical and horizontal (TX=8.75, FT=3, WT=2, LV=border_INSIDE-BORDER-anno (10)). Place below the sheet name (centered)

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CHECKLIST FOR SUPERELEVATION DIAGRAM (Page 1 of 1)

- Axis of rotation line (0%). Label as “Axis of Rotation” along with the line designation of the PG line and offset to the PG line (if applicable – see generic example 2 of 5)
 - Each traveled way and shoulder plane shown and labeled. DO NOT abbreviate traveled way or shoulder
 - Stationing below diagram (each diagram if stacked)
 - Location of horizontal BCs and ECs indicated with vertical lines. Label radius and direction of curvature above the full superelevation portion of the diagram. A dimension line connects the BC to the EC (see generic example 5 of 5)
 - Percent at both edges of sheet (on top of the horizontal grid line)
 - Station equations
 - Identify (with a triangle) the points of transition (as shown in the Highway Design manual) with the plus stations below the diagram. Do not label these points (see generic example 5 of 5)
 - Identify (with a triangle) and label those rare occurrences such as, “compound curves”, “reversing curves” and “broken back curves”
- Where the superelevation diagrams are shown on their own separate sheets, include the following information on those sheets:*
- District, county and route TX=7.0, FT=3, WT=1, LV=border_PROJ-ID-BLOCK-anno (10) (upper right corner of sheet)
 - Post Miles TX=7.0, FT=3, WT=1, LV=border_PROJ-ID-BLOCK-anno (10) (upper right corner of sheet)
 - Unit and Project Number and Phase (lower right corner of sheet) TX=7.0, FT=3, WT=1, LV=border_SHEET (10).
 - Signature and date of signature are included on LV=border_SIGNATURE (63). Current registration seal information is to be included on border_SEAL (10), (upper right corner of sheet). The signature is added as the last step before the project goes to PS&E. The text size for the date and information inside the seal is to be TH=7, TW=5, FT=3, WT=1, but the width can be squeezed to fit the area. If both names are long, the first name can be above the last name
 - Information inserted in plan sheet development name block spaces in left margin of border sheet. See Figures 2-10 and 2-11 in Section 2-1.6 of this manual for additional instructions
 - Scale – horizontal (TX=8.75, FT=3, WT=2, border_INSIDE-BORDER-anno (10)). Place below the sheet name (centered).

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2-2.6 Construction Details

Construction details present supplementary information that cannot be shown on the layouts because of complex and extensive details required. Drawings on construction details should typically depict greater detail of items shown on layouts. Do not use construction detail sheets as a way of creating a second set of complete layouts. Do not substitute construction details sheets for layouts to avoid complying with standard presentation of plotting scale, match lines, stationing, orientation, curve data, etc. Utilize construction details to enlarge spot locations to more clearly show the pertinent information. Details shown on construction detail sheets are unique to a specific project and are those for which there are no Standard Plans or may be a detail from a standard plan modified to fit site conditions. If the project requires only a small number of plan sheets and space is available on the layouts, construction details can be shown on the layouts.

Standard Plan details are never to be included as part of the contract plans unless a Standard Plan detail is modified. When a portion of a Standard Plan drawing must be modified and included in the project plans, only the affected dimensions should be shown and a reference made to the applicable Standard Plan sheet. If a Standard Plan drawing needs substantial modification and is included in the project plans, the modified detail should be fully dimensioned and no reference made to the associated standard plan for additional dimensions.

Some drawings on construction detail sheets are not drawn to a specific scale. These drawings are usually drawn at a one to one size, but when enlarged to fit the border they must remain proportionally correct. Most

construction detail sheets are labeled "No Scale," except for the possible inclusion of construction details such as curb returns (usually at a scale of 1"= 20'). Each curb return is to be shown as a construction detail. Curb returns need to be fully dimensioned so that they are buildable and the quantities are calculable. For information on curb ramps, see the subsection on curb ramps in this section.

Curb return staking intervals for each curb return must include BCR and ECR. Depending on the length of curve, $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ delta lines will need to be shown. See Chapter 12 Section 12.5-8 of the Caltrans Surveys Manual for additional information about staking intervals for various curve lengths at the curb flow line. Information shown for curb returns typically includes:

- Radius
- Radius point
- Offsets shown with respect to BCR, ECR, $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$ delta lines

Examples of other construction items that may require construction details are curb and dike transitions, sidewalks, curbs, pavement surfacing conforms, and driveways. Details for other work (for example: drainage, signing, pavement delineation, etc.) are usually shown on their own detail sheets.

Pavement elevations may be shown on construction detail sheets when it is pertinent to the detail. Pavement elevations generally will be required at large curb returns, some speed-change lanes and at transition areas that cannot be defined with information on the profiles and superelevation diagrams.

Standard drawings of other agencies, when applicable to the project, shall be included as part of the project plan set. If there is

specification information on the standard drawings from other agencies, it must be removed and included in the specifications portion of the PS&E submittal. Referring to a standard drawing number from another agency is not acceptable.

Curb Ramps

The design of curb ramps must meet current design policy and standards developed in accordance with the Americans with Disabilities Act (ADA) of 1990. The design of curb ramps should meet the Caltrans conservative design standards shown in the Caltrans Standard Plans. If site condition constraints do not allow meeting these conservative design standards, then the prescribed accessibility design standards set forth in Design Information Bulletin 82 (DIB 82) “Pedestrian Accessibility Guidelines for Highway Projects” must be met.

The Department of Transportation is authorized to certify accessibility design compliance for all projects on State Rights-of-Way (see DIB 82). For highway projects (where there is no building work) the project engineer and project manager are responsible for certifying accessibility design compliance at Ready to List (RTL). For transportation buildings and facilities on State Rights-of-Way, the Office of Transportation Architecture (OTA) and/or the Office of Electrical, Mechanical, Water & Wastewater Engineering (TAEMWW) is responsible for certifying accessibility design compliance (see TAEMWW Memo To Designers 7-7.1).

A construction detail for each curb ramp in the project must be included in the advertised contract plans. This includes curb ramps that meet all of the aspects of the conservative design standards or curb ramps with aspects

that do not meet the conservative design standards but meet the Federal/California standards. A detail for each curb ramp, whether a remove/replace or new location, conveys to the bidder/contractor that an ADA compliant curb ramp can be constructed per the design shown on the plans.

Multiple curb ramps within a project may be based on a similar case type (e.g. Case A or Case C) but each curb ramp location has its own unique site conditions and constraints (i.e. profiles, cross slopes, right of way or utility/electrical systems features). Standard plans A88A and A88B along with DIB 82 provide guidance and design criteria on various considerations that go into designing a curb ramp, but by themselves they don’t provide the contractor with the specific design information needed to construct each individual curb ramp.

Each curb ramp detail is to show obstacles or constraints that have to be addressed (relocated) during the design phase. The elevations, slopes and dimensions are to be shown on each curb ramp detail. Some information may appear to be redundant but there are multiple consumers, and each may require information in a format that meets their needs. The necessary information to call out for each curb ramp on the construction detail will vary depending on the design complexity of the curb ramp and the existing site conditions (see curb ramp examples). By showing each curb ramp detail, the quantity of minor concrete and detectable warning surface (DWS) can be verified by the bidder/contractor for each curb ramp location as shown by the designer on the detail. Information shown for curb ramps typically includes but is not limited to:

- Slopes
- Elevations

- Cross slopes
- Transition areas
- Conform areas
- Pertinent dimensions for ramp, sidewalk and curbs
- Flow line alignment
- Retaining curb
- Detectable Warning Surface (DWS) (with dimensions if not common 3' x 4' shape)

Identify each curb ramp on the layouts with a curb ramp number. Do not reuse a curb ramp number. The construction detail for each curb ramp will be labeled by its number, with an option to add a modifier (i.e. Case A, Case CM, blended, etc.), see curb ramp examples.

Each curb ramp location is NOT a location of construction as identified on the title sheet. Multiple curb ramps at an intersection may or may not be part of one location of construction. See Section 2-1 for more information about locations of construction.

Depending on the site conditions, it is not always necessary to design to the maximum slope and minimum dimension of the accessibility design standards. Do not call out a slope as “maximum” or a dimension as “minimum” on plans or details. Each construction detail is to provide specific design information for the contractor to construct each curb ramp from the project plans. Survey data provided during the design phase for curb ramp locations assists the designer when verifying that a compliant curb ramp can be constructed before the contract is advertised.

Any curb ramp design, regardless of case type or unique configuration, initially strives to meet the conservative design slopes and dimensions shown in the standard plans. If any aspect of an individual curb ramp does

not meet the conservative design standards, the curb ramp must be included in the quantity and individually identified in the quantity table for the bid item “PRE/POST CONSTRUCTION SURVEYS” in the summary of quantities. A curb ramp where all aspects meet the conservative design standards, is NOT to be included.

The Division of Construction requires inspection documentation of all completed permanent pedestrian facilities. For each slope or dimension check, Construction takes and records three readings equally dispersed across the surface to be measured. The readings are not averaged. See Construction Policy Bulletin (CPB) 17-1 and Construction Manual Section 4-7303 for more information.

Driveways

The design of driveways must be in accordance with the Highway Design Manual (HDM), Topic 205 – Road Connections and Driveways and the Standard Plans for driveways. Information shown for driveways typically includes:

- Driveway width
- Sidewalk width, if different from driveway width
- Elevations – top of driveway at beginning and ending, back of sidewalk at beginning and ending of driveway, and at joins (see Standard Plans)
- X-dimension (see Standard Plans)
- Slope of driveway
- Cross slope of the pedestrian path on the driveway

Do not call out a slope as “maximum” or a dimension as “minimum” on driveway plans or details. Survey data provide the designer

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with the actual site conditions to meet the appropriate design parameters.

The Division of Construction requires inspection documentation of completed permanent pedestrian facilities, including driveways. For each slope or dimension check, Construction takes and records three readings equally dispersed across the surface to be measured. The readings are not averaged. See Construction Policy Bulletin (CPB) 17-1 and Construction Manual Section 4-7303 for more information.

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2-2.7 Temporary Water Pollution Control

Introduction

To meet regulatory requirements and protect the site resources, every project must include an effective combination of Water Pollution Control (WPC) Best Management Practices (BMPs). Also known as construction site BMPs, these temporary measures are applied during construction activities to reduce the pollutants in storm water discharges throughout the duration of project construction. Construction site BMPs provide both temporary erosion and sediment control, as well as, control for potential pollutants other than sediment.

All projects shall follow the procedures set forth in the Storm Water Quality Handbook Project Planning and Design Guide (PPDG) to develop a strategy for addressing stormwater during construction. The PPDG includes the Construction Site Consideration Form and the Construction Site Checklists located in Appendix E. This guide is available for download on the Caltrans internet at:

<http://www.dot.ca.gov/hq/oppd/stormwtr/>

General

Project engineers are required to select and estimate construction site BMPs when developing the project PS&E. At a minimum, designers shall provide a quantity table of construction site BMPs and include separate bid items for these BMPs, as part of the PS&E package. The determination of the degree and level of detail of construction site BMPs to be included in the contract documents should be discussed between district construction, design, and associated

units such as NPDES and environmental engineering, at the Project Initiation Document, Project Approval and Environmental Document, and PS&E phases of the project.

If a determination is made that a greater emphasis on construction site BMPs is justified, appropriate construction site BMPs shall be delineated on the plan sheets in addition to being shown on the summary of quantities sheet. Additional measures, as described in the PPDG, may be required for exceptional projects.

The benefit of including contract items for BMPs, quantity tables, or plans is more consistent bids for stormwater items, easier contract administration, and more timely installation and maintenance of construction site BMPs.

The inclusion of contract items for BMPs, quantity tables, or plans showing location and deployment of BMPs does not relieve the Contractor of preparing a Storm Water Pollution Prevention Plan (SWPPP) or Water Pollution Control Program (WPCP).

As described in the PPDG, pertinent information used to develop the construction site BMP strategy and quantities (plans, calculations, etc.) shall be provided in the Resident Engineer file and made available in the Information Handout (if prepared for the project).

Temporary Water Pollution Control Quantities

The quantity table of construction site BMPs shall be included as part of the project plans and shown on the project's summary of quantities sheet.

The temporary water pollution control quantity table shall show the particular type of BMP, unit of measure, the quantity used, and the approximate locations or stationing of construction site BMPs. Stationing should be referenced to the nearest alignment line. If the project uses only post miles to identify limits of work and construction, then the locations of BMPs should also be identified by post mile.

Temporary Water Pollution Control Details

The temporary water pollution control details to be included in the plans are unique to a specific project and those for which there are no standard plans. They usually depict modifications to BMPs or a combination of several BMPs for special situations. The temporary water pollution control standard plans which have details applicable to the project shall be identified in the project's special provisions standard plan list.

If construction site BMPs are only shown on the project layout sheets and details of BMPs are to be included in the project, then these details should be included in the construction details for the project. If temporary water pollution control plan sheets are included in the project plan set and details are to be included, temporary water pollution control details may be shown with the temporary water pollution control plan sheets.

Temporary Water Pollution Control Plans

If a determination is made to include temporary water pollution control plan sheets as part of the project plan set, then they shall be developed to show the proposed location of the construction site BMPs.

The project's base mapping is typically used as the background for these plans. The background information (topography) should be shown as existing (dropped out) and temporary water pollution control work shown as solid lines.

Temporary water pollution control plan sheets should be titled correctly so as not to be confused with erosion control plan sheets. Temporary water pollution control plan sheets show layouts of construction site BMPs and may include temporary erosion control measures. Erosion control plan sheets show layouts of erosion control measures intended to be left in place beyond completion of the contract (see Section 2-2.8).

On projects with multi-year duration and complex staging, especially where roadway alignments change, temporary water pollution control plans may need to be prepared for the major construction stages and phases. The BMPs necessary for the particular stage shall be indicated and may be shown on the project's stage construction sheets.

A list of abbreviations and symbols with their meanings should be included on the first sheet of the temporary water pollution control plans. Do not include standard plan abbreviations as part of the list of abbreviations.

Environmentally sensitive areas (ESAs) shall be shown on all project plan (layout) sheets, including the temporary water pollution control plans. The symbols used to indicate ESAs shall be consistent throughout the plan sheets.

Each sheet of the temporary water pollution control plans shall have the following note

included on it: "APPROVED FOR
TEMPORARY WATER POLLUTION
CONTROL WORK ONLY."

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2-2.8 Erosion Control

Drafting Standards

Use acronyms, symbols and abbreviations shown on the Standard Plans to prepare project plans. Non-standard acronyms, symbols, and abbreviations must be shown on the first sheet of the applicable plan series (e.g. EC-1 and ECL-1). Refer to Section 2-1.2 “Drafting Standards” for further information.

Utility Policy

Caltrans Utility Policy requires that all utilities be shown on the advertised contract plans sheets for every project (unless a utility exception is granted by the Chief, HQ Division of Design) whether Caltrans owned or utilities owned by others (public or private). Every project must have a completed Utility Policy Certification signed by a licensed civil engineer. Usually the same engineer will produce and be responsible for the utility plans.

As a convenience and reminder to the contractor and/or subcontractor, utility facilities may be shown on erosion control plans when there may be a potential conflict with project work. When utility facilities are shown a second (2nd) time (in addition to them being shown on the utility plan sheets) the line weight may be reduced to de-emphasize the utility line in comparison to project work. Refer to Section 2-2.13 “Utility Facilities” for further information.

Right of Way

The defined right of way may be shown on the erosion control plans (in addition to being shown on the roadway layouts) when it is determined that erosion control work is located near the right of way. Refer to Section 2-1.1 “Right of Way” for further information.

Master Files

The background for erosion control plan view sheets utilizes the base map. The base map consists of two (2) separate files:

- Master Topographic file
- Master Design file

The Master Topographic file (“**bb**” file) is developed and maintained by the Surveys and Photogrammetry units in the district. The “**bb**” file includes existing features that are always dropped out on plan view sheets.

The Master Design file (“**aa**” file) is developed and maintained by the roadway design unit in the district. The “**aa**” file contains the new permanent design features that are shown solid on plan view sheets. The right of way and alignment may be new or existing, but they are shown solid on plan view sheets.

Master files may contain a lot of information, but only the necessary information needed for any specific contract plan sheet is to be merged into that contract plan sheet (active file). Plan view sheets must maintain the state plane coordinates from the master files. The roadbed is always shown. Refer to Section 3.8 “Master Files” of the CADD User’s Manual for further information.

Composition of Project Plans

Do not call out roadway bid items on erosion control plans. Do not include plan sheets that have no work. Use break lines in place of match lines between plan sheets that are not contiguous. The number of erosion control plans may not correspond numerically to the roadway layout or planting plan sheets. A key map may be necessary to eliminate confusion on the number of each type of plan view sheet. Refer to Section 2-1.1 “Composition of Project Plans and General Preparation Procedures” for further information.

Erosion Control Plan

Erosion control plans provide a visual representation in plan view of new erosion control work in relation to highway facilities.

Erosion control plans typically show locations of the following:

- Erosion control types
- Fiber rolls
- Compost socks
- Mulches

For each contiguous erosion control area or linear item on each sheet, a callout must identify the representative symbol for each erosion control type, fiber roll, or compost sock shown per direction of travel or quadrant area. The erosion control type callout will include either the erosion control type and the area in square feet, or the erosion control type and a location number (in a circle) that refers to information included in the erosion control quantity table. For fiber rolls and compost socks include a callout

such as “Fiber Roll” either with a quantity or location number referring to information included in the erosion control quantity table.

Depending on the size and type of project, the erosion control work may be identified with an erosion control quantity table by stationing or post miles and other dimensions as needed (e.g. setback, offset, width, limit of existing vegetation, etc.). The erosion control quantity table must be supported by erosion control typical details and showing disturbed soil area locations on the roadway layout plans as needed to identify the limits of erosion control work.

If a project includes both erosion control and planting work, do not duplicate callouts for the exact same construction on both the erosion control and planting plans. Erosion control work can be shown on the planting plans.

Erosion Control Legend

The erosion control legend utilizes tables to show the erosion control types, seed mixtures, and other erosion control work such as fiber rolls, compost socks, and mulches.

For each erosion control type, the erosion control type table describes the:

- Bid items (compost, straw, incorporate materials, fiber roll, RECP, hydroseed, hydromulch)
- Sequence of application
- Material (compost, straw, seed, fiber, tackifier, netting)

2-2.9 Contour Grading Plans

Contour grading plan sheets are to be used where the shapes of the embankments and cuts are variable, warped, or complex. Contour grading is required because cross sections can not show smooth grading transitions. A good example of the need for contour grading is bridge embankments.

When contour grading is used, show existing and proposed contours, cut and fill lines, and benching. Pavement elevations may be shown.

The labeling of existing contours and spot elevations shown on the topographic base mapping does not need to be rotated to conform to the reading directions shown in Figure 2-1 of this manual. New contour line elevation labeling shall conform to the reading directions shown in Figure 2-1.

Existing contours shall appear as dropped out. New contour grading shall be shown as solid lines. Index contour lines will be every fifth contour, shown as heavier weight lines and labeled with their elevations. Intermediate contours are shown as medium weight lines and are not to be labeled with elevations. In very steep terrain (at any scale), intermediate contours may be eliminated if the contour lines are so close together that they affect the readability of the plans. See Section 2-1.2 of this manual for contour intervals.

On large complex projects, contour grading may be shown on separate sheets. Contour grading, when minimal, may be shown on the layout plan sheets or the drainage plan sheets where the addition of the contour grading to such sheets will not produce sheets which are cluttered, unreadable, or confusing.

Each sheet of the contour grading plans shall have the following note included on them: "APPROVED FOR CONTOUR GRADING WORK ONLY."

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2-2.10 Drainage Plans, Details, Profiles and Quantities

General

When there is not sufficient space to allow the drainage work to be shown on the project plan layouts, separate drainage plans, profiles, details, and quantity sheets may be used. Drainage work is typically performed by a subcontractor, therefore the work shown on the drainage plans, profiles, details, and quantity sheets should only be related to drainage work.

Permanent stormwater treatment controls should be shown on the drainage plan, profile, and quantity sheets.

For convenience, drainage and utilities may be shown on the same sheets since both facilities are typically underground and their locations may be in conflict with each other. Drainage and contour grading also may be shown together on the same sheet.

Drainage Plans

Drainage plans provide a visual representation in plan view aspect of the drainage facilities. The base mapping for the project layout sheets is typically used as the background for the drainage plans. The background information should be shown in dropped out format and drainage work is shown as solid lines. Drainage plans do not repeat the roadwork items shown on the project plan layouts. If no drainage work is to be performed within the corresponding limits of a project plan layout sheet (road work items), do not include a drainage plan sheet for that area. The number of project plan layout sheets may not be the same as the number of drainage plan sheets.

If a temporary construction easement (TCE) is required for drainage work, show the easement lines on the drainage plan sheet. See Section 2-1.1 regarding right of way information to be shown.

Existing drainage facilities shall appear as dropped out. If work is to be performed on existing facilities, indicate what type of work is involved, such as "Abandon" or "Remove." The proposed drainage work shall be shown as solid lines. The words "Construct," "Place," etc., for new construction should not be used.

For identification and location purposes, drainage work is to be separated into groupings of interconnected drainage items. Each grouping becomes a drainage system.

A drainage system may consist of a single culvert with or without appurtenances (headwalls, wingwalls, drainage inlets, flared end sections, inlet and outlet structures) or may be a complex system consisting of several culverts and appurtenances feeding into a main culvert.

Where a main culvert (collector) runs the full length of the project or a lengthy portion of the project, the main culvert and related appurtenances should be broken into more than one system and assigned more than one drainage system number. The breaks to identify each of these systems should be at a distinct point, such as a drainage inlet, cleanout, junction structure, profile grade change, etc.

A drainage system number shall be assigned to each drainage system on the project where work is to be performed. Drainage system numbering shall be consecutive throughout the project. System numbering should not start and stop for each individual sheet of drainage plans. Drainage systems may

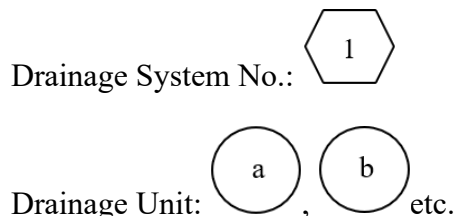
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alternatively be numbered by decimal post mile if drainage systems can be clearly labeled on the plan sheets. Drainage system decimal post mile location shall also be shown on the drainage profile sheet under the drainage system number.

If a drainage system is added after final district review, don't renumber all the systems. Use the next drainage system number occurring after the last one used on the project. If a system is deleted, insert a note in the description column of the drainage quantity sheet for the deleted system (example: "Drainage System No. 13 deleted").

Each drainage system shall be identified by a number, and each item of the system shall be assigned a drainage unit designation and shall be labeled as shown in the following example:



Generally, the number of units in a system should not exceed the single alpha unit code (a through z). In extreme cases, use a double alpha unit code when the number of drainage units exceeds 26.

Typically, the coding of drainage units should begin with the main feature of the drainage system and progress from there. Coding of units may also start at the lowest point of a cross drain and progress to the highest point. The method of coding drainage units is to be consistent throughout the project.

Full details of all drainage system items with type and size labeling are to be shown on the drainage plans and drainage profiles.

The drainage system number and unit designation on the drainage plans shall correspond with those shown on the drainage profiles, drainage details and drainage quantities.

The station reference to be shown for a drainage system is the point at which the culvert crosses or intersects the roadway station line or profile grade. Where a culvert does not cross or intersect the roadway station line or profile grade, the culvert shall be referenced to the nearest roadway station line by station pluses and station offset distances.

Indicate ditches by standard symbols with arrowheads to show direction of flow. Flow arrows are often helpful at inlet and outlet structures.

Subsurface drains such as edge drains, pavement structure drains, horizontal drains, and underdrains should be shown on the project plan layouts. If there is not enough space for this type of work to be shown on the project plan layouts, it may be shown on the drainage plan sheets. Where subsurface drainage systems are large and complex, separate subsurface drainage plan sheets may be used. If separate subsurface drain plans are used, the subsurface drain details and the summary of subsurface drain quantities table shall immediately follow the subsurface drain plans. If subsurface drains are shown on the project plan layouts or drainage plan sheets, the subsurface drainage items shall be summarized in a table on the project's summary of quantities sheet. For additional information regarding subsurface drainage, see Section 2-2.11 of this manual.

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The first sheet of drainage plans should contain notes, legends, symbols, and a list of abbreviations. Do not include standard plan abbreviations or acronyms as part of the listed abbreviations.

Each sheet of the drainage plans shall have the following note included on them: "APPROVED FOR DRAINAGE WORK ONLY."

Drainage Profiles

Drainage profiles must contain the data necessary to install and construct new drainage facilities. Where existing drainage facilities are to be removed, the typical cover (vertical distance from the top of the facility to original ground) must be shown on the drainage profiles or in the drainage quantities list.

The minimum height of cover for pipe culverts is discussed in Topic 856.5 and shown in Table 856.5 of the Highway Design Manual

Drainage profiles provide the means of determining the quantity of excavation and backfill needed to install, construct or remove a drainage facility. Structure excavation and structure backfill is included in the item or items of work to install, construct or remove a drainage facility.

Drainage profiles of cross drains shall be displayed in the direction of increasing stations. Profiles should be arranged to best fit within the area available on the profile sheet.

The following data is to be given for the units of each drainage system:

- Type, size, length, and location of culverts (station pluses and station offset distance)
- Culvert appurtenances, such as headwalls, wingwalls, drainage inlets, flared end sections, inlet and outlet structures, shown and labeled. Identify location of items by plus station and station offset distance.
- Existing groundline profile (shown as dashed line) and finished grade (shown as solid line).
- All flow line elevations. The slope of the culvert shall be shown by percentage or decimal and shall be consistent throughout the profiles. For consistency, care shall be taken with significant figures. One significant figure right of the decimal point when using percent and three significant figures right of the decimal point when using decimal slopes.

Drainage system numbers and unit designations on the profiles must correspond with drainage plan sheets, drainage details, and quantities summary sheets.

The estimated slope length of pipe in a drainage unit shown on the drainage profile sheet shall be the centerline length of the culvert expressed in decimal feet, to the nearest tenth of a foot. Where the pipe is placed between successive drainage structures (inlets, junction boxes, etc.), the slope length of pipe shown should be the centerline length between the inside face of each structure.

The length of pipe shown on the drainage profile for each culvert shall be the same as that entered in the drainage quantity sheet.

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The final pay length for each culvert installed during construction will be determined in accordance with the Standard Specifications and the instructions in the Construction Manual.

Drainage Details

The details shown on the drainage detail sheets usually depict special drainage structures, channel changes, modifications to existing structures, etc.

Drainage detail sheets should not be confused with drainage plan sheets. Drainage plan sheets show layouts of drainage systems.

The details shown on the drainage detail sheets are unique to a specific project and those for which there are no standard plans or may be a detail from a standard plan which must be modified to fit site conditions.

When a small part of a Standard Plan drawing must be modified and included in the project plans, only the affected dimensioning should be shown, and a reference made to the applicable Standard Plan sheet. If a Standard Plan drawing needs substantial modification and is included in the project plans, the modified detail should be fully dimensioned and no reference made to the associated standard plan.

Drawings on the drainage detail sheets are typically not drawn to a specific scale. Drawings are usually drawn at a one-to-one proportion, but then enlarged to fit the border sheet. Each sheet is to be labeled "No Scale." Sufficient dimensioning shall be shown on the details so that the facilities are buildable and the quantities are calculable.

Standard drawings of other agencies, when applicable to the project, shall be included as part of the project plan set. Referencing to a

standard drawing number from another agency is not acceptable.

Drainage details which are applicable to a specific drainage system should be identified on the drainage detail sheet by the corresponding drainage system number and unit designation. Drainage system number and unit designation must correspond with drainage plan sheets, profiles and quantities summary sheets. If a drainage detail applies to several drainage systems, only show those drainage system numbers with that detail.

Drainage Quantities

General

This sheet consists of a summary of drainage facilities and appurtenances (headwalls, wingwalls, drainage inlets, flared end sections, inlet and outlet structures, etc.), which are to be constructed, installed, removed, reset, remodeled, adjusted, modified, abandoned, reconstructed, or salvaged as shown on the drainage plans or in some instances where shown on the project plan layouts.

Referencing Drainage Facility

Drainage facilities shall be referenced on the drainage quantities table by:

- Station,
- Drainage system number,
- Drainage unit designation, and
- Drainage plan sheet number.

The station reference used for a drainage system is the point at which the culvert crosses or intersects the roadway station line or profile grade. Appurtenances (headwalls, wingwalls, drainage inlets, flared end sections, inlet and outlet structures, etc.) for these culverts shall be listed together using

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the single reference station of the culvert, regardless of skew or distance from roadway station line.

Where a drainage system consists of a culvert installed in the median or in roadside areas, approximately parallel to the roadbed, the culvert shall be referenced to the roadway station line by station pluses and station offset distances. The station pluses and station offset distances shall be to:

- the end of the culvert where no appurtenance is attached to the end of the culvert,
or
- the appurtenance (headwall, drainage inlet, flared end section, inlet or outlet structure) attached to the end of the culvert.

Downdrains shall be referenced to the nearest control line station. Station references shall match those shown on the drainage plan sheet and drainage profile sheet.

The drainage system number and unit designation must correspond with drainage plan sheets, drainage profile sheets, and drainage detail sheets.

Column Headings and Content of Columns

Station, drainage system number, drainage unit designation, and drainage plan sheet number shall be the column headings on the right side of the table. Where sufficient space is available on the sheet, the drainage system number, drainage unit designation, and drainage plan sheet number may be duplicated on left side of the table for easier cross reference. See the drainage quantities sheet examples.

A description column shall be provided on the drainage quantities table showing name, size, type, or classification of all units of each drainage system. The description column shall be on the right side of the table preceding the column headings for station, drainage system number, drainage unit designation, and drainage plan sheet number. Units of each drainage system, which require separate calculations for pay quantities, such as a headwall or a drainage inlet, shall be listed on their own individual row. Culvert appurtenances such as elbows, which are measured and paid for by the linear foot for the size and type of pipe involved, may be listed on the same row as the culvert. At least one row of space shall be provided between each listing of drainage systems in the table.

Individual columns shall be provided on the drainage quantities table for all drainage facilities that are bid items. Items of like or related nature should be grouped together to facilitate checking and for ready reference.

The column headings for bid items shall read the same as the description for the bid item shown in the Engineer's Estimate. The column headings for the drainage quantities table shall be the same on all sheets of the summary to facilitate checking item totals.

Individual columns shall be provided for the various existing drainage facilities, which are to be removed, abandoned, salvaged reset, remodeled, adjusted, modified, or reconstructed. Remodeling, adjusting, or modifying existing concrete drainage inlets may be paid for by the cubic yard of minor concrete necessary to perform the work involved or may be paid for by the unit (each).

Pipe Culverts

Individual columns are to be provided for items, such as flared end sections, pipe downdrains, downdrain slip joints, downdrain anchors, entrance tapers, rock slope protection, and concrete used for slope protection, gutter lining, ditch lining, and channel lining. The Standard Specifications allows the option of either minor concrete or shotcrete to be used for slope protection, gutter lining, ditch lining, and channel lining.

Drainage work that is included in another bid item and not paid for separately, but shown in a column, should be indicated with the symbol "(N)" in the column heading and by adding the following note to the sheet:

(N) - NOT A SEPARATE BID ITEM.

Certain bid items such as "minor concrete (minor structure)" and "miscellaneous iron and steel" are usually designated as final pay quantities. Final pay quantities are only to be designated in the Engineer's Estimate using the symbol "(F)." Do not use final pay designation on the plans.

Individual columns shall be provided in the table for each size and type of pipe culvert.

Circular reinforced concrete pipe shall be shown by size only, where the method of excavation and backfill shown on the Standard Plans apply. In such cases, the contractor will select the class of circular reinforced concrete pipe. Where circular reinforced concrete pipe is to be installed by other methods, the size and class of the circular reinforced concrete pipe shall be shown in the column headings. Oval shaped reinforced concrete pipe and reinforced concrete pipe arch shall be shown by size and class.

Corrugated metal pipe culvert (steel or aluminum) shall be shown by size of pipe and wall thickness. Corrugation type (annular and/or helical) should be shown. The maximum height of cover (overfill height) for a metal pipe culvert is directly tied to its wall thickness, corrugation profile and type of corrugation. Where metal pipes require bituminous coating, lining, or invert paving, show them as such in the column heading for the pipe culverts involved.

The length of pipe culvert for each individual drainage unit shown on the drainage quantities sheet shall be the same estimated slope length (decimal feet expressed to the nearest tenth of a foot) of the pipe shown on the drainage profiles.

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Where two or more pipe materials meet the physical standards and hydraulic requirements for a culvert, the culvert shall be identified as alternative pipe culvert. A table of allowable pipe materials for alternative pipe culvert, designating the type of material, size, class (when applicable), thickness, and protection shall be shown on the first sheet of the drainage details or drainage quantities. Refer to Topic 857 of the Highway Design Manual.

An individual column shall be provided in the table and identified as "Maximum Cover." The entries in this column indicate the maximum cover over each length of circular reinforced concrete pipe culvert (or alternative pipe culvert where circular reinforced concrete pipe is an allowable alternative). Cover is defined as the maximum vertical distance from the top of pipe to finished grade. The maximum height of cover shall be shown to the nearest tenth of a foot, since the class of reinforced concrete pipe to be installed depends on the method of excavation and backfill, and the limits of cover as set forth in the Standard Plans.

An individual column shall be shown in the table for pipe culvert joint classification (standard, positive, or down drain). Where situations dictate watertightness for joints other than the down drain type, a note should be added to the table in the description column indicating which joints are to be made watertight.

Structure excavation, structure backfill, and culvert beddings required for installation of culverts shall not be shown on the drainage quantities table. These items are not paid for separately. They are included in the contract price paid per linear foot for the culvert involved.

Where concrete backfill is used to install a culvert, the concrete backfill is to be paid for separately and such quantity of concrete backfill shall be shown in the drainage quantities table.

Structure excavation, structure backfill, and pervious backfill required for construction of culvert headwalls, endwalls, and wingwalls shall not be shown on the drainage quantities table. These items are not paid for separately. The items of structure excavation, structure backfill and pervious backfill are included in the contract price paid per cubic yard for the concrete to construct such facilities.

Headwalls and endwalls, as shown on Standard Plan D89A and D89B are, in most instances, paid for by the cubic yard as structural concrete. The quantities for these headwalls and endwalls shall be listed under the column heading of "Structural Concrete" or "Structural Concrete, Headwall" and should be shown to the nearest hundredth of a cubic yard.

Headwalls, endwalls, and warped wingwalls for pipe culverts 60 inches and greater in diameter are paid for by the cubic yard of structural concrete or structural concrete, headwall and by the pound for bar reinforcing steel required for construction of such facilities. Quantities of concrete should be shown to the nearest tenth of a cubic yard.

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Concrete Drainage Inlets, Pipe Inlets and Risers

Pipe inlets and pipe risers shall be shown under individual columns for the size, type, and thickness (where applicable). The dimension shown in the entries for the individual pay lengths is the 'H' dimension expressed to the nearest tenth of a foot. Typically, concrete bases for pipe inlets and pipe risers are paid for separately as minor concrete (minor structure). The quantities for the concrete bases shall be listed under the column heading of "Minor Concrete (Minor Structure)" and quantities should be shown to the nearest hundredth of a cubic yard.

An individual column shall be provided in the table as "Height of Inlet." This is the 'H' dimension of drainage inlets as depicted on the Standard Plans for drainage inlets. The dimension to be included in the "Height of Inlet" column shall be the calculated height rounded to the nearest tenth of a foot increment. The "Height of Inlet" column is needed for both construction and removal of drainage inlets.

Minor structures, such as concrete drainage inlets are, in most instances, paid for by the cubic yard as structural concrete. The quantities for the concrete drainage inlets shall be listed under the column heading of "Structural Concrete, Drainage Inlet" and quantities should be shown to the nearest hundredth of a cubic yard.

Frames, grates, and covers for drainage inlets (both concrete and pipe inlets) are normally paid for by the pound as miscellaneous iron and steel. A separate column should be used for the item of miscellaneous iron and steel. The type of grate may be shown in a separate column or may be referred to in the description column.

Reinforced Concrete Box and Arch Culverts

Cast-in-place reinforced concrete box culverts and reinforced concrete arch culverts and associated headwalls, wingwalls, endwalls, and warped wingwalls are paid for by the cubic yard of structural concrete and by the pound for bar reinforcing steel required for construction of such facilities. Quantities shall be shown in the columns for structural concrete and bar reinforcing steel. Quantities of concrete should be shown to the nearest tenth of a cubic yard.

When conditions require isolation of quantities for construction of specific structures, the column headings and items of work may be more specialized. Example: the item of structural concrete, box culvert could be used for the quantity of concrete to construct box culverts instead of grouping that quantity with the general item of structural concrete

Precast reinforced concrete box culverts are paid for by length (linear foot).

Drainage Quantity Totals

Where all of the drainage quantities can be shown in a table on one quantity sheet, quantity totals for each bid item column shall appear at the bottom of the table.

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Where more than one sheet is necessary to show drainage quantities, the totals for each bid item shall appear at the bottom of the table on each individual sheet. The totals for the bid items shall be identified as "SHEET TOTALS." Sheet totals for each bid item shall appear on the last sheet of the drainage summary of quantities. Sheet totals shall be totaled and shown as "GRAND TOTAL" or "TOTAL."

Where there is not sufficient space on a single border sheet to accommodate the number of columns necessary to list all of the project's drainage items, two sheets may be used to display the listing of items. If this occurs:

- Items of like or related nature should be grouped together to facilitate checking and for ready reference.
- The first grouping of drainage items (by columns) shall be shown on the first sheet of the drainage quantities, "DQ-1" and shall be repeated on the odd numbered ID code sheets (DQ-3, DQ-5, etc.).
- The remaining group of drainage items (by columns) shall be shown on the second sheet of the drainage quantities, "DQ-2" and shall be repeated on the even numbered ID code sheets (DQ-4, DQ-6, etc.).
- The reference information entered within the columns labeled "station," "drainage system number," "drainage unit designation," and "drainage plan sheet number" which is shown on the first sheet of the drainage quantities, "DQ-1" shall be repeated on sheet DQ-2 to provide continuity. The reference information entered within these columns on sheet DQ-3 will match that shown on DQ-4. The remaining sheets will follow this same sequence.

- This explanatory note should be added to the first sheet of the drainage quantities: "Sufficient space was not available to list all drainage items within a single table on a sheet border, therefore the listing of the first grouping of drainage items are repeated on the odd numbered ID code sheets (DQ-1, DQ-3, etc.) and the listing of the remaining group of drainage items are repeated on the even numbered ID code sheets (DQ-2, DQ-4, etc.)."

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CHECKLIST FOR DRAINAGE PLAN SHEETS (Page 1 of 2)

- District, county and route TX=7.0, FT=3, WT=1, LV= border_PROJ-ID-BLOCK-anno (10)* (upper right corner of sheet)
- Post Miles TX=7.0, FT=3, WT=1, LV= border_PROJ-ID-BLOCK-anno (10)* (upper right corner of sheet)
- UNIT, PROJECT NUMBER & PHASE (lower right corner of sheet) TX=7.0, FT=3, WT=1, LV= border_SHEET (10)*
- Signature only included on Level border_SIGNATURE (63). Date of signature and current registration seal information included on Level 10, (lower right corner of sheet). Drafting reviewers will attach signatures when project goes to PS&E. Text height should be 7, but the width can be squeezed to fit the area using element selection. If both names are long, the first name can be above the last name. FT=3, WT=1
- Standard north arrow (AC = NARR)
- Scale horizontal (TX=8.75, FT=3, WT=2, LV=border_INSIDE-BORDER-anno (10)*.
- Information inserted in plan sheet development name block spaces in left margin of sheet. See Figures 2-10 and 2-11 in Section 2-1.6 of this manual for additional instructions.
- The following note shall be shown on each drainage plan sheet that shows right of way and easement lines: "For complete right of way and accurate access data, see right of way record maps at district office." In the case of a conventional highway, omit the words "and accurate access." Include this note on any other plan view sheet that shows right of way lines.
- Temporary construction easement (TCE) lines shown for drainage work if TCE required
- First sheet of drainage plan sheets contains notes, legends, symbols, and a list of abbreviations (do not include standard plan abbreviations as part of the listed abbreviations)
- Drainage work separated into groupings of interconnected drainage items
- Drainage system numbers and drainage units identified by symbol and coding as provided under "Drainage Plans" of this section of the manual
- Type of work on existing facilities indicated (Remove, Abandon, Adjust, etc.). Words such as "Construct, "Place," etc. not used for new construction.

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CHECKLIST FOR DRAINAGE PLAN SHEETS (Page 2 of 2)

- Alignment lines used for referencing of drainage facilities shown
- The station reference for each drainage system shown (the point at which the culvert crosses or intersects the roadway station line or profile grade)
- Where a culvert does not cross or intersect the roadway station line or profile grade, the culvert is referenced to the nearest roadway station line by station pluses and station offset distances.
- Direction of flow identified for ditches, channels, etc.
- Waterways (stream, creek, river, etc.) and direction of flow shown
- Subsurface drain locations, including types of outlets, vents and cleanouts shown, if subsurface drains not shown on project layouts. If sufficient space is not available on drainage plans, subsurface drains may be shown on separate subsurface drain plans.

*Level names are shown followed by the old level number in parenthesis.

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CHECKLIST FOR DRAINAGE PROFILE SHEETS (Page 1 of 2)

- District, county and route TX=7.0, FT=3, WT=1, LV=border_PROJ-ID-BLOCK-anno (10)* (upper right corner of sheet)
 - Post Miles TX=7.0, FT=3, WT=1, LV=border_PROJ-ID-BLOCK-anno (10)* (upper right corner of sheet)
 - UNIT, PROJECT NUMBER & PHASE. (lower right corner of sheet) TX=7.0, FT=3, WT=1, LV=border_SHEET (10)*
 - Signature only included on Level border_SIGNATURE (63)*. Date of signature and current registration seal information included on Level 10, (lower right corner of sheet). Drafting reviewers will attach signatures when project goes to PS&E. Text height should be 7, but the width can be squeezed to fit the area using element selection. If both names are long, the first name can be above the last name. FT=3, WT=1
 - Information inserted in plan sheet development name block spaces in left margin of sheet. See Figures 2-10 and 2-11 in Section 2-1.6 of this manual for additional instructions.
 - Scale – vertical and horizontal
 - Drainage System No. shown with station reference of system
 - Drainage unit designations shown for each item of the system (headwalls, wingwalls, drainage inlets, flared end sections, inlet and outlet structures)
 - Location of each item of each system identified by station and offset distances from station
 - Profile line of drainage facility with percent or decimal grade shown
 - Inlet and outlet elevations of drainage facilities
 - Existing groundline profile (dashed line) and finished grade (solid line) shown and labeled
 - Datum elevations at both edges of sheet (on top of the horizontal grid line)
- Pipe Culverts*
- Corrugated metal pipe culvert (steel or aluminum) and circular reinforced concrete pipe shown by diameter and length
 - Oval shaped reinforced concrete pipe and reinforced concrete pipe arch shown by span, height and length
 - Alternative pipe culvert shown by diameter and length
 - Inlet and outlet elevations of pipe culvert shown
 - Inlet and outlet facility, if any, attached to ends of pipe culvert shown (flared end section, headwall, endwall, drainage inlet, etc.)

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CHECKLIST FOR DRAINAGE PROFILE SHEETS (Page 2 of 2)

Concrete Drainage Inlets, Pipe Inlets and Risers

- Pipe inlets shown by size, type and length (pay length equals "H" dimension expressed to tenth of a foot), concrete bases for pipe inlets shown
- Pipe inlet with grate – Type of grate, inlet elevation of top of grate and outlet elevation of inlet shown
- Pipe inlet with side opening(s) and cover on top of inlet – Type of cover, inlet elevation of side opening(s) and outlet elevation of inlet shown
- Concrete drainage inlets shown by type (G1, GO, SO, OL-7, GT1, etc.) and "H" dimension expressed to tenth of a foot
- Concrete drainage inlets with grate – Type of grate, inlet elevation of top of grate and outlet elevation of inlet shown
- Concrete drainage inlets with side opening(s) and cover on top of inlet – Type of cover, inlet elevation of side opening(s) and outlet elevation of inlet shown
- Pipe risers shown by size, type and length (pay length equals "H" dimension expressed to tenth of a foot)

Box Culverts

- Reinforced concrete box culvert shown by span, height, and length. Number of cells shown: single, double, etc.

- Inlet and outlet elevations of box culvert shown
- Type of wingwalls for each end of box culvert shown ("A," "B," "C," "D," "E," warped)
- Wingwall "H" dimensions shown
- Elevation "a" shown for warped wingwalls

Ditches and Channels

- Profile line of facility with percent or decimal grade shown, if profile not shown on roadway profile sheets
- Typical cross section of facility shown, if not shown on roadway profile sheets or drainage details. Where facility is lined, show type of lining, thickness of lining, and details of construction joints, cut-off stubs and end return.
- Inlet and outlet facility, if any, shown and dimensioned

Slope Protection

- Type, length, and arrangement of slope protection shown
- Typical cross section of facility shown, if not shown on roadway profile sheets or drainage details. Where facility is lined, show type of lining, thickness of lining, and details of construction joints, cut-off stubs and end return. Where rock slope protection (RSP) is used, show RSP fabric, thickness of rock layers, and classification of rock layers.

*Level names are shown followed by the old level number in parenthesis.

2-2.11 Subsurface Drains

General

The various categories of subsurface drainage are discussed in Chapter 840 of the Highway Design Manual (HDM). This Section 2-2.11 covers edge drains, underdrains, and horizontal drains, which are the more commonly used subsurface drains. The terminology, "edge drains," as used in this section includes associated structural section drain facilities as is discussed on page 840-2 of the HDM. Subsurface drains should be shown on the project plan layouts. If sufficient space does not allow this type of work to be shown on the project plan layouts, it may be shown on the drainage plan sheets. Where subsurface drainage systems are large and complex, they may require separate sheets of plans. If edge drains are to be installed, they shall also be shown on the project's typical cross sections. If underdrains are to be installed to drain the pavement structure, they shall also be shown on the project's typical cross sections.

Edge Drain Plans

Where separate sheets are used to show installation of edge drains, the base mapping for the project is typically used as the background for these plans. The background information is shown as existing (dropped out) and new drainage work is shown as solid lines. These plans provide a visual representation, in plan view, of placement of edge drain facilities. These plans do not repeat the roadwork items shown on the project plan layouts

Identify size of drains and the types of drain outlets, vents, and cleanouts. Identify location of items by plus station and station offset distance.

Edge drain outlets and vents should connect to drainage facilities, such as drainage inlets, drainage pipes, and overside drains, whenever possible. If such features are not available, the Standard Plans show various methods to handle edge drain outlets, vents, and cleanouts. The type of edge drain outlets, vents, and cleanouts used shall be labeled in the same manner as shown in the Standard Plans.

The first sheet of the edge drain plans should contain notes, legends, symbols, and a list of abbreviations. Do not include standard plan abbreviations or acronyms as part of the listed abbreviations.

Each sheet of the edge drain plans shall have the following note included on it: "APPROVED FOR EDGE DRAIN WORK ONLY."

If no edge drain work is to be performed within the corresponding limits of a project plan layout sheet (road work items), do not include a edge drain plan sheet for that area. The number of project plan layout sheet may not be the same as the number of edge drain plan sheets.

Edge Drain Profiles

Typically, profiles of edge drains will not be required, because the profile grade of the drains match the profile grade of the pavement structure they are installed within.

Edge Drain Details

These details, typically will not be required in the project plan set, because the standard plans show installation details, including various methods to handle edge drain outlets, vents, and cleanouts.

In some instances, inclusion of drain details in the project plan set may be necessary to fit site conditions. These details would be those for which there are no standard plans or when a standard plan detail is modified.

Drawings on the edge drain detail sheets are not drawn to a specific scale. Drawings are drawn at a one to one proportion, but then enlarged to fit the border sheet. Each sheet is to be labeled "No Scale." Sufficient dimensioning shall be shown on the detail so that the facilities are buildable and the quantities are calculable.

Edge Drain Quantities

Items should be summarized on a separate quantity list and shall not be included within the summary of drainage quantities. The quantity list should be included as part of the project's summary of quantities sheets.

This quantity list should contain a summary of the edge drains, drain outlets, vents, and cleanouts to be installed. Identify sizes of drains and the types of drain outlets, vents, and cleanouts. Identify location of these

items by plus station and station offset distance.

The column headings for bid items shall read the same as the description for the bid item shown in the Engineer's Estimate.

Where all of the edge drain quantities can be shown in a table on one quantity sheet, quantity totals for each bid item column shall appear at the bottom of the table. Where more than one sheet is necessary to show the edge drain quantities, the totals for each bid item shall appear at the bottom of the table on each individual sheet. The totals for the bid items shall be identified as "SHEET TOTALS." Sheet totals for each bid item shall appear on the last sheet of the edge drain summary of quantities. Sheet totals shall be totaled and shown as "GRAND TOTAL" or "TOTAL."

Underdrain and Horizontal Drain Plans

These plans provide a visual representation, in plan view, of placement of underdrain and horizontal drain drainage facilities. When separate sheets are used to show installation of underdrains or horizontal drains, the base mapping for the project is typically used as the background for these plans. The background information should be shown as existing (dropped out). The underdrain work should be shown as solid lines. The portion of the new horizontal drain pipe embedded in the hillside should be shown as a dashed line. The portion of new horizontal drain pipe projecting from the face of the slope should be shown as a solid line.

Where horizontal drains are laid out in a grid pattern on a large slope, it may be helpful to develop an isometric view in addition to the standard plan view or profile.

The size, length, grade, and type of pipe involved shall be shown on the plan sheets. Show depth and spacing of drains. Show locations of outlets and cleanouts (risers). Identify location of items by plus station and station offset distance.

Underdrain outlets typically discharge into a storm drain or culvert. The type of riser used for underdrains shall be labeled in the same manner as shown in the standard plans.

Horizontal drains typically require a collector system to remove intercepted water from the site.

The first sheet of horizontal drain or underdrain plans should contain notes, legends, symbols, and a list of abbreviations. Do not include standard plan abbreviations or acronyms as part of the listed abbreviations.

Each sheet of the underdrain plans and horizontal drain plans shall have the applicable following note included on their respective sheets: "APPROVED FOR UNDERDRAIN WORK ONLY" or "APPROVED FOR HORIZONTAL DRAIN WORK ONLY." Where both types of drains are shown on the same plan sheets, the note should read: "APPROVED FOR UNDERDRAIN AND HORIZONTAL DRAIN WORK ONLY."

If no horizontal drain or underdrain work is to be performed within the corresponding limits of a project plan layout sheet (road work items), do not include a horizontal drain or underdrain plan sheet for that area. The number of project plan layout sheets typically are not the same as the number of horizontal drain or underdrain plan sheets.

Underdrain and Horizontal Drain Details

Underdrain typical details are shown in the standard plans. No standard plan details are available for horizontal drains. Horizontal drain details, including the collector system to remove intercepted water, are to be shown on the detail sheets.

Drawings on these detail sheets are not drawn to a specific scale. Drawings are drawn at a one to one proportion, but then enlarged to fit the border sheet. Each sheet is to be labeled "No Scale." Sufficient dimensioning shall be shown on the details so that the facilities are buildable and the quantities are calculable.

Horizontal Drain and Pipe Underdrain Quantities

Items should be summarized on a separate quantity table and shall not be included within the summary of drainage quantities. The quantity list should be included as part of the project's summary of quantities sheets.

The quantity list shall show the materials to be used with their locations identified by area and stationing. Station location references shall match those shown on the plan sheet. If the project uses only post miles to identify limits of work and construction, then the locations of horizontal drain or underdrain work should also be identified by post mile.

The column headings for bid items shall read the same as the description for the bid item shown in the Engineer's Estimate.

Where all of the underdrain or horizontal drain quantities can be shown in a table on one quantity sheet, quantity totals for each bid item column shall appear at the bottom of the table. Where more than one sheet is necessary to show the underdrain or horizontal drain quantities, the totals for each bid item shall appear at the bottom of the table on each individual sheet. The totals for the bid items shall be identified as "SHEET TOTALS." Sheet totals for each bid item shall appear on the last sheet of the underdrain or horizontal drain summary of quantities. Sheet totals shall be totaled and shown as "GRAND TOTAL" or "TOTAL."

2-2.12 Sanitary Sewer Plans, Profiles, Details, and Quantities

General

Where extensive or complex sanitary sewer work is to be performed as contract work and there is not sufficient space to allow the sanitary sewer work to be shown on the project plan layouts, separate sanitary sewer plans, profiles, details, and quantity sheets should be used. Sanitary sewer work is typically performed by a subcontractor, therefore the work shown on these plans, profiles, details, and quantity sheets should only be related to sanitary sewer work.

Sanitary Sewer Plans

Sanitary sewer plans should be prepared the same way drainage plans are prepared (see Section 2-2.10 of this manual).

The base mapping for the project is typically used as the background (dropped out) for these plans. Existing and new sanitary sewer facilities shall be shown using the Caltrans line styles shown Standard Plan A10C. See Section 2.4 of the CADD Users Manual for further details. If work is to be performed on existing facilities, indicate what work is to be performed, such as "Remove," "Relocate," or "Abandon". The proposed sanitary sewer work shall be shown as solid lines. The words "Construct," "Place," etc., for new construction should not be used.

Clearly define sanitary sewer work as that to be done by the project contractor and that to be done by others.

The first sheet of the sanitary sewer plans should contain notes, legends, symbols, and a list of abbreviations. Do not include standard plan abbreviations or acronyms as part of the listed abbreviations. The legend should also define the owner of the sanitary sewer.

Each sheet of the sanitary sewer plans shall have the following note included on them: "APPROVED FOR SANITARY SEWER WORK ONLY."

Sanitary Sewer Profiles

Where new sanitary sewer lines are to be constructed as contract items, profiles along such lines shall be included in the plans.

Sanitary sewer profiles should be prepared the same way drainage profiles are prepared (see Section 2-2.10 of this manual).

Sanitary Sewer Details

Drawings on the sanitary sewer detail sheets are not drawn to a specific scale. Drawings are drawn at a one to one proportion, but then enlarged to fit the border sheet. Each sheet is to be labeled "No Scale." Sufficient dimensioning shall be shown on the details so that the facilities are buildable and the quantities are calculable.

Standard drawings of other agencies, when applicable to the project, shall be included on the detail sheets. Referencing to a standard drawing number from another agency is not acceptable.

Do not add sanitary sewer details or the sanitary sewer quantity list to the sanitary sewer plan (layout) sheet where such addition would produce sheets that are cluttered, unreadable, or confusing.

Sanitary Sewer Quantities

The summary of sanitary sewer quantities should be prepared the same way the summary of drainage quantities are prepared (see Section 2-2.10 of this manual).

2-2.13 Utility Facilities

Utility Policy

All projects must conform to Caltrans' Encroachments and Utilities Policy in Chapter 17 of the Project Development Procedures Manual (PDPM). Encroachments and Utilities Policy exceptions must be approved through the exception process. The Chief, Headquarters Division of Design has approval authority for exceptions and has delegated this authority to the Chief, Office of Project Support. In some instances, exception approval has been delegated to the district (see Design Delegation Agreements). A copy of the exception approval must be included with the PS&E submittal to Office Engineer.

All projects on the state highway system (regardless of funding) must have a completed “Utility Policy Certification” whether high priority subsurface facilities exist within the project limits or not. This certification is to be completed even if there are no utilities within the project limits. See PDPM Chapter 17, Section 2, Article 6 “Certify Policy Compliance” for a sample copy of the “Utility Policy Certification.”

Responsibility of Utility Information

The project engineer or the utility engineering workgroup (UEW) is to provide the Caltrans district utility coordinator with a utility matrix for facilities within the project limits. Decisions to relocate or protect utilities must be made by the project engineer or UEW after consultation with the project development team (PDT) and the utility owner.

The utility matrix is used to organize utility information for individual projects. For projects on the state highway system (SHS), whether state or locally funded, a utility matrix is required. Once completed, a copy of the utility matrix must be given to the district UEW (as applicable) and the Caltrans district utility coordinator. Projects that did not require a utility investigation (exempt or work of a flexible nature) do not need to complete a utility matrix.

It is the responsibility of the project engineer or UEW to provide the Caltrans district utility coordinator with preliminary utility plans, when utility verification by owners are necessary for facilities that fall within the project limits. The utility verification process is used to determine the most up-to-date location, and for identifying potential utility conflicts. The district utility coordinator will provide the project engineer and UEW with any corrections or additions to the preliminary utility plans after it has been reviewed by the utility companies. This updated information shall be included in the final advertised contract plans.

All existing utility facilities (subsurface, aboveground or aerial) and new/planned utility installations/relocations must be shown on the project plans to notify the contractor to possible utility conflicts with project work. Utility sheets are recommended to be developed for each project. Depending of the size and type of project, utilities may be included on the layout sheets. For those projects that consist of landscape or electrical systems work only, separate utility sheets are recommended to be part of the contract plans. If the decision is made to show the utilities on the landscape or electrical systems plan sheets only (no utility sheets or roadway layouts), then a civil engineer must sign the landscape or electrical

systems plan sheets showing the utilities. Responsibility for investigating and showing the utility information is under the purview of a civil engineer and the signature on the plan sheet establishes that responsibility.

If any existing or new/planned subsurface facility is in potential conflict with any structures work (e.g. bridge footing, retaining wall, etc.) the subsurface facility should be shown on the structures plans in addition to the roadway utility plans. This will help notify the contractor/subcontractor of a potential conflict.

Subsurface facilities

Subsurface facilities (public, private, state-owned or cooperatively owned underground utilities) that are within the project limits must be shown. The lack of accuracy of the underground utility location is not to hinder disclosure of the presence of underground facilities in the area. The location of these facilities are to be shown in the advertised contract plans to the best quality of information available.

High priority subsurface installations (formerly referred to as “High Risk subsurface facilities”) are defined in PDPM Chapter 17 “Encroachment and Utilities.” Inclusion of positive location information in the project plans is mandated for high priority subsurface facilities. Inclusion of approximate location information is mandated for all other utilities.

The preferred method of positive location to specifically identify and accurately determine the horizontal and vertical location of a utility is by excavating a test hole (pothole) to expose the utility. For definitions of quality level information see ASCE Standard CI/ASCE 38-02. A table identifying the values determined by positive location is required to be shown on the utility plans (see “Utility Plan Examples” in this section).

Reference points presented for positive location of horizontal and vertical locations, on the utility plan view sheets, must correlate with state survey control for the project.

Only if a project is granted an exception to the Caltrans utility policy can a note be placed on the utility plans stating that some or all of the utilities are not shown within the project limits of the advertised contract plans.

For various examples of stating the utility note, see the PPM example “Project Utility Sheets.”

The following note is to be placed on the utility plans for projects that are exempt from the Caltrans utility policy “EXEMPT PROJECT WITH LIMITED EXCAVATION, UTILITIES ARE NOT SHOWN.” For a list of exempt type projects, see PDPM Chapter 17 “Encroachments and Utilities.”

For those projects that have locations where some of the work is flexible in nature (e.g. placement of sign posts, guardrail posts, irrigation lines, etc.), showing existing utilities can assist the contractor and R.E. in knowing which utility owners are within the construction limits. After the utility mark out during construction, the contractor and the R.E. will determine if an item of work needs to be placed away from existing utility facilities. For projects that have one or more items of work that is flexible in nature, see the PPM example “Project Utility Sheets” for the wording of the utility note.

For construction activities, the phrase “Protect in Place” is not to be placed on the utility plan sheets. Protecting existing utilities is covered in Section 5-1.36 of the Standard Specifications and as such, does not need to be restated on the utility plans.

Composition of Plans

There is a distinct line style to depict each utility type (electrical, water, gas, etc.) and status (new, existing and abandoned). These line styles are in the Caltrans line style resource file “ctlstyle-ss3.rsc.” These utility line styles are shown in Appendix A4 of the CADD Users Manual. Utilities shown on the utility plan sheets are NOT to be dropped out.

When a conflict occurs between an existing utility facility and the planned project work, utility owners will usually relocate their facilities prior to the beginning of construction activities. If it is certain that the facility will be relocated prior to the award of the contract, then show just the final location of the relocated facility on the utility plans.

If there is a possibility that the utility facility won’t be relocated until after the beginning of construction activities, then show both the existing location and the new/planned location. Use “to and from” leader lines and arrows as shown on Standard Plan A10C.

Utility Plans

The background for utility plans is the base map. The base map consists of two (2) separate files:

- Master Topographic file
- Master Design file

The Master Topographic file (“**bb**” file) is developed and maintained by the Surveys and Photogrammetry units in the district. The “**bb**” file includes existing features that are always dropped out on the utility plans.

The Master Design file (“**aa**” file) is developed and maintained by the roadway design unit in the district. The “**aa**” file contains the new permanent design features that are shown solid. The right of way and alignment may be new or existing, but they are shown solid on the utility plans.

Master files may contain a lot of information, but only the necessary information needed for the utility plans, should be merged into any specific contract plan sheet (active file). Utility plan view sheets must maintain the state plane coordinates from the master files. The roadbed is always shown. Refer to Section 3.8 “Master Files” of the CADD Users Manual for further information.

Existing, new/planned or relocated utilities must to be clearly and accurately depicted (including owner, type, size, pressure or voltage, etc.) on the advertised utility plans. The utility line styles with the Caltrans symbology are not to be dropped out.

The first sheet of the utility plans is to contain the legend consisting of notes, symbols and non-standard abbreviations. Do not include standard plan abbreviations, acronyms or symbology as part of the legend. The owners of the utilities must be identified by labeling

each utility line. The full name of owner and the associated acronym identifying each owner is to be shown in the legend. This owner acronym can then be used to label on the remaining utility plan sheets.

As a convenience and reminder to the contractor/subcontractor, utility facilities may also be shown on other plan sheets (e.g. drainage, landscape and electrical systems, etc.) when they may be in potential conflict with project work. When utility facilities are shown a second (2nd) time within the project plans (in addition to them being shown on the utility plan sheets) they may, depending on how cluttered the plan sheet is, reduce the line weight to de-emphasize the utility line in comparison to project work.

When a high priority subsurface facility is shown on a specific plan sheet, a “Positive Location Information” table must be shown on the associated utility plan sheet. The values in the table reflect the exact location of each positive location. The information includes the positive location number, stationing and offset, depth of cover, horizontal position and elevation and method of positive location. The method of positive location is listed as “TEST HOLE” or “ELECTRONIC DETECTION.” Listing the method notifies the contractor of the ASCE Standard CI/ASCE 38-02 utility quality levels. When showing the horizontal position and elevation, the appropriate datum of the California Coordinate System and applicable Zone Number must be identified.

The exact location of a test hole (formally called pothole) is marked on the plans by the Caltrans symbol for potholing (circle with an X). The label (symbol) identifying the positive location number (pentagon) is to be placed with the appropriate number. Do not duplicate positive location numbers. The test

hole symbol and the symbol for labeling the positive location number is shown in the standard plans and is in the Caltrans cell library (ctcellib.cel).

Where utility plans are included in the project plan set, the following statement shall be included at the bottom center of each utility plan view sheet: *“THIS PLAN TO BE USED FOR UTILITY INFORMATION ONLY.”*

Utility Work as Part of the Project Work

For the majority of projects, the utility plans show only the existing utility conditions. But some projects will also need to show new/planned installations or relocated facilities. The owners usually relocate their own facilities prior to the beginning of construction activities.

But utility plans that show work to be done by the project contractor are to be prepared the same way drainage plans are prepared, except for the use of system numbers and item designations. See Section 2-2.10 of this manual.

Sheets showing profiles, details and quantities may be required in addition to the plan sheets. Utility work is typically performed by a subcontractor, therefore the work shown on these profiles, details, and quantity sheets should be the new/planned installation or relocation of utilities only. Clearly define the utility work to be performed by the project contractor.

Indicate what work is to be performed, such as "Remove," "Relocate," or "Abandon." The words "Construct," "Place," etc., should not be used to describe the installation of a new utility facility as they do not convey additional information to the bidder or contractor. The appropriate bid item is to be used to describe the installation of any new/planned work or the relocation of a facility.

Utility Profiles and Cross Sections

Where new/planned or relocated utility facilities are to be installed as an item of work, profiles along such lines may be needed. If needed, profiles may be shown on the bottom grid portion of a combination plan and profile sheet or on a separate profile sheet. Utility profiles, details and/or quantities may be shown on the profile sheet if it can be clearly shown. Utility profiles should be prepared the same way drainage profiles are prepared, except for the use of system numbers and item designations. See Section 2-2.10 of this manual.

Partial cross sections showing the location of an existing utility with respect to a new/planned construction feature (e.g. drainage pipe, bridge footing, etc.) should also be shown on the specific project plan, profile or detail sheet where the potential conflict may occur.

Utility Details

Details shown on the utility detail sheets are not drawn to a specific scale. They are to be drawn at a one to one proportion, but then enlarged to fit within a Caltrans standard border sheet. Each sheet is to be labeled "No Scale." Sufficient dimensioning shall be shown on the details so that the facilities are buildable and the quantities are calculable.

Standard drawings from other agencies, when applicable to the project, shall be included as part of the project plans set. Referring to a standard drawing number from another agency is not acceptable. Refer to Section 2-1.6 "Standard Drawings from Other Agencies" for further information.

Utility details may be shown on the utility plan or profile sheet if there is room.

Utility Quantities

The summary of utility quantities are to be prepared in a tabular format similar to the tables on the project summary of quantities. See Section 2-2.19 of this manual for further information. Utility quantities may be shown on the utility plan, profile or detail sheet if there is room.

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CHECKLIST FOR UTILITY PLAN SHEETS

- District, county and route
- Post Miles
- Unit and Project Number and Phase
- Signature and date of signature. Current license number, printed name, and license renewal date of a civil engineer. Signature is added as the last step before the project goes to PS&E
- Standard roadway north arrow
- Scale centered below sheet name
- Information on plan sheet development name blocks in left margin of border sheet. See Figures 2-10 and 2-11 in Section 2-1.6 of this manual for additional instructions
- Correct statement centered at bottom of sheet (“*THIS PLAN TO BE USED FOR UTILITY INFORMATION ONLY*”)
- The following statement must be shown on each plan sheet where determinate right of way is shown: "FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE"
- Standard abbreviations are to conform to those listed in the Standard Plans
- The first sheet of utility plans shall contain project specific notes, legends, symbols and nonstandard abbreviations that are not included in the Standard Plans
- Name and abbreviations for all utility owners, including state-owned facilities/utilities in the legend
- Public, private and state-owned utilities/facilities are shown on utility plan sheets. Utilities are not to be dropped out.
- Utility note only appears if the project is exempt as defined by the “utility policy” or the project has been granted an exception to the “utility policy”
- Utility relocation information shown, if any
- Correct utility line styles for utility type and status, see CADD Users Manual
- Utility feature points shown (manholes, pull boxes, cabinets, poles, etc.
- High priority subsurface facility positive location information called out and shown in tabular format, if any exist within limits of each utility sheet

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Chapter 2 – Project Plans

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2-2.14 Construction Area Signs

General

Sign Use

Construction area signs include all temporary signs required for the direction of public traffic through and around the work during project construction.

Construction area signs, shown on the construction area sign plans, are only those signs that identify the begin and end points of project work on the state highway involved and the signs placed on local streets which intersect or connect to the state highway within the project limits. See "Construction Area Sign Plans" within this section for further information.

Construction area signs, shown on the stage construction, traffic handling, and detour construction plans, are those temporary signs used for the direction of public traffic through and around the project limits during construction. See Section 2-2.16 for further information regarding stage construction plans, traffic handling plans and detour construction plans.

With the exception of temporary signs used for motorist information as described in Section 2-2.15, the locations of temporary construction signs should be within the project begin and end work limits as shown on the project title sheet.

Construction area signs also appear on the traffic control system standard plans ("T" series). These standard plans show lane closures or ramp closures, which are for short periods of time (usually installed and removed on a daily basis).

Payment for the temporary signs illustrated on the "T" series standard plans is not included in the lump sum bid item for construction area signs, but is included in the lump sum item for traffic control system.

Sign Identification and Details

Standardized temporary construction signs shall be identified on the project plans by their California or Federal sign designations and sign message. Nonstandard temporary construction signs should be identified as special signs.

The California Manual on Uniform Traffic Control Devices (CA MUTCD) contains uniform standards and specifications for all official traffic control devices, including construction work zones. Part 6 of the CA MUTCD deals exclusively with temporary traffic control and is available at this website:

<https://dot.ca.gov/programs/safety-programs/camutcd>

Sign designations with "(CA)" suffix indicate signs unique to California. You can find links to drawings for both California signs and Federal signs at this website:

<https://dot.ca.gov/programs/safety-programs/sign-specs>

Detailed drawings of standard temporary construction signs in the project plans are not required.

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A detailed drawing with the dimensions of the sign panel, color of the sign, sign message and message layout of the sign panel shall be included for each special (nonstandard) temporary construction sign used. See Section 2-2.18 for further information regarding details for special (nonstandard) signs.

Construction area signs designated as stationary mounted on the plans are installed on wood posts, or with the approval by the construction engineer, they may be installed on existing ground sign supports, existing lighting standards or other supports.

Construction area signs designated as portable on the plans are installed on portable bases, standards or frameworks.

If stationary mounted signs are to be used, the signs should be clearly designated as stationary mounted on the plan sheets. A separate table can be used to show information about the stationary mounted construction area signs with the header for the table reading “STATIONARY MOUNTED CONSTRUCTION AREA SIGNS”.

If portable signs are to be used, the signs should be clearly designated as portable on the plan sheets. A separate table can be used to show information about the portable construction area signs with the header for the table reading “PORTABLE CONSTRUCTION AREA SIGNS”.

Construction area signs are removed when no longer required for the direction of public traffic.

Construction area signs are contractor furnished.

Construction Area Sign Plans

The strip map from the project title sheet is typically used for the construction area sign plans. Only those existing topographic features essential for orientation purposes need to be identified on the construction area sign plans.

"Road Work Ahead" and "End Road Work" signs are shown on the construction area sign plans to alert motorist of construction activities within the project limits. The "Road Work Ahead (W20-1)" sign replaces the formerly used "Road Construction Ahead (C18)" and the "End Road Work (G20-2)" sign replaces the formerly used "End Construction (C13)" sign. These changes are a result of Caltrans adopting the California Manual on Uniform Traffic Control Devices.

Include this note on the construction area sign plan sheets: "APPROVED FOR CONSTRUCTION AREA SIGN WORK ONLY."

If stage construction plans, traffic handling plans, detour construction plans or motorist information plans are included in the project plan set, add a note to the construction area sign plans regarding additional construction area signs shown on the other plan sheets.

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The construction area signs shown on the construction area sign plans shall be summarized in tabular format with the following information:

- "Stationary Mounted" included in title of table, if all signs are stationary mounted.
- Sign letter (same sign identification as used to graphically show location of the sign on Construction Area Signs (CAS) sheet) within a symbol should be used when quantifying construction area signs on the CAS plan sheet.
- When CAS are shown on other plan sheets like Detour Plan, Stage Construction and Traffic Handling Plan etc., sign number (same sign identification as used to graphically show location of signs on those plan sheets) should be used when quantifying CAS on those plan sheets.
- When additional construction area signs are shown on Detour plans, Stage Construction and Traffic Handling plans etc., a note should be included on the CAS plan sheet to let the contractor and the construction personnel know that additional Construction Area Signs are shown on other sheets.
- Sign designation – Show the full sign designation for all signs. Include the "(CA)" suffix for "CALIFORNIA" only signs.
- Panel size.
- Sign message.
- Number and size of posts, if the sign is to be stationary mounted.

Include the following note below the summary of constructions area signs:

"EXACT SIGN LOCATIONS TO BE DETERMINED BY THE ENGINEER".

Variations of the above note as shown in the Examples "A-1", "B-1", "B-2", "B-3", B-4" and "65 CS-1" can be also used.

Construction area signs are paid for by lump sum, therefore the heading in the summary of construction area signs regarding the quantity of the signs shall be "No. of Signs" instead of the typical designation for the number of units "EA" or each.

Construction area signs shown on stage construction, traffic handling, and detour construction plans shall be summarized with their respective sheets in tabular format.

A cross reference note shall be added to the respective plans regarding additional construction area signs shown on other plan sheets.

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2-2.15 Motorist Information Plans, Details and Quantities

Motorist information plan sheets are to be included in the set of project plans when a determination is made that additional traffic advisory or informational signs are required outside of the project limits to help manage traffic flow during project construction. This determination is made by the district traffic manager on a project-by-project basis. Motorist information plan sheets were formerly named transportation management plan sheets. See Section 2-2.16 of this manual regarding traffic handling within the project limits.

The motorist information plan sheets should include, but not be limited to, advance closure signs, closure alert signs, and alternate route signing. The intent is reduce the volume of traffic passing through the project area. To achieve this goal, traffic is to be detoured around the project area by redirecting the motorist to alternate routes. Electronic message signs, portable changeable message signs, extinguishable signs, and stationary mounted signs are typically used to display motorist information.

The mapping like that used for the project title sheet is typically used for motorist information plan sheets. The mapping should extend beyond the work limits shown on the title sheet to graphically show locations of the motorist information signs. Only those existing topographic features essential for orientation purposes need to be identified on the motorist information plans.

The limits of work shown on the title sheet is properly limited to the essential work of construction itself and should not be

expanded to include additional contractor responsibilities such as placement of motorist information signs some distance from the project limits.

Add a note to the motorist information plan sheets regarding additional construction area signs shown on other plan sheets (stage construction plans, traffic handling plans, detour construction plans, construction area sign plans) when such plans are included in the project plan set.

Details

Standardized temporary construction signs shall be identified on the project plans by their California or Federal Sign designation and sign message. Nonstandard temporary construction signs should be identified as special signs.

The California Manual on Uniform Traffic Control Devices (CA MUTCD) contains uniform standards and specifications for all official traffic control devices, including construction work zones. Part 6 of the CA MUTCD deals exclusively with temporary traffic control and is available at this website:

http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/ca_mutcd.htm

Sign designations with "(CA)" suffix indicate signs unique to California. You can find links to drawings for both California signs and Federal signs at this website:

<http://www.dot.ca.gov/trafficops/tcd/specs.html>

Detailed drawings of standard signs in the project plans are not required for temporary construction signs. A detailed drawing with the size of the sign panel, sign message and message layout of the sign panel shall be included for each special (nonstandard) temporary construction sign used. See Section 2-2.18 for further information regarding details for special signs.

Quantities

Temporary signs shown on the motorist information plan sheets shall be summarized as described in Section 2-2.14.

The summary shall be included on motorist information plan sheets if sufficient space is available, otherwise motorist information quantity plan sheets shall be included to summarize these signs.

2-2.16 Stage Construction, Traffic Handling, and Detour Construction Plans, Details and Quantities

General

Stage construction and traffic handling plans shall be included in the set of project plans, if staging of the work or shifting and detouring of traffic, within the limits of the project, is needed and as permitted by the lane closure charts. Detour construction information shall be included in the set of project plans if detour construction is necessary for the staging of the work.

Stage construction, traffic handling and detour construction plans show the work area, sequence of operations, work to be performed (in relation to the shifting or detouring of traffic), materials to be used to construct detours, temporary widening, crossovers, etc. and the traveled way to be used for all movements of traffic during each construction sequence within the project limits.

Stage construction and traffic handling plans shall include, as applicable to the project, temporary drainage, temporary signing, temporary pavement delineation, temporary railing (Type K), temporary crash cushions and temporary lighting requirements. Modification of existing traffic signals or installation of temporary signals may be required for stage construction. This signal and lighting work may be shown on the electrical systems plan sheets provided a cross reference note is added to the stage construction or traffic handling plans stating that electrical system work is shown on the electrical systems plan sheets.

If utility installation or relocation work is to be performed by the project contractor, add a note to the stage construction plans in the stage sequence in which such work is to be performed. A typical note would read: "RELOCATE WATER LINE THIS STAGE, SEE UTILITY PLANS."

On extensive or complex projects, there may be too much information to clearly show both stage construction and traffic handling on the same plan sheets. When this occurs, separate plan sheets shall be prepared for stage construction and traffic handling, respectively.

If a temporary roadway detour is to be constructed and sufficient space does not allow the detour construction information to be shown on the stage construction and traffic handling plans, separate detour construction plans shall be prepared.

Construction Area Signs

Construction area signs, shown on the stage construction, traffic handling, and detour construction plans, are those temporary signs used for the direction of public traffic through the project limits during construction. Construction area signs used for stage construction, traffic handling, and detour construction shall be shown and summarized in the same manner as described in Section 2-2.14. A cross reference note shall be added to the respective plans regarding additional construction area signs shown on other plan sheets.

Stage Construction Plans

The stage construction plans should contain sufficient information to construct those roadways in the stage sequence shown. It is not necessary to show profiles, superelevation diagrams and typical cross sections on the stage construction plan sheets if they are clearly shown elsewhere in the project plans.

The base mapping for the project is typically used as the background for these plans.

The first sheet of the stage construction plans should contain notes, legends, symbols, and a list of abbreviations. Do not include standard plan abbreviations or acronyms as part of the listed abbreviations.

Each stage shown on the stage construction plan shall show the sequence of construction by symbols (crosshatching, hatching, etc.) The symbology used shall be defined and included in a legend. The symbols used shall show the following:

- Work to be performed in the stage shown (solid lines not dropped out),
- Traffic direction, number of lanes and lane widths available in the stage shown,
- Existing roadbeds and those roadbeds constructed in previous stage(s), shown as dropped out (example: Stage 1 construction should be shown as existing on plan sheets for Stage 2 work since the work from the prior stage or sequence will have been completed).

Existing roads or detours that have been replaced by permanent construction in previous stages shall not be shown on subsequent stages.

If temporary railing (Type K) is used, a typical section may be required to show the lateral location of temporary (Type K) in relation to the work area and the edges of traveled way.

If only stage construction work is shown on the plan sheet, then each sheet of these plans shall be titled "STAGE CONSTRUCTION PLAN." The sheet identification code would be "SC" and the note included on them shall read: "APPROVED FOR STAGE CONSTRUCTION WORK ONLY."

If both stage construction work and traffic handling work is combined on the same plan sheet, then each sheet name should reflect both types of work involved. The combined sheet name would be "STAGE CONSTRUCTION AND TRAFFIC HANDLING PLAN." The sheet identification code would be "SC" and the note included on them shall read: "APPROVED FOR STAGE CONSTRUCTION AND TRAFFIC HANDLING WORK ONLY."

The stage number and sequence, if any, should be placed under the main sheet name.

Stage Construction Details

The details shown on the stage construction detail sheet are unique to the specific project. These details may include typical cross sections, profiles, and superelevations for temporary roadway widening, temporary crossovers, etc. These details provide supplementary information that cannot be shown on the stage construction plan sheets because of the greater detailing required. An example of greater detailing would be the need for pavement elevations at transition areas. Details for temporary drainage features and other temporary construction features, as applicable to the project stage construction, should be shown on these detail sheets.

Stage Construction Quantities

Items of work to construct temporary widening, crossovers, etc. and items of work for their subsequent removal shall be included in the project summary of quantities sheets for similar items of work used for roadway construction and identified by the stage number in which such work is to be performed. Items for temporary drainage work should be included with the project summary of drainage quantities sheets.

Earthwork quantities and pavement structure quantities for permanent roadway construction shall be summarized on the project summary of quantities sheets, as described in Section 2-2.19, "Summary of Quantities."

The summary of quantities for the temporary railing (Type K) and temporary crash cushions used for stage construction shall be shown in tabular format. Entries within the table should be referenced to an alignment line by stationing. This table should be included with the:

- Stage construction plans, if separate sheets are used for stage construction plans,
- Stage construction and traffic handling plans, if stage construction and traffic handling are combined on same plan sheets.

If additional quantities of temporary railing (Type K) and temporary crash cushions are shown on plan sheets other than the stage construction plans, add a note to the table such as: "SEE THE PROJECT SUMMARY OF QUANTITIES SHEETS FOR GRAND TOTALS FOR THE ITEMS OF TEMPORARY RAILING (TYPE K) AND TEMPORARY CRASH CUSHIONS."

Construction area signs shall be summarized as described in Section 2-2.14. With the exception of construction area signs, traffic handling items of work shall be summarized as provided in "Traffic Handling Quantities" of this section.

Traffic Handling Plans

Traffic handling plans show how traffic is to be routed through the construction zone. These plans are unique for each project. The plans show long-term closures of lanes and ramps, detouring of traffic by signing, and the number of traffic lanes available for public traffic. Stage construction may require lateral shifting of traffic in relation to the normal path of travel, including shifting traffic by use of median crossovers. Lateral shifting of traffic may also involve the dropping of a traffic lane. Lateral shifting of traffic from its normal path of travel typically requires restriping of roadbeds.

A traffic handling plan is generally required for each stage of construction.

The base mapping for the project is typically used as the background for these plans. Existing information is to be dropped out.

The plan sheets for routing traffic through or away from the construction zone shall show all required temporary construction signing.

The first sheet of the traffic handling plans should contain notes, legends, symbols, and a list of abbreviations. Do not include standard plan abbreviations or acronyms as part of the listed abbreviations.

Traffic handling plans should not be confused with traffic control system standard plans ("T" series). Traffic control system plans show lane closures or ramp closures for short periods of time. The traffic control systems shown in the standard plans are usually installed and removed on a daily basis. Payment for the traffic control systems shown in the standard plans, including temporary signs used, is included in the lump sum bid item for traffic control system.

The components of the traffic handling plans generally consist of such items as:

- Channelizers,
- Portable delineators,
- Barricades,
- Temporary changeable message signs,
- Construction area signs,
- Flashing yellow beacons,
- Temporary striping (edgelines, centerlines, lane lines, etc.),
- Temporary pavement markings,
- Temporary pavement markers, etc.

Temporary pavement delineation, if required on the project, should be included in the traffic handling plan sheets, if separate plan sheets are used for traffic handling, otherwise

temporary pavement delineation would be included on the combination sheet for both stage construction and traffic handling.

Temporary pavement delineation shall be identified by a legend such as placement of a "T" designation in front of the standard plan traffic line detail number or by the use of the standard plan traffic line detail number enclosed in a distinct symbol, which is only used for temporary delineation.

If only traffic handling work is shown on the plan sheet, then each sheet of these plans shall be titled "TRAFFIC HANDLING PLAN." The sheet identification code would be "TH" and the note included on them shall read: "APPROVED FOR TRAFFIC HANDLING WORK ONLY."

Traffic Handling Details

The details shown on the traffic handling detail sheet are unique to the specific project. These details provide supplementary information that cannot be shown on the traffic handling plan sheets because of insufficient availability of space. These details could be for special construction area signs, temporary traffic striping, etc.

Traffic Handling Quantities

The components of the traffic handling plans are typically paid for as separate bid items.

The summary of quantities for the temporary items such as, traffic stripe, pavement markings, pavement markers, delineators, channelizers, and object markers shall be shown in tabular format. Entries within the table should be referenced to an alignment line by stationing. This table should be included with either of the following sheets depending on the type of sheets used:

- Traffic handling plan sheets, if separate sheets are used for traffic handling plans,
- Stage construction and traffic handling plan sheets, if stage construction and traffic handling are combined on the same plan sheets.

If additional quantities of temporary items for traffic handling are shown on plan sheets other than the traffic handling plans, add a cross reference note regarding additional quantities on other plan sheets.

Where the temporary items for traffic handling can be shown in a table on one plan sheet, quantity totals for each bid item column shall appear at the bottom of the table. Where more than one sheet is necessary to show the temporary items, the totals for each item shall appear at the bottom of the table on each individual sheet. The totals for the items shall be identified as "SHEET TOTALS." Sheet totals for each item shall appear on the last sheet of this summary. Sheet totals shall be totaled and shown as "GRAND TOTAL" or "TOTAL."

Construction area signs shall be summarized as described in Section 2-2.14.

Detour Construction Plans

The detour construction plans shall contain sufficient alignment, profiles, superelevation diagrams, and typical cross sections to construct temporary roadways in the stage sequence shown. These plans typically show traffic direction, number of lanes available, temporary pavement delineation, channelizers, construction area signs, and if applicable, barricades, temporary railing (Type K), temporary crash cushions and other items necessary to maintain traffic through the constructed detours. If the traffic handling items used for maintaining traffic on the constructed detours are not shown on the detour construction plans, they shall be shown on the traffic handling plan sheets.

The base mapping for the project is typically used as the background for the detour construction plans.

Details applicable to construction and removal of detours shall be shown on the detour construction plans, if separate detour construction plan sheets are included in the set of project plans.

Each sheet of the detour construction plans, shall have this note included on them: "APPROVED FOR DETOUR CONSTRUCTION WORK ONLY."

Detour Construction Quantities

Items of work to construct detours and items of work for their subsequent removal shall be shown in a separate table. Subtotals of the roadway construction items from this table shall be included in the project summary of quantities for similar items of work and identified as those used to construct the specific detour.

Temporary railing (Type K) and temporary crash cushions used with the detours shall be summarized in the same manner as that described in "Stage Construction Plans" of this section.

Construction area sign shall be summarized as described in Section 2-2.14.

With the exception of construction area signs, the traffic handling items used on the constructed detours shall be summarized in the same manner as described in "Traffic Handling Quantities" of this section. This summary should be included with the detour construction plans, but may be included with the traffic handling quantity summary and identified as those used to construct the specific detour.

2-2.17 Pavement Delineation Plans, Details, and Quantities

General

When there is not sufficient space to allow the final pavement delineation work to be shown on the project plan layouts, separate pavement delineation plans, details (if needed) and quantity sheets shall be used.

For convenience, final pavement delineation and permanent project signing may be shown on the same sheets since they are interrelated. If final pavement delineation and permanent project signing are combined on the same sheet, the sheet name should reflect both types of work involved. The combined sheet name would be "Pavement Delineation and Sign Plan." The sheet identification code for the plan sheet is "PD."

Temporary pavement delineation, if required on the project, should be included in the stage construction or traffic handling plans (see Section 2-2.16).

Pavement Delineation Plans

Pavement delineation plans provide a visual representation in plan view aspect of all final traffic lines, pavement markings, delineators, channelizers (left in place), and object markers used for the direction of public traffic.

A modified version of the base mapping for the project layout sheets is typically used as the background for the final pavement delineation plans. The design features such as pavement edges, dikes, sidewalks, etc, should be shown as existing (dropped out). Design features not directly related to pavement delineation should not be shown.

Alignment lines not in conflict with a traffic stripe may be left solid. If an alignment line is in conflict with a traffic stripe, the preferred method to handle this situation is to drop out the alignment line and show the traffic stripe in a non-drop out format. Final pavement delineation work should be shown in solid format, since it is performed after roadway work is completed.

Traffic lines and pavement markings shown on the final pavement delineation plans shall include, as applicable to the project:

- Centerlines
- Lanelines
- Edgelines
- Channelizing lines at exit and entrance ramp gores
- Crosswalks
- Limit lines (stop lines)
- Arrows
- Words
- Other appropriate delineation

Lane widths shall be indicated.

Details of standardized traffic lines and pavement markings, typically used for pavement delineation, are included in the standard plans. The details, as they appear in the standard plans, for these standardized traffic lines and pavement markings are not to be repeated in the project plans.

The standard plan detail number for each traffic stripe used in the project plans and its begin and end points with arrowheads and end terminator shall be shown on the plans. The begin and end points should be referenced to an alignment line by plus stations if the project uses stationing to identify limits of construction. If the project uses only post miles to identify limits of work and construction, then the limits or location of pavement delineation work should also be identified by post mile.

A single broken traffic stripe (gaps in traffic stripe detail) should be represented by a dashed line. A single traffic stripe that is not broken should be represented by a single solid line. For convenience, a double traffic stripe that consists of two solid lines or one solid line and one broken line should be represented by a single solid line. If sufficient space is available on the plan sheet, double traffic stripe may be graphically represented as two lines. Use the CT line styles shown in the CADD Users Manual.

Pavement markings (arrows, symbols, words and numerals) should be graphically shown on the pavement delineation plans in the same configurations as they appear in the standard plans and at a size consistent with the plotting scale used for the plan sheet.

If word pavement markings are illegible at the plotting scale used, symbols may be used to show the location of the word message. Show the symbol and its definition in the legend or show a symbol at the marking location and use a leader line coming off the symbol to spell out the pavement marking words.

The first sheet of the plans should contain notes, legends, symbols, and a list of abbreviations. Do not include standard plan abbreviations or acronyms as part of the listed abbreviations. Symbols to identify the standard plan traffic stripe detail numbers are typically enclosed in a distinct geometric shape (typically a circle, an oval or an elongated hexagon).

Each sheet of the pavement delineation plans shall have this note included on them: "APPROVED FOR PAVEMENT DELINEATION WORK ONLY." If signing work is combined with the pavement delineation work, the note would read: "APPROVED FOR PAVEMENT DELINEATION AND SIGN WORK ONLY."

Pavement delineation plan sheets may not be required for less complex projects if pavement delineation details and quantity tables can adequately describe the limits and locations of striping and pavement markings. An example of a less complex project would be the application of a seal coat or placement of surfacing on existing pavement of a two-lane highway.

Pavement Delineation Details

In the rare event, the details shown in the standard plans do not fit a particular situation for pavement delineation, special details for the particular situation shall be included on the pavement delineation detail sheets.

If the pavement delineation detail required for the project is a modification or combination of two standard plan details, then it shall be shown as a special modified detail on the pavement delineation detail sheets and so identified. Sufficient information shall be provided for the modified detail so that the quantities involved are calculable.

Pavement Delineation Quantities

A summary of quantities for the items of traffic stripe, pavement markings, and pavement markers, as applicable to the project, shall be included on the pavement delineation quantity sheets.

For complex projects that require use of many different types of traffic stripe and pavement markings that are located by stationing, the quantity table should include individual columns on the left side of the table with these headings:

- "PLAN SHEET NUMBER"
- "STATION LIMITS" (to identify where a striping detail number or pavement marking is to be used)
- "DETAIL No."
- "PAVEMENT MARKING"

Under the column heading of "DETAIL No.," each striping detail number shown on each plan sheet should be listed on their own individual row of the table to assist in determining items related to that detail, specifically number and type of pavement markers. Under the column heading of "PAVEMENT MARKING," each pavement marking shown on each plan sheet should be listed on their own individual row of the table.

For less complex projects (example: resurfacing existing pavement on a 2-lane highway) where only a few types of traffic stripe may be required, each plan sheet number may not need to be shown in the quantity table. The overall project limits of the traffic stripe and locations of pavement markings may be identified only by stationing or post mile depending on how the limits of construction are identified on the project.

Individual columns shall be provided in the quantity table for all final pavement delineation items of work. The column headings for bid items shall read the same as the description for the bid item shown in the Engineer's Estimate.

Items of work shown in the columns of the quantity table which are not a separate bid item (payment included in other items of work), shall be indicated with the symbol "(N)" in the column heading for such items and by adding the following note to the sheet:

(N) - Not a separate bid item.

Where pavement delineation quantities can be shown in a table on one plan sheet, quantity totals for each bid item column shall appear at the bottom of the table.

Where more than one sheet is necessary to show pavement delineation quantities, the column headings in the table shall be the same on all sheets of the summary to facilitate checking item totals

Where more than one sheet is necessary to show pavement delineation quantities, the totals for each bid item shall appear at the bottom of the table on each individual sheet. The totals for the bid items shall be identified as "SHEET TOTALS." Sheet totals for each bid item shall appear on the last sheet of the pavement delineation summary of quantities. Sheet totals shall be totaled and shown as "GRAND TOTAL" or "TOTAL."

Quantities for delineators, channelizers (left in place), and markers (object and post mile), as applicable to the project, shall be included on the pavement delineation quantity sheets. These quantities may be included in the pavement delineation table or a separate table.

If final pavement delineation and permanent project signing are combined on the same plan sheets, a summary of quantities shall be prepared for each type of work, one for the final pavement delineation and one for the permanent project signing. For additional information regarding summary of quantities for permanent project signing, see Section 2-2.18.

2-2.18 Sign Plans, Details, and Quantities

General

These signs are permanent roadside and overhead signs that provide regulation, warning, and guidance information for road users.

The California Manual on Uniform Traffic Control Devices (CA MUTCD) contains uniform standards for all official traffic control devices. Part 2 of the CA MUTCD deals exclusively with permanent signs and is available at this website:

<http://www.dot.ca.gov/trafficops/engineering/>

Sign designations with "(CA)" suffix indicate signs unique to California. You can find links to drawings for both California signs and Federal signs at this website:

<http://www.dot.ca.gov/trafficops/tcd/specs.html>

Temporary signs are those signs required for the direction of public traffic through and around the work during project construction. For detailed information regarding temporary signs, see Sections 2-2.14, 2-2.15 and 2-2.16 of this manual

Sign Plans

When there is not enough space to show permanent sign work on the project plan layouts, separate sign plans shall be used.

For convenience, permanent project signing and final pavement delineation may be shown on the same sheets because they are interrelated. If final pavement delineation

work is combined on the same sheet with the permanent signing, the sheet name should reflect both types of work involved. The combined sheet name would be "Pavement Delineation and Sign Plan." The sheet identification code for the plan sheet is "PD."

The base mapping for the project layout sheets is typically used as the background for the permanent sign plans. The background information should be shown as existing (dropped out), and permanent sign work should be shown in solid format.

The sign plans show the proposed locations of new roadside signs and overhead signs, which are to be installed or constructed, and existing roadside signs and overhead signs that are to be removed, salvaged, relocated, reset, modified, or reconstructed.

The first sheet of the plans should contain notes, legends, symbols, and a list of abbreviations. Do not include standard plan abbreviations or acronyms as part of the listed abbreviations.

Each roadside sign or sign structure shall be assigned an individual project sign number or alpha designation enclosed in a distinct geometric shape. Different geometric shapes may be used to distinguish between roadside signs and overhead signs. The individual project sign number or alpha designation used on the sign plan sheets shall correspond to those shown on the sign details and sign quantities.

The graphic symbol used to indicate the actual location of a sign shall show the sign panel on the side of the sign post(s) where the sign message will appear to approaching traffic. The locations of roadside signs and overhead signs are shown graphically on the sign plan sheet and may include their station locations.

The individual project sign number or alpha designation, sign designation, and a schematic depiction of the sign panel message (if special or variable message sign) shall be shown on the sign plan sheet so that they can be read without rotating the plan sheet.

Standardized signs shall be identified by their California or Federal sign designation. Nonstandard signs should be identified as special signs.

Each sheet of the sign plans shall have this note included on them: "APPROVED FOR SIGN WORK ONLY." If pavement delineation work is combined with signing work the note would read: "APPROVED FOR PAVEMENT DELINEATION AND SIGN WORK ONLY."

Sign Details

A detailed drawing of each standard sign panel is not required in the project plans.

Special sign panels and variable message sign panels shall be shown on the sign detail sheets. Each sign panel detail (layout) shall include:

- Individual project sign number or alpha designation
- Overall dimensions of the sign panel (length and depth)

- Message (legend) placement on panel, (letters and symbols depicted as they will appear on sign panel)
- Uppercase and lowercase letters for words
- Size of symbols, arrows and letters
- Offset distances from edges of panel to arrows and symbols
- Width of border around panel (if not standard)

Sign panels for permanent signs, installed or constructed as part of project construction work, are to be contractor furnished. In the past, sign panels for permanent signs, installed or constructed as part of project construction work, were state furnished. The same information (sign/installation order) previously furnished to sign manufacturer by the district sign coordinator for state furnished signs now must be included in the project plans. The details sent to sign manufacturer for sign panels are to be dimensioned in inches only.

This material summary for sign panels shall include the following information for each sign panel:

- Sign colors
- Sign designation
- Sign size (length and depth)
- Single or double faced
- Sign facing and legend reflectivity
- Sign panel substrate material and framing requirements

The basic guide for selection of sign facing material is available at this website:

<http://www.dot.ca.gov/trafficops/tcd/specs.html>

The material for the sign panel substrate is determined from the information presented in Standard Plans S81 through S95.

An elevation view of each overhead sign structure (sign panel and sign supports) shall be included in the sign detail sheets, see the examples of overhead sign details and quantities at this website:

http://www.dot.ca.gov/hq/esc/techpubs/manual/bridgemanuals/reference-sheets/refer_sheets.html

Sign Quantities

Sign quantities for roadside signs and overhead signs shall be summarized in tabular format.

The tables for sign quantities shall identify each sign by:

- Their individual project sign number or alpha designation, and
- Their California or Federal sign designation (nonstandard signs identified as special signs).

Individual columns shall be provided in the table for all permanent signing items of work. The column headings for bid items shall read the same as the description for the bid item shown in the Engineer's Estimate.

Roadside sign panels are paid for by the square foot for furnish sign of the various types specified on the plans. This square foot cost is for fabricating and furnishing the sign panel.

Installation of the roadside signs are paid for separately, by the unit price for the various work item for that location, such as "Roadside Sign - Two Post." This item of

work includes payment for the furnishing and installing sign supports (placing wood posts in the ground, in this case) and installation of the sign panel.

Overhead sign panels are paid for by the square foot for furnish sign of the various types specified on the plans. Installation of the overhead sign panel is included in the price paid per pound for the item to install overhead sign structure for new overhead sign locations. For the item of work, "Install Sign Panel on Existing Sign Structure," sign panel installation is paid for by the square foot.

The metal structure to support the overhead sign panel is paid for separately by the pound for the items for furnish sign structure and install sign structure of the various types specified on the plans (tubular, truss, lightweight, etc.).

Overhead sign structure posts are typically supported on cast-in-drilled-hole pile foundations. These pile foundations are measured and paid for by the linear foot and are not final pay items.

The furnish sign structure bid items are only designated as final pay quantities in the Engineer's Estimate by using an "(F)." Furnish overhead sign structure is not designated specialty work, because the contractor only has to order material.

Installation of overhead signs is work performed by a specialty contractor, therefore the bid item is also designated as specialty work. Since it is specialty work and final pay, the quantities are only designated in the Engineer's Estimate using a "(S-F)."

Do not use final pay or specialty item designation on the plans.

For a listing of final pay items and specialty work, refer to Section 7 of the Construction Contract Development Guide (formerly RTL Guide) located at this website:

https://oe.dot.ca.gov/project_control_and_support/rtl/CCD-Guide.pdf

Where sign quantities can be shown in a table on one plan sheet, quantity totals for each bid item shall appear at the bottom of the table. Where more than one sheet is necessary to show sign quantities, the totals for each bid item shall appear at the bottom of the table on each individual sheet. The totals for the bid items shall be identified as "SHEET TOTALS." Sheet totals for each bid item shall appear on the last sheet of the sign summary of quantities. Sheet totals shall be totaled and shown as "GRAND TOTAL" or "TOTAL."

2-2.19 Summary of Quantities

Introduction

Quantity summaries shall be included in the project plans to aid in determining the location and quantities for bid items which are located throughout the plans. The intent of having a quantity summarized is to have one location in the plans which shows the total project quantity for an item and that total corresponds to the quantity shown in the Engineer's Estimate.

General

A quantity table for a specific bid item should include detailed information on the location of the work to be performed. Do not simply repeat the item by item listing shown in the Engineer's Estimate as the summary of quantities.

Quantity summaries shall be in tabular format. To aid in determining the location of bid items on the plans, entries within the table shall be referenced to an alignment line and station where construction is identified by stationing. Where construction is identified by post miles, entries within the table shall be identified by post miles. Summary headings and column headings for the items summarized shall match the description for the bid item shown in the Engineer's Estimate.

Use the same amount of decimal places on the plan and the quantity summaries (same degree of accuracy). Commas are not used for thousands, if all entries in the item column have four or fewer digits left of the decimal point. Commas are used for thousands, if any individual entry in the item column has five or more digits left of the decimal point. In

numbers of five digits or more, use a comma after every third digit left of the decimal point.

Items of work shown on the summary of quantities sheets which are not a separate bid item (payment included in other items of work), shall be indicated with the symbol "(N)" in the column heading for such items and by adding the following note to the sheet:

(N) - Not a separate bid item.

If items included in the summary of quantities are eligible for final pay or specialty item designation, the items are to be designated only on the Engineer's Estimate using:

- (F) - final pay item only
- (S) - specialty item only
- (S-F) - specialty and final pay item

Do not use final pay or specialty item designation on the plans.

Any item quantity can go on the project summary of quantities sheets unless there is an individual summary sheet already for that type of work (drainage, signing, pavement delineation) within the project plans. If other sheets of the project plan set include quantity tables, those quantity tables are not to be duplicated on the project summary of quantities sheets. The subtotals of common bid items of the road portion of a project are to be summarized on the project summary of quantities sheets (see "Cross Referencing Quantity Totals" within this section).

The project summary of quantities sheets typically list items of work shown on the

project layout sheets and construction detail sheets.

Quantities must be calculated and summarized for items of work such as:

- Roadway earthwork
- Pavement structures
- Miscellaneous concrete construction
- Place hot mix asphalt (miscellaneous areas)
- Dikes
- Railings
- Barriers
- Fences
- Walls

Roadway Earthwork

Roadway earthwork quantities are normally shown on full profile sheets or the profile portion of plan (layout) sheets. Embankment quantities should never be shown as a negative number. One of the reasons for listing roadway excavation and embankment quantities is to help bidders and the contractor determine haul distances and understand the scope of the earthwork.

If earthwork quantities are not shown on the profiles, they shall be summarized on the project summary of quantities sheet. These quantities should be listed by each alignment line using the begin and end stations where earthwork is performed.

Regardless of where the roadway earthwork quantities are shown, the total amount of roadway excavation and embankment for the project shall be shown on the project summary of quantities sheets.

Embankment is not a separate bid item. Embankment quantities shown in the project summary of quantities sheets shall be identified as a "Not a separate bid item" as described within this section for non bid items.

Pavement Structures

Pavement structure (structural section) elements (hot mix asphalt, pavement reinforcing fabric, concrete pavement, bases and subbases), as applicable to the project, shall be summarized on the project summary of quantities sheets. These quantities shall be listed by each alignment line using the begin and end stations where pavement structure work is performed. Identify the elements of the pavement structure using the same item name as in the Engineer's Estimate, example: "Class 2 Aggregate Base."

Minor Concrete (Miscellaneous Construction)

The table for "Minor Concrete (Miscellaneous Construction)" should include, as applicable to the project:

- Curbs
- Valley gutters
- Curb ramps
- Driveways
- Gutter depressions
- Sidewalks

Identify the types of curb used (example: "A2-8 Curb") and cases of curb ramp used (example: "Case A Curb Ramp").

Place Hot Mix Asphalt (Miscellaneous Areas)

The table for "Place Hot Mix Asphalt (Miscellaneous Areas)" should include those areas of paving which cannot be placed with a hot mix asphalt spreader. Examples of those areas which fall within this bid item are:

- Hot mix asphalt overside drains
- Hot mix asphalt aprons
- Hot mix asphalt walkways
- Pipe down drain flares
- Island paving

In most projects, "Place Hot Mix Asphalt (Miscellaneous Areas)" is paid for by the square yard to place and by the ton for the quantity of hot mix asphalt used.

Hot Mix Asphalt Dikes

In the table for "Place Hot Mix Asphalt Dike," identify the types of dike to be placed. In most projects, hot mix asphalt dike is paid for by the linear foot to place and by the ton for the quantity of hot mix asphalt used.

Railings and Barriers

Railings and barriers are typically paid for by the linear foot. Terminal system end treatments, end anchor assemblies and the various types of transition railing used for metal beam guard railing and thrie beam barriers are measured and paid for separately, by the unit.

Retaining Walls and Sound Walls

Where the construction of more than one retaining wall or sound wall is shown on the road portion of the project plans, a cumulative quantity summary identifying quantities for the same wall types shall be included on the project summary of quantities sheets. If only one type of retaining wall or sound wall is to be constructed on the project, then the wall quantities for that wall are only to be included with the respective retaining wall or sound wall plans.

If the walls included in the project have been designed by both the district and the Office of Structure Design, care should be exercised in combining these wall quantities for the Engineer's Estimate to make sure the bid items for the work are compatible.

Cross Referencing Quantity Subtotals

The same type of work (with the same bid item) may at times appear on more than one quantity table within the road portion of the project. These items are to be shown as subtotals on those quantity tables but totaled together and shown on the summary of quantities sheets as "Grand Total" or "Total". The tables in the various sections of the plans which list the common bid items, are to include an asterisk in each column heading of those common bid items and a note on that plan sheet which reads: "*SEE SUMMARY OF QUANTITIES SHEETS FOR PROJECT TOTALS"

Where the tables on the summary of quantities sheets summarize quantity subtotals from other plan sections of the road portion of the project, describe their origin. Example: if the table for "Place Hot Mix Asphalt (Miscellaneous Area)" includes a quantity subtotal from the drainage summary, then add a note in the location or description column of the table that reads: "Subtotal From Drainage Quantities."

If the same type of work with the same bid items are shown on the road portion and the structure portion of the project plans, include the following information:

- Add an asterisk in each column heading of the quantity tables on the project summary of quantities sheets which have bid items common to both road work and structure work
- Include a note on the summary of quantities sheets below the quantity table that reads:
 "*SEE STRUCTURE PLANS FOR
 ADDITIONAL QUANTITIES"

2-2.20 Retaining Wall Plans, Profiles, Details, and Quantities

General

Standard plans are available for a variety of crib walls and concrete retaining walls. Loading conditions and foundation requirements are outlined in the Standard Plans. For sites with requirements that are not covered by the Standard Plans, a special design earth retaining system is required. Refer to Topic 210 of the Highway Design Manual.

A foundation investigation should be made for all locations at which a retaining wall is being considered. Foundation investigations are made by the Division of Engineering Services – Geotechnical Services. Foundation recommendations should be included in the project history file. When log of test boring information is developed, it shall be included with the retaining wall plans as Log of Test Boring sheets.

Retaining walls are to be shown on the project typical cross sections when they are within the majority of the station limits given. Retaining wall layout lines should be shown on the project layout sheets to show their location in relation to the roadway alignment.

The plan set for each earth retaining wall should include:

- Wall plan view
- Typical wall cross section
- Wall profiles
- Wall details
- Wall quantities
- Log of test borings

Plans

The wall plan view should include:

- Existing contour lines
- Wall layout line
- Controlling roadway stationing, tangent bearings and equations
- Begin and end stations of wall layout line, including offsets
- Horizontal curve data (delta, radius curve, tangent, and length), if applicable for wall layout line
- Varying width of the footing (if used)
- Surface and subsurface drainage structures or utilities that could affect or be affected by wall construction
- Right of way lines and easements
- Elevation and location of existing facilities to remain in place during wall construction

Typical Wall Cross Section

The typical wall cross section, in most cases, is shown on the first sheet of the wall plans and should include:

- Designation of wall type
- Wall batter (if used)
- Wall layout line
- Original ground line
- Finished grade on both sides of wall
- Gutter or other wall drainage feature (if used)
- Railing or fencing on top of wall (if used)
- Barrier attached to wall (if used)
- Temporary railing (Type K), if needed for adjacent traffic during construction (show its placement relative to the wall)

Additional wall cross sections shall be included for those locations where the wall layout line in relation to the right of way line is critical.

Each sheet of the wall plans, depending on type of wall, shall have a note included on them, such as: "APPROVED FOR RETAINING WALL WORK ONLY."

Profiles

The wall profile should include:

- Horizontal to vertical scale ratio of 1:1
- Datum for vertical alignment
- Design heights and respective wall lengths
- Top of wall elevations
- Bottom of wall leveling pad elevations or footing elevations (as appropriate for type of wall foundation)
- Existing ground line at the wall layout line
- Finished grade
- Locations of expansion joints and weakened plane joints
- Architectural treatment of wall (if used)

Details

Special wall details, as applicable to wall construction, such as sign bases, utility openings, drainage features, fences, and concrete barriers should be included on the wall plan sheet of the wall concerned or included on a separate detail sheet with the wall plans. If a special wall detail is developed by the Division of Engineering Services-Office of Structure Design for a district designed wall, then the detail provided by Office of Structure Design is to be included with the district designed plans for that specific wall.

If aesthetic features are to be incorporated in the wall, include detail sheets for the aesthetic features.

Quantities

Wall quantities for concrete walls usually consist of these items: concrete (retaining wall) or a class of concrete, reinforcement (retaining wall), structure excavation (retaining wall), structure backfill (retaining wall), pervious material (retaining wall), and architectural treatment (as needed).

Quantities should be tabulated on the plans for each wall.

Where the construction of more than one wall is shown on the road portion of the project plans, a cumulative quantity summary identifying quantities for the same wall types shall be included on the project summary of quantities sheets. If only one type of retaining wall is to be constructed on the project, then the wall quantities for that wall are only to be included with the retaining wall plans.

If the same type of wall with the same bid items are shown on the road portion and the structure portion of the project plans, include the following information on the wall quantity table for the road portion of the project:

- Add an asterisk in each column heading of the table which have bid items common to both road work and structure work
- Include a note on the wall summary of quantities sheet below the quantity table that reads:
 "*SEE STRUCTURE PLANS FOR
 ADDITIONAL QUANTITIES"

If the walls included in the project have been designed by both the district and the Office of Structure Design, care should be exercised in combining these wall quantities for the

Engineer's Estimate to make sure the bid items for the work are compatible.

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2-2.21 Sound Wall Plans, Profiles, Details, and Quantities

General

Details for standard masonry block sound walls are included in Standard Plans. Other approved sound walls are described in Section 1100 of the Highway Design Manual.

A foundation investigation should be made for all locations at which a sound wall is being considered. Foundation investigations are made by the Division of Engineering Services – Geotechnical Services. Foundations recommendations should be included in the project history file. When log of test boring information is developed, it shall be included with the sound wall plans as Log of Test Boring sheets.

Sound walls are to be shown on the project typical cross sections when they are within the majority of the station limits given. Sound wall layout lines should be shown on the project layout sheets to show their location in relation to the roadway alignment.

The plan set for each sound wall should include:

- Wall plan view
- Typical wall cross section
- Wall profiles
- Wall details
- Wall quantities
- Log of test borings

Plans

The plan view should include:

- Wall layout line
- Controlling roadway stationing, tangent bearings and equations
- Begin and end stations of wall layout line, including offsets
- Horizontal curve data (delta, radius curve, tangent, and length), if applicable to wall layout line
- Varying width of footing (if used)
- Surface and subsurface drainage structures or utilities that could affect or be affected by wall construction
- Right of way lines and easements
- Elevation and location of existing facilities to remain in place during sound wall construction

Typical Wall Cross Section

The typical wall cross section, in most cases, is shown on first sheet of wall plans and should include:

- Designation of wall type
- Wall layout line
- Wall stem
- Wall support (footing, barrier, or piles)
- Original ground line
- Finished grade on both sides of wall
- Wall drainage features (if used)

Additional wall cross sections shall be included for those locations where the wall layout line in relation to the right of way line is critical.

Each sheet of the sound wall plans shall have this note included on them: "APPROVED FOR SOUND WALL WORK ONLY."

Profiles

The wall profile should include:

- Datum for vertical alignment
- Overall wall length
- Wall length for each segment of differing wall heights
- Locations of expansion joints
- Location of steps on top of sound wall
- Location of footing steps (if wall on spread or trench footing)
- Location of pile cap steps (if piles used)
- Existing ground line at the wall layout line
- Finished grade
- Top of wall elevations
- Top of footing elevations (if wall on spread or trench footing)
- Top of barrier elevation (if wall on top of concrete barrier)
- Top of retaining wall elevations (if sound wall on top of retaining wall)
- Pile cap elevation (if piles used)
- Pile size, spacing and depth (if piles used)
- Locations of access gates in wall (if used)
- Architectural treatment of wall (if used)

Details

Special wall details, as applicable to wall construction, such as utility openings, drainage features, and concrete barriers should be included on the wall plan sheet of the wall concerned or included on a separate detail sheet with the wall plans.

If a special wall detail is developed by the Division of Engineering Services-Office of Structure Design for a district designed wall, then the detail provided by Office of Structure Design is to be included with the district designed plans for that specific wall.

If aesthetic features are to be incorporated in the sound wall, include detail sheets for the aesthetic features. For additional design criteria refer to Topic 1102 of the Highway Design Manual.

Quantities

Sound walls are measured and paid for by the square foot of the type of wall designated in the Engineer's Estimate. Sound wall footings, pile caps and grade beams are measured and paid for by the cubic yard of minor concrete (sound wall). The price paid per cubic yard of minor concrete (sound wall) includes excavation, backfill, and reinforcement. Cast-in-drilled-hole concrete piling and concrete barrier are separate bid items.

Quantities should be tabulated on the plans for each wall.

Where the construction of more than one sound wall is shown on the road portion of the project plans, a cumulative quantity summary identifying quantities for the same wall types shall be included on the project summary of quantities sheets. If only one type of sound wall is to be constructed on the project, then the wall quantities for that wall are only to be included with the sound wall plans.

If the same type of wall with the same bid items are shown on the road portion and the structure portion of the project plans, include the following information on the wall quantity table for the road portion of the project:

- Add an asterisk in each column heading of the table which have bid items common to both road work and structure work
- Include a note on the wall summary of quantities sheet below the quantity table that reads:

"*SEE STRUCTURE PLANS FOR
ADDITIONAL QUANTITIES"

If the walls included in the project have been designed by both the district and the Office of Structure Design, care should be exercised in combining these wall quantities for the Engineer's Estimate to make sure the bid items for the work are compatible.

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2-2.22 Landscape, Irrigation, and Planting Plans, Details, and Quantities

Drafting Standards

Use acronyms, symbols and abbreviations shown on the Standard Plans to prepare project plans. Non-standard acronyms, symbols, and abbreviations must be shown on the first sheet of the applicable plan series (e.g. LL-1, IP-1, PP-1, etc.). Refer to Section 2-1.2 “Drafting Standards” for further information.

Utility Policy

Caltrans Utility Policy requires that all utilities be shown on the advertised contract plans sheets for every project (unless a utility exception is granted) whether Caltrans owned or utilities owned by others. Every project must have a Utility Policy Certification signed by a licensed civil engineer. Usually the same engineer will produce and be responsible for the utility plans.

All existing utility facilities (subsurface, aboveground or aerial) and new/planned utility installations/relocations must be shown on the project plans to notify the contractor to possible utility conflicts. It is recommended that separate utility sheets be included for each project. Depending on the size and type of project, utilities may be shown on the roadway layout sheets in lieu of the utility sheets. For those projects that consist of landscape work only, separate utility sheets are recommended to be part of the contract plans. If the decision is made to show the utilities on the landscape plan sheets only (no utility sheets or roadway

layouts), then a civil engineer must sign landscape plan sheets showing the utilities. Responsibility for investigating and showing the utility information is under the purview of a civil engineer and the signature on the plan sheet establishes that responsibility.

As a convenience and reminder to the contractor and or subcontractor, utility facilities may be shown on landscape layout, irrigation or planting plans when there may be a potential conflict with project work. When utility facilities are shown a second (2nd) time or more (in addition to them being shown on utility plan sheets), the line weight may be reduced to de-emphasize the utility line in comparison to project work.

Refer to Section 2-2.13 “Utility Facilities” for further information.

Right of Way

For landscape only projects, the defined right of way must be shown on a landscape plan view type sheet that encompasses the construction limits of the project. The defined right of way may also be shown a second (2nd) time or more on other plan view sheets when it is determined that project work is located near the right of way. Showing the defined right of way conveys to the bidder, contractor, and or subcontractor that project work is within Caltrans’ right of way or the limits of an easement. Refer to Section 2-1.1–“Right of Way” for further information.

Master Files

The background for landscape type plan view sheets utilizes the base map. The base map consists of two (2) separate files:

- Master Topographic file
- Master Design file

The Master Topographic file (“**bb**” file) is developed and maintained by the Surveys and Photogrammetry units in the district. The “**bb**” file includes existing features that are always dropped out on plan view sheets.

The Master Design file (“**aa**” file) is developed and maintained by the roadway design unit in the district. The “**aa**” file contains the new permanent design features that are shown solid on plan view sheets. The right of way and alignment may be new or existing, but they are shown solid on plan view sheets.

Master files may contain a lot of information, but only the necessary information needed for any specific contract plan sheet, should be merged into that contract plan sheet (active file). The roadbed is always shown. Refer to Section 3.8 “Master Files” of the CADD Users Manual for further information.

Composition of Project Plans

Do not callout roadway bid items on landscape layout, irrigation or planting plans. Do not include plan sheets that have no work. Use break lines in place of match lines between plan sheets that are not contiguous. The number of landscape type plan view sheets may not correspond numerically to the roadway layout sheets. Depending of the size and type of project, the number of irrigation plan sheets may

not correspond numerically to the number of landscape layout plan or planting plan sheets. A key map may be necessary to eliminate confusion on the number of each type of plan view sheet. Refer to Section 2-1.1 “Composition of Project Plans and General Preparation Procedures” for further information.

The irrigation conduit (formerly irrigation crossover) bid item is usually shown on the roadway layout sheets, as they typically will be placed before the pavement structure is constructed. In addition to being shown on the roadway layout sheets, the irrigation conduit is shown on the irrigation plans if there is other irrigation work. This informs the contractor where to connect the new irrigation pipe and conduit for control and neutral conductors at either end of the irrigation conduit. The line weight of the irrigation conduit shown on the irrigation plans may be reduced so there is less chance of irrigation conduit being counted twice as a bid item. A callout on the irrigation plans stating “FOR IRRIGATION CONDUIT SEE ROADWAY LAYOUT PLANS” provides further clarity that it is constructed from the roadway layout sheets. Water meters or stub-outs for water meters may be handled the same as irrigation conduit.

If there is not sufficient room to clearly show irrigation conduits or water meters on the roadway layout sheets, they may be shown on the irrigation plan sheets. A note on the first roadway layout sheet stating “SEE IRRIGATION PLANS FOR IRRIGATION CONDUIT” informs the bidder and contractor that the irrigation conduit(s) are shown only on the irrigation plans.

Plans

The most commonly used plan view sheets are the following:

- Landscape Layout Plans
- Irrigation Plans
- Planting Plans

Landscape Layout Plan

Landscape layout plans generally show hardscape items that are not irrigation or planting work.

Landscape layout plans typically show but are not limited to, the following:

- Site furnishings
- Gravel mulch, decomposed granite, and rock blanket
- Paving beyond the gore area and paving of narrow areas
- Maintenance vehicle pullouts and access roads
- Fences and gates
- Slope paving

Depending on the size and type of project, these bid items may instead be shown on the roadway layout or planting plan sheets if there is room to clearly show all the information.

Irrigation Plan

Irrigation plans provide a diagrammatic representation in plan view of new irrigation work in relation to highway facilities.

Irrigation plans typically show but are not limited to, the following new and or existing items:

- Water meter
- Irrigation controllers
- Backflow preventer assembly
- Remote control valves
- Irrigation conduits (formerly crossovers)
- Supply line (main and lateral)
- Irrigation sprinkler type
- Shutoff valves (ball and gate)

New irrigation work is shown with solid lines, symbols and leader lines. Existing irrigation is shown dropped out. Supply lines typically include only pipe size labels. Existing irrigation facilities must be shown when using check and test existing irrigation specification or when connecting new irrigation system to existing irrigation. Showing new planting on irrigation plans is optional but if shown, it is dropped out. Plant symbols may be simplified to circles or massed areas for clarity and must be identified in a legend. Most irrigation symbols are located in the Caltrans Cell Library and available irrigation line styles are located in the Caltrans Line Styles resource file. Refer to the CADD Users Manual, Appendix A1 and A4 for further information.

Planting Plan

Planting plans provide a visual representation in plan view of planting work in relation to highway facilities.

Planting plans typically show but are not limited to, the following:

- Roadside clearing limits
- Prune existing plants
- Planting
- Transplanting

- Cultivation
- Wood mulch
- Maintain existing planted areas limits
- Plant establishment work limits
- Plant removal work limits

For each new individual, mass or contiguous planting area on a sheet, a callout must identify one representative symbol for each plant shown based on the direction of travel or quadrant area. The callout will include the plant name abbreviation (the underlined letters in the plant legend) and the plant quantity for the area.

Existing plant materials, shown as a single plant symbol or as massed areas, shall be dropped out. Work performed on existing plant material, such as pruning, shall be shown by symbol, callouts, or a note.

The grading, capacity and hydraulics design of permanent storm water treatment or low-impact development features (e.g. vegetated or non-vegetated biofiltration strips and or swales) are under the purview of a civil engineer and must be shown on a plan sheet signed by a licensed civil engineer.

New planting work for permanent storm water treatment or low-impact development should be shown on planting plans.

Planting plans may show new hardscape type bid items if there is room and all information can be clearly shown.

Alternative Plan Sheets

Alternative or additional plan sheet names are identified as:

- Roadside clearing plan
- Plant removal plan
- Maintain existing planted area plan
- Irrigation removal plan
- Irrigation and planting plan

Use only plan sheet names listed in Section 2.1 of the CADD Users Manual. When combining different types of work (bid items) on one plan sheet, the majority of the work on that plan sheet will determine the selected sheet name.

Roadside Clearing Plan

Roadside clearing plans show the limits of roadside clearing on landscape projects. These sheets show existing plants to be removed, weed removal, and mowing areas. If there is room and all the information can be clearly shown, roadside clearing work may be consolidated with the planting plan sheets.

On roadway construction projects with hardscape, irrigation, and or planting work, plants removed in earthwork areas should not be called out because they are removed under the clearing and grubbing specifications. Only plants removed outside the limits of earthwork area are shown and called out for payment under the roadside clearing bid item.

Plant Removal Plan

Plant removal plans show the removal of trees, shrubs, groundcover or unwanted vegetation. If there is room and all the information can be clearly shown, this work may also be consolidated with the roadside clearing or planting plans on projects that consist of landscape work only.

Maintain Existing Planted Area

Maintain existing planted area plans show locations and the type of existing planting to be maintained. These sheets may also be used to show locations of vegetated permanent stormwater treatment features to be maintained such as biofiltration strips and swales. If there is room and all the information can be clearly shown, this work may also be consolidated with the planting plan sheets.

Irrigation Removal Plan

Irrigation removal plans identify irrigation facilities to be removed. Equipment to be removed is normally shown with hatching or callouts of the existing equipment. If there is room and all the information can be clearly shown, this work may also be consolidated with the irrigation plan sheets.

Irrigation and Planting Plan

Irrigation and planting plans may be consolidated if there is room and all the information can be clearly shown.

Irrigation Sprinkler Schedule

Irrigation sprinkler schedule is used to show sprinkler types that are used on any given project. The information in the sprinkler schedule includes the sprinkler symbol, item description, and detailed information related to the operating ranges and material components. Additional information or instructions may be included in the “remarks” section of the schedule.

Plant Legend (formerly Plant List)

The plant legend identifies individual plant species by symbol, container size, botanical name, common name, and quantity. Botanical names contain underlined letters that denote the abbreviations used on the planting plans to identify the plant symbols. The legend also contains planting instructions, including hole size, basin type, soil amendments, fertilizer, and plant spacing.

Details

Detail sheets are defined as one of the following:

- Landscape Details
- Irrigation Details
- Planting Details

Detail sheets show project specific details not included in the Standard Plans, or details modified from the Standard Plans. A modified standard plan detail or a combination of standard plan details must be shown and labeled as a modified detail. Provide sufficient dimensioning and callouts for the modified detail so that quantities involved are calculable. See Section 2-1.4 “Use of Standard Plans.”

Standard drawings from other agencies, when applicable to the project, shall be included as part of the project plan set. Referring to a standard drawing number from another agency is not acceptable. Refer to Section 2-1.6 “Standard Drawings from Other Agencies” for further information.

Landscape detail sheets include project specific details for work shown on the landscape layout sheets. If the number of

details does not warrant an entire sheet then they may be shown on the landscape layout plan sheets if there is room.

Irrigation detail sheets include project specific details for work shown on the irrigation plans. If the number of details does not warrant an entire sheet then they may be shown on the irrigation sprinkler schedule, or irrigation plan if there is room.

Planting details sheets include project specific details for work shown on the planting plans. If the number of details does not warrant an entire sheet then they may be shown on the plant legend or planting plan if there is room.

Quantities

Quantities sheets are defined as one of the following:

- Landscape Quantities
- Irrigation Quantities
- Planting Quantities

Quantity summaries (totals or subtotals) for hardscape, irrigation, and planting work shall be included in the project plans for bid items shown on the plans. Quantities summarized in tabular format must show the bidder, contractor and resident engineer the bid items and their total quantities, their locations within the project limits, and the plan sheets on which they are shown.

When the same bid item is shown both on roadway layouts and landscape layout plans (such as hardscape work, inert material, or site furnishing) it shall be grand totaled on the appropriate table on the summary of quantities and subtotaled

on the appropriate table on a landscape quantity sheet.

Bid items for work shown on the irrigation plans shall be summarized on the irrigation quantities table. Irrigation quantities are tallied in two parts: the lateral supply side of the remote-control valves and the main supply side of the valves. When a bid item is used on both sides of the valve, the subtotal shown on the lateral side table is carried forward to the main side table where the two subtotals are added, resulting in the final total. Do not create a separate Total Quantities table.

Planting types and quantities are summarized on the plant legend but the totals for the bid items shall be shown on the plant quantities table.

If the quantity tables do not warrant an entire sheet then landscape quantities may be shown on the final landscape layout sheet, irrigation quantities on the Irrigation Sprinkler Schedule (ISS), and plant quantities on the Plant Legend (PL) sheet. Sheet names should not be modified when combining quantity tables with sheets mentioned above.

Work with its associated quantity that is shown in a quantity table but is not a separate bid item shall be noted with an (N). The (N) signifies that the quantity for the work is important enough to show in the quantity table but it is paid for under one or more contract bid items. Use the cell NOTE3: “(N) NOT A SEPARATE BID ITEM” placed just below the quantity table.

For further information on presenting bid items and quantities in a quantity table,

refer to Section 2-2.19 “Summary of Quantities.”



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CHECKLIST FOR PLAN SHEETS

- District, county and route
- Post Miles
- Unit and Project Number and Phase
- Signature, date of signature, license number, printed name, and license renewal date. (Signature is added as the last step before the project goes to PS&E)
- Standard roadway north arrow
- Scale centered below sheet name
- Information on plan sheet development name blocks in left margin of border sheet. See Figures 2-10 and 2-11 in Section 2-1.6 of this manual for additional instructions
- Correct sheet approval statement centered at bottom of sheet (example: *"APPROVED FOR PLANTING WORK ONLY"*)
- On landscape only projects at least one type of plan view sheet must show right of way. The following statement must be shown on each plan sheet where determinate right of way is shown: "FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE"
- Standard abbreviations conform to those listed in the Standard Plans
- The first sheet of each landscape layout, irrigation and or planting plan shall contain project specific notes, legends, and symbols, and nonstandard abbreviations that are not included in the Standard Plans
- Identify routes within the project limits. Line designations and routes must be identified and are typically placed above the alignment line. Do not use route shields
- Show existing fences and gates dropped out
- Show new gates with size and type
- City and county limit lines shown
- Utility plans signed by a registered civil engineer
- Waterways (stream, creek, river, etc.) and direction of flow
- Do not show extraneous topography (See Section 2-1.1)
- Environmentally sensitive area (ESA) limits shown. Use hatched area as shown on Standard Plan A10B
- Alignment line and stationing shown solid
- Limit of roadbed shown

CHECKLIST FOR IRRIGATION PLAN

- Symbols and abbreviations are consistent on all plan sheets and with those shown in the irrigation legend
- Pipe appropriately labeled (size) or provided for in Pipe Sizing Chart on detail sheet
- Connect to existing system symbol shown at all points of connection between existing and new irrigation facilities
- Existing irrigation component symbols per Standard Plan symbols
- Verify that locations of irrigation controllers are at the same locations as shown on the electrical systems plans
- New planting dropped out if shown
- Water meter labeled with size and as recycled or potable

CHECKLIST FOR PLANTING PLAN

- Symbols and abbreviations are consistent on all plan sheets including botanical names
- Each plant group has appropriate symbol or pattern and quantity as per the plant legend
- Symbols used for plant types match throughout plans and on the plant legend

- Each planting area is provided with one quantity call out for each plant symbol or massed area
- Specify wood mulch areas in cubic yards
- Specify cultivation areas in square yards
- Show existing planting dropped out

CHECKLIST FOR IRRIGATION SPRINKLER SCHEDULE

- Numbered notes shown in appropriate columns are applicable when circled in notes list
- Sprinkler symbols correspond with irrigation plan

CHECKLIST FOR PLANT LEGEND

- Symbols and abbreviations are consistent on all plan sheets including botanical names
- Underlined portions of Botanical Names correspond with abbreviations on the planting plans
- Numbered notes shown in appropriate columns are applicable when circled in notes list
- Plant Sizes shown conform to standard American Nursery and Landscape Association (ANLA) container size descriptions
- Appropriate basin type(s)

- Hole size is shown and large enough to accommodate plant container size, root protectors and or amendments
- Planting limits filled out completely
- Number of plants shown are to total to the amount shown on planting quantity table
- Provide staking, foliage protectors, root protectors, and or root barriers if needed

CHECKLIST FOR QUANTITY SHEET

- Quantity tables for hardscape items such as rock blanket, gravel mulch, minor concrete, decomposed granite, and edging shall be shown on landscape quantities table as subtotals if the grand total is shown on another quantity table used elsewhere in the project
- Irrigation quantity summaries shall be shown on irrigation quantities sheets. For projects using large number of valves and controllers, split quantities into two tables; quantities downstream of control valves, and quantities on the supply side of control valves
- Planting quantities table may be shown on planting plan or plant legend
- Ensure that all project work shown on the plans is either identified as a bid item or is paid for under another bid item



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2-2.23 Electrical Systems

The Plans Preparation Manual specifies how the electrical design information for electrical systems work must be organized on the electrical plan sheets. Electrical work, identified by the applicable items in the Bid Item List, is described in the:

- project Special Provisions
- Standard Specifications

Electrical work, identified by the applicable items in the Bid Item List, is shown in the:

- project plans (“E,” “ED,” and “EQ” sheets)
- special electrical structures plans (“SES” sheets)
- Standard Plans (“ES” series, as revised)

Utility Policy

Caltrans Utilities Policy requires all new, relocated, or existing facilities (subsurface, aboveground, or overhead), to be shown on the advertised project plans unless a utility exception is granted by the Headquarters Division of Design Chief. Whether owned by Caltrans or others (public or private), existing utilities must be shown to notify the contractor of possible conflicts. Caltrans-owned electrical facilities (e.g., detectors, sensors, fiber optic, pull boxes, conduit and cables, direct-burial cables, etc.) must be shown using symbols and line styles consistent with the Standard Plans. Every project must have a completed Utility Policy Certification signed by a licensed civil engineer. The same engineer will usually produce and be responsible for the utility plans. The district utility coordinator and utility engineering workgroup (UEW) do not usually have information for Caltrans-owned electrical facilities. The UEW or project engineer will need to obtain locations of

Caltrans-owned electrical facilities to complete the utility plans and verification. Sources may include functional units that install and operate electrical systems, as-built plans, and district electrical maintenance.

Include utility sheets signed by a civil engineer for each project plan set that consists of electrical systems work only (no roadway layout sheets) unless the project is exempt from this requirement as defined in the Project Development Procedures Manual, Chapter 17. Responsibility for investigating and showing the utility information is under the purview of a civil engineer and the signature on the plan sheet establishes that responsibility.

Utility facilities should be shown on electrical plan view sheets when there may be a potential conflict with electrical systems work. When utility facilities are shown, in addition to them being shown on utility plan sheets, the line weight may be reduced to de-emphasize the utility line in comparison to project work.

Refer to Section 2-2.13 “Utility Facilities” for further information.

Right of Way

The defined right of way and easement limits should be shown on electrical plan view sheets. Projects with only electrical work must show the defined right of way and easement limits on electrical plan view sheets. Do not present or label any right of way as approximate on any plan sheet, including spot locations and details. Refer to Section 2-1.1 “Right of Way” for further information.

Master Files

The background for electrical system plan view sheets should utilize the base map. The base map consists of two (2) separate files:

- Master Topographic file
- Master Design file

The Master Topographic file (“bb” file) is developed and maintained by the Surveys and Photogrammetry units in the district. The “bb” file includes existing features that are always dropped out on plan view sheets.

The Master Design file (“aa” file) is developed and maintained by the roadway design unit in the district. The “aa” file contains the new permanent design features. An edited version of the “aa” file is typically used for electrical system plans (similar to pavement delineation plans version), with new design features such as pavement edges, dikes, sidewalks, etc., shown dropped out (as if they are already existing). Design features directly related to electrical systems must be shown.

Master files contain information that is not relevant to the electrical work. Merge information that pertains to the electrical plan sheets (active files). The roadway should always be shown. The right of way and alignment may be new or existing, but they are shown solid on all plan view sheets.

The base map is never diagrammatic; it is always delineated proportionally and accurately with correct coordinates. Therefore, aspects of electrical systems not depicted by standard symbols (i.e., conduit runs) are also to be delineated accurately in relation to the base map.

Refer to Section 3.8 “Master Files” of the CADD Users Manual for further information.

Composition of Project Plans

All work needed for each electrical bid item in the project must be shown on the electrical plan sheets. The contractor must be able to readily identify all components of work associated with each bid item. This applies to all projects on the state highway system (SHS) regardless of funding, including local projects utilizing federal funds, Department-advertised and Department-administered contracts.

Electrical plan sheets identified as "E" may include notes, legends, schedules, plan views, and staging work (new, modified, or temporary). Plan sheets that include only electrical details must be identified as “ED”. Electrical quantity tables are mandatory and must be shown on “EQ” sheets. Electrical plans may include special electrical structures (SES) sheets.

Plans Organization

Organize the electrical plan sheets for each bid item by location of work, increasing post mile, or by stage sequence. Specify location and stage construction when applicable (e.g., to match layout or stage construction sheets). Arrangement should match other sheets in the plan set (e.g., roadway layout, pavement delineation, etc.). Organize electrical details and electrical quantity sheets in the same sequential order as the plan view sheets. Bid item components must be shown on the electrical plan view sheets and tabulated on quantity sheets. When payment is by lump sum all the work shown on an electrical plan view sheet must be included for payment in a single bid item.

Non-Electrical Systems Work

It may be necessary to show work not included in electrical bid items, such as roadside signs, irrigation controller enclosure cabinet installations, or overhead signs (e.g., to support a CMS or sign illumination) on electrical plan sheets. This notifies the contractor where to connect or in what sequence to construct such items relative to electrical work. A note on electrical plan sheets must clearly identify under which bid item such work is paid. Do not include roadway work for payment in electrical lump sum bid items unless it is minor or incidental to the electrical work and the roadway bid item that would otherwise be used is not in the project Bid Item List. For example, a small amount of concrete curb or sidewalk associated with a cabinet foundation might be included in an electrical lump sum bid item, when there is no applicable minor concrete item in the project. Do not call out other unrelated roadway bid items on electrical plan sheets.

Drafting Presentation Standards

Use legends, symbols, acronyms, abbreviations, and line styles shown on the Standard Plans to prepare project plans. Do not redefine standard legends, symbols, abbreviations, or line styles for a project. Nonstandard acronyms, abbreviations, legends, symbols, and line styles must be shown on the first electrical sheet type (e.g., E, ED, EQ). Refer to Section 2-1.2 “Drafting Standards” for further information.

Notes and Legends

Include project specific notes and legends where applicable. Do not mix legends and notes. If an individual legend entry is called out at multiple locations it must have the same number at each location.

Notes

Notes are numbered but not enclosed in any geometric shape. Notes must be brief and direct. Do not include specifications in notes that belong in the special provisions (refer to Standard Drawings from Other Agencies in Section 2-1.6). Do not designate various types of notes (e.g., “GENERAL NOTES,” “STAGE CONSTRUCTION NOTES,” “PROJECT NOTES,” etc.). Notes should be placed on the plan view sheet where they apply. When notes are not placed on the applicable sheet, specify to which sheets they apply.

Legends

The legend should be placed on the same plan sheet where the work is called out. When an individual legend entry involves existing facilities, clearly, and in separate

sentences, state what is existing, what is new and what the contractor is to do.

Each legend (for one or more location) must be numbered and enclosed with a rectangle to match the callout at each location it applies. Do not use legends to specify conduit run numbers. Avoid using legends if the annotation can be shown clearly in the plan view sheet. Example:



Schedules

Add the conduit and conductor run schedule and the pole and equipment schedule on or before the plan view sheet that it corresponds to (see Plan View Sheets section below). A schedule may be placed on the same plan view sheet where the work is called out.

Equipment or material (e.g., pole) schedule entries and callouts are lettered and drawn inside a circle. Example:



Conduit and conductor run numbers, schedule entries, and callouts are numbered and drawn inside a triangle. Conduit run numbers are used for Traffic Signals and Ramp Metering. For conduit runs without Conductor Signal Cable, avoid using conduit run numbers. Example:



Plan View Sheets

Plan view sheets provide a visual representation of electrical work in relation

to highway facilities. Plan view sheets are to be coordinately correct. A scale of 1" = 20' is typically used for traffic signals. A scale of 1" = 50' (Caltrans standard base scale) is typically used for lighting. Refer to Section 2-1.3 "Scales" for further information. Each electrical plan view sheet must include the following statement: "APPROVED FOR ELECTRICAL WORK ONLY." This statement must be located at the bottom-center of the plan sheet. Do not place this statement on electrical system detail or quantity sheets. Structure electrical plan sheets are generally made from the general plan of the structure involved, with bridge design elements dropped out, and non-pertinent details and notes removed.

The only information to be shown at the lower right corner of the electrical plan view sheet is the plan sheet name the scale, and the plan sheet identification and number. When payment is by lump sum the plan view sheet name must match the lump sum bid item description verbatim. Avoid using non-standard bid items. Use a non-standard bid item if the predominant electrical work shown on the project plan sheets is not described by any of the standard approved bid items.

Use break lines in place of match lines between plan view sheets that are not contiguous. The number of electrical plan view sheets may not correspond numerically to the roadway layout sheets. A key map may be necessary to eliminate confusion on the number of each type of plan view sheet. Avoid the use of break lines if electrical components will be omitted (e.g., conduit runs, pull boxes, poles etc.). Refer to Section 2-1.1 "Composition of Project Plans and General Preparation Procedures" for further information.

Coordination with Roadway Layouts

Coordinate electrical plan sheets so that they present the same configuration as the roadway layout plans. This facilitates correct location of overhead sign structures, standards, poles, push button assembly posts, pull boxes, etc. in relation to items such as utilities, pavement edges and sidewalks. Coordinate electrical stage construction plan sheets with roadway stage construction plan sheets so that they present a compatible stage sequence. This clarifies the sequence of both removal of existing electrical components (e.g., standards and poles) and construction of new electrical components.

One Electrical System (Lump Sum Bid Item) per Plan Sheet

When payment is by lump sum bid item, callout work for only one electrical system or lump sum bid item on each plan view sheet. This is required for work on new, modified, existing, or temporary electrical systems. Electrical stage construction work also must be shown on a plan view sheet for only one electrical system or lump sum bid item.

Shared Components

When electrical components (e.g., pull boxes, conductors, conduits, cabinets, poles, etc.) are shared among multiple electrical systems and payment is by lump sum, select one specific new, temporary, or existing electrical system in which to include each shared component. On other plan view sheets on which the shared component appears, repeat the callout or legend entry but with added information that states under what electrical system the component is included (i.e., “Part of XXXXX System”).

This is required for all electrical systems when payment is by lump sum.

New Electrical Systems

For new electrical systems paid for by lump sum, work at all locations throughout the project is included in one bid item. Refer to the Bid Item List for the current standard bid items.

For each electrical system not listed in the current Bid Item List, obtain approval to create and use a nonstandard bid item with supporting specifications (e.g., EXTINGUISHABLE MESSAGE SIGN SYSTEMS, HIGHWAY ADVISOR RADIO SYSTEMS, etc.). The same requirements for standard bid items apply to nonstandard bid items.

Temporary Electrical Systems

For temporary electrical systems paid for by lump sum, all work at all locations throughout the project is included in one bid item. Refer to the Bid Item List for the current standard bid items for temporary electrical systems.

Removing and Modifying Existing Electrical Systems

Use lump sum removing existing electrical system bid items (e.g., REMOVING SIGNAL AND LIGHTING SYSTEMS, REMOVING RAMP METERING SYSTEMS, etc.) where only removal of work is called out on the plan sheets and no electrical components are to be added or modified. Use modifying existing electrical system bid items (e.g., MODIFYING CHANGEABLE MESSAGE SIGN SYSTEMS, MODIFYING FLASHING BEACON SYSTEMS, etc.) where a combination of removing, adjusting, or adding existing components is called out on the plan sheet.

Stage Construction

Work for stage construction involved in each new electrical system is included for payment in the same lump sum bid item as the permanent work that the stage work facilitates. Therefore, the stage construction sheet name remains the same as the permanent electrical system bid item description. Work for stage construction to remove or modify existing electrical systems is included in the bid item for removing or modifying the existing electrical system, respectively.

Present work to be performed in the current stage as new. Present existing facilities or

facilities remaining from previous stages as existing. Specify removed or relocated facilities accordingly. Do not show facilities when they have been removed in a previous stage. Refer to Section 2-2.16 “Stage Construction/Traffic Handling” for further information.

Modifiers

A modifier must be included on plan view sheets that are one of multiple sheets showing work:

- in the same location
- for the same bid item

For new or temporary electrical work, a modifier identifies the:

- location of work
- stage of work
- local agency that the work is for

Do not refer to multiple electrical systems in a modifier. For removing or modifying existing electrical systems lump sum bid item work, include a modifier to identify one type of existing electrical system that is being removed (partially or completely) or modified. This is required because you may call out work for only one new, temporary, or existing electrical system on each plan view sheet.

A modifier must be located near the bottom-center of the plan view sheet. Do not include a modifier as part of the electrical plan view sheet name. Modifiers must be specific. Use modifiers that follow the same conventions throughout the project plans. Modifiers are not required for all projects.

Details

Electrical details are project specific details for work shown on the electrical plan sheets

that is not included in the Standard Plans. Electrical details may include modifications to the Standard Plans. Refer to Section 2-2.6 “Construction Details” for further information. A modified standard plan detail or a combination of standard plan details must be shown and labeled as a modified detail. Provide sufficient dimensioning and callouts for the modified detail so that quantities involved are calculable. See Section 2-1.4 “Use of Standard Plans.”

Each detail must have a name or a designation (or both, e.g., “LOOP DETECTOR SPACING FOR RAMPS,” or “DETAIL B”). If a callout or legend entry invokes an electrical detail that is not on the same plan sheet, the callout or legend entry must include the sheet identification and number on which the detail is shown (e.g., “SEE SHEET ED-1 FOR DETAIL A”). Shared details called out in multiple plan sheets should be shown on ED sheets.

If a detail includes dimensions, the statement “NO SCALE” should be added below the name of the detail (unless it is drawn to scale). If a detail has no dimensions (e.g., a schematic wiring diagram), the statement “NO SCALE” is not necessary. When all details on one electrical detail plan sheet comply with either of the previously mentioned cases, inclusion, or absence of the statement “NO SCALE” applies to the entire electrical details plan sheet.

When an electrical plan view or detail sheet shows material that is paid for under a different bid item, identify which bid item is used for payment. Also identify all such bid items in a quantity table that includes the bid item description consistent with the project Bid Item List.

Standard drawings from other agencies, when applicable to the project, shall be included as part of the project plan set. Referring to a standard drawing number from another agency is not acceptable. Identify which bid item includes payment for the work involved. Refer to Section 2-1.6 “Standard Drawings from Other Agencies” for further information.

Quantities

Electrical quantities must be summarized in tabular format in "EQ" plan sheets. Quantity tables must show the bid item quantities, location, and their respective plan sheet. Quantity tables for electrical bid items must be included in the project plans for each bid item, except for removing existing electrical system bid items. When a bid item is called out on roadway plan sheets and electrical plan sheets (e.g., roadside signs) it must be quantified on the appropriate quantity table. Reference the electrical plan sheet on which those quantity table entries are shown. The quantity tables must include significant components included in the bid item. Significant components include, but are not limited to, Standards, poles, posts, pedestals, foundations, signal heads, pedestrian signal heads, APS's, BPA's, luminaires, cabinets, enclosures, conduit, pull boxes, vaults, conductors, cables, detectors, sensor, cameras, CMS's, EMS's, modems and UPS's by type and quantity.

Lump Sum Bid Item Quantity Tables

Most electrical system work is paid for by lump sum bid items. Quantity tables of material and components of work must be included for each electrical bid item except for removing electrical system bid items. Quantity tables must be included in "EQ" sheets. Material, components, and quantities

in quantity tables for lump sum bid items are for bidder and contractor information because not all material needed is identified (e.g., conduit couplers, fasteners, slack in conductors, etc.). The note "ELECTRICAL SYSTEMS QUANTITY TABLES SUMMARIZE SIGNIFICANT COMPONENTS. SEE ELECTRICAL SYSTEMS PLANS AND SPECIFICATIONS TO DETERMINE ALL MATERIALS NEEDED FOR EACH SYSTEM." must be included in each electrical system quantity sheet. The note "NOT A SEPARATE BID ITEM" must be included in each quantity table column or header for items of work which are not separate bid items. "(N)" may be used as an abbreviation for "NOT A SEPARATE BID ITEM". The title of the lump sum bid item quantity table must be consistent with the electrical system plan view sheet title (bid item description). When there are multiple locations or stages of work, include the material and components in a single quantity table or in multiple quantity tables with the same title. Repeat locations and stages exactly as they appear in modifiers used on the plan view sheets. Arrange quantity tables on electrical quantity sheets in the same order as the plan view sheets, they summarize (refer to Composition of Plans). Include incidental roadway work for payment in the applicable electrical system lump sum bid item, if shown on the plan sheets.

For further information on presenting bid items and quantities in a quantity table, refer to Section 2-2.19 "Summary of Quantities."

Special Electrical Structures

Special electrical structures (SES) sheets are not separate bid items. SES sheets include details that are part of one or more electrical bid item. Callouts on electrical plan view sheets must refer to the applicable sheet (e.g., SEE SHEET SES-1). When an SES detail is a component shared among multiple electrical systems, state under which electrical bid item the detail is paid (i.e., "Part of XXXXX Bid Item"). Include a similar cross reference on the electrical plan view sheet stating under which electrical bid item the detail is paid.

CHECKLIST FOR ELECTRICAL SHEETS

- | | |
|---|--|
| <p><input type="checkbox"/> District, county, route, and post miles are shown</p> <p><input type="checkbox"/> Unit, Project Number and Phase are shown</p> <p><input type="checkbox"/> Signature, date of signature, license number, printed name, and license expiration date are shown. (Signature is added as the last step before the project is ready to list)</p> <p><input type="checkbox"/> North arrow is shown on applicable sheets</p> <p><input type="checkbox"/> Scale centered below "E" and "ED" sheet titles</p> <p><input type="checkbox"/> Information on plan sheet development name blocks in left margin of border sheets. See Figures 2-10 and 2-11 in Section 2-1.6 for additional instructions</p> <p><input type="checkbox"/> Applicable sheet approval statement centered at bottom of "E" sheets (example: <i>"APPROVED FOR ELECTRICAL WORK ONLY"</i>)</p> <p><input type="checkbox"/> Right of way and easements shown on: <ul style="list-style-type: none"> • electrical system plan view sheets • spot locations where no other plan view sheet shows R/W </p> <p><input type="checkbox"/> Following statement shown on each plan sheet where right of way is shown: "FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE"</p> | <p><input type="checkbox"/> Standard abbreviations conform to those listed in the Standard Plans.</p> <p><input type="checkbox"/> The first sheet of each electrical plan sheet (e.g., "E", "ED" and "EQ") contains project specific, symbols, and nonstandard abbreviations that are not included in the Standard Plans.</p> <p><input type="checkbox"/> Routes, streets, and lines are designated. Do not use route shields (markers).</p> <p><input type="checkbox"/> Plan view sheet name must match the bid item description for the work shown.</p> <p><input type="checkbox"/> Modifiers such as location number, city, county, intersection of local streets, stage construction, etc. are near the bottom center of sheet.</p> <p><input type="checkbox"/> Limit of roadbed shown on plan view sheets.</p> <p><input type="checkbox"/> Environmentally sensitive area (ESA) limits shown on plan view sheets</p> <p><input type="checkbox"/> Alignment line and stationing are shown solid on the plan view sheets. Stationing matches roadway layout sheets</p> <p><input type="checkbox"/> Fences, city, and county limits are shown</p> <p><input type="checkbox"/> Utility plans signed by a registered civil engineer</p> <p><input type="checkbox"/> Road approaches, street names, and on/off ramps are shown and labeled</p> <p><input type="checkbox"/> Bridge name and number (Show bridge limits when work is to be performed on the bridge)</p> |
|---|--|

**CHECKLIST FOR ELECTRICAL
QUANTITY SHEETS**

- For conduit runs in sidewalks, show limits of sidewalk, driveways, and curb ramps along the entire conduit
- Verify locations of irrigation controllers match the landscape plans
- Verify locations of standards, poles, posts, and APS's are ADA compliant, and consistent with the roadway layout plans and other applicable sheets
- Existing electrical systems are shown on plan view sheets
- Cross-references between SES, plan view and electrical detail sheets
- Name of quantity table for lump sum bid item matches bid item description and plan view sheet name
- Quantity sheets have the note "ELECTRICAL SYSTEMS QUANTITY TABLES SUMMARIZE SIGNIFICANT COMPONENTS. SEE ELECTRICAL SYSTEMS PLANS AND SPECIFICATIONS TO DETERMINE ALL MATERIALS NEEDED FOR EACH SYSTEM"
- Quantity tables for lump sum bid items include the symbol "(N)" or "NOT A SEPARATE BID ITEM" in each header or column
- Bid items that are not lump sum are summarized in quantity tables

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2-2.24 Structure Design

The preparation of bridge plans is the responsibility of the Office of Structure Design. Proposed bridge construction plans are sent to the district for a check of all data pertaining to horizontal and vertical alignment and for verification of clearances.

For guidelines on preparation and design of bridge plans, see the Caltrans Bridge Design Details Manual and the Structural Detailing Standards.

In addition to the design of bridges, the Office of Structure Design is responsible for the design and aesthetic features of the following types of buildings and structures:

- Maintenance stations
- Roadside rests
- Pumping plants
- Special design sound walls, retaining walls and earth retaining structures

Additions and modifications to existing buildings or miscellaneous transportation facilities is also the responsibility of the Office of Structure Design.

The preparation of plans specific to the construction or modification of a building is the responsibility of a structural engineer.

Sheet types that may be used for construction or modification of a building are:

- General Plan (general layout and index of structures design work)
- Architectural Plans
- Structural Plans
- Mechanical Plans
- Electrical Plans
- Sanitary Plans (sewers for buildings)

Standard drawings applicable to building related work are available from the Transportation Architecture Branch of the Office of Structure Design.

If the construction or modification of a building requires road work to be performed, then the associated road work should be shown on those sheets that contain that specific type of work, for example:

- Layouts or Construction Detail sheets would show, as applicable to the project, construction of road connections to the building, construction of parking areas, paving of existing surfaced areas, etc.
- PD sheets would show pavement striping and signing
- Landscaping sheets would show planting and irrigation work

The building construction plans are to follow the last sheet of the road work portion of the project plans (this includes new and revised standard plans applicable to the project). This order of plan sheets follows the convention used for a highway construction project, where the bridge plans follow roadway plans.

If building construction plans (such as a roadside rest) are part of the project plans for highway construction, then the plan sheets use the naming convention as detailed in Section 2.2 of the CADD Users Manual. The sheet name and print sequence is shown in Section 2.1 of the CADD Users Manual.

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SECTION 2-3

PROCESSING PLANS AFTER PLANS, SPECIFICATIONS AND ESTIMATE (PS&E) SUBMITTAL

2-3.1 Draft Contract Ready

After PS&E submittal by a district, DES-OE Project Plans Unit will send the district a “First Notice,” acknowledging that the plans portion of the district’s PS&E submittal has been received. It is recommended that the district keep the MicroStation files (.dgn) of the Project Plans as submitted to DES-OE. There may be cases where the district submits revised, replacement or additional plan sheets after the original PS&E submittal, and will receive another “First Notice.”

Upon a complete review of the district PS&E submittal, DES-OE develops Draft Contract Comments (DCC). In reviewing the DCC, the district has their only opportunity to respond to any redline change before the printing of the PS&E package (Bid Set.) After the district reviews, discusses and agrees with the DCC, the District Responses (DR) are returned to DES-OE. Note: the project engineer may request a scanned copy of a particular redline plan sheet from the DES-OE-Spec Engineer (SE) only if it is necessary to convey the redline plan change. Any change or correction after the DCC must be handled by addenda.

The Draft Contract Ready (DCR) process finalizes the contract documents for advertisement. After the Project Plans Unit (PPU) has completed the redline changes to the plans, the final project plans will be available to be viewed on the web in TIFF format. The SE prepares a Quality Feedback

and DCR memo to be sent back to the district project engineer along with the final Special Provisions.

The Structures portion of the project plans will be handled by DES-OE directly with Structure Office Engineer and the structures design engineer. For further instructions on the DCR process, contact DES-OE.

2-3.2 Project Ready-To-List (RTL) Certification

The Construction Contract Development (CCD) Guide describes activities, roles and responsibilities required to complete project plans, specifications and estimate, to advertise, open bids, and award a construction contract. The CCD Guide (formerly RTL Guide) is available at: <http://www.dot.ca.gov/hq/esc/oe/rtl/ccdg/CCD-Guide.pdf>

RTL certification ensures that all applicable design, right of way, environmental, regulatory, and statutory conditions have been addressed in the plans, specifications, and estimate. See Sections 1 and 2 of the CCD Guide. Two of the requirements for RTL that involve CADD files are Cross-Sections and the Survey File Checklist.

Earthwork cross-sections are a vital component in the development and construction of many projects. They assist the designer in developing the most efficient way to handle the earthwork items and assist the bidder in understanding the scope of the earthwork to be performed. Surveys, Construction and the Contractor utilize the earthwork cross-sections to construct the project as designed.

Although cross-sections are not included in contract bid documents, they are supplemental information for the

convenience of bidders. When cross-sections are prepared, they shall be made available to bidders. Potential bidders will be notified in the “Notice to Contractors” that cross-sections will be available through the District/Region Construction Duty Senior in the district in which the project is located.

For guidance in developing earthwork cross-sections, see Chapter 3 of CADD Users Manual.

The Survey File checklist shall be completed as described in the Project Development Procedures Manual "Appendix QQ." The Survey File checklist defines what Surveys will need to stakeout a project. It would be good business practice to submit a draft of the Survey File checklist to Surveys at PS&E for QA/QC, even though it must be completed and submitted to Surveys by the RTL date in order to achieve RTL Certification.

2-3.3 As-Awarded

After a project has been awarded to the winning bidder, DES-OE will send the District a “Second Notice,” which instructs the District to copy back the As-Awarded .dgn files. These .dgn files include any addenda that may have occurred during the advertisement of the project. All .dgn files in DES-OE for a particular project will be deleted on the date listed in the "Second Notice." The District will need to keep the As-Awarded MicroStation files for possible use by Construction during the course of constructing the project. The As-Awarded project plans are microfilmed and stored by the HQ Microfilm Unit.

The district (or consultant, as the case may be) shall use the As-Awarded MicroStation files when developing the As-Built plans at the completion of construction.

2-3.4 Contract Change Order

Changes to a contract may be necessary during the construction of any project. A change is made with a Contract Change Order (CCO). A CCO is a legally binding document used to make changes to the contract.

Construction is the lead in handling CCOs. Depending on the nature of the change, Construction will usually consult with or get concurrence from the project engineer when the change affects the design of the project. For a comprehensive look at how the CCO process works, see Chapter 5 of the Construction Manual.

If replacement or additional sheets are generated by the CCO, they must have the signature and seal of a registered engineer (whether the engineer be from Design or Construction) who is most responsible for the change. Before the As-Built plans can be completed, each replacement or additional project plan sheet must contain the signature and seal of a registered engineer.

2-3.5 As-Builts (Roadway Plans)

As-Built plans are the original project (As-Awarded) plan sheets that have been updated showing changes that occurred during construction. Accurate As-Awarded and As-Built project plans are needed for possible litigation involving construction claims and tort liability suits.

As-Built plans represent the existing field conditions at the completion of a project, and may be used as reference or base mapping for future projects.

All As-Built plans must be clearly identified as such. All plan sheets containing changes must have the name of the Resident Engineer, the Construction Contract Acceptance (CCA) date, and the contract number. Except for certain projects that do not require a State representative on site during construction, Districts will be responsible for all As-Built road plans.

The Resident Engineer can make the field changes to hard copy prints (afterwards transferred to the original As-Awarded project CADD files) or directly to the As-Awarded project CADD files themselves. For the final As-Built plans, revisions are noted by lining out the original information but it must still remain legible. Do not eradicate original figures or make corrections over them. All lettering must be legible. The changes shall be made in such a manner that they will produce good quality microfilm.

For instructions on how to complete the As-Built changes in the As-Awarded project CADD .dgn files, see Chapter 4 of the CADD Users Manual. The final As-Built changes shall be completed in the original As-Awarded project CADD .dgn files on Level 62.

In order to attain uniformity, the following data should be shown on “As Built” plans:

- Revision of alignments and right of way.
- Grade revisions in excess of 0.1 foot.
- Drainage changes.
- Revisions made to typical sections.
- Change in pavement lanes, sidewalks, islands, and median openings.
- Curb and gutter changes.
- Electrical conduits, pull boxes, and

service points.

- Revision in the location of utility crossings and facilities made during construction.

For further information on data shown on As-Built plans, see Chapter 5 of the Construction Manual.

When the As-Built plans are completed, the District shall create TIFF files from the .dgn As-Built plans and send them to the Document Retrieval System (DRS) Unit at HQ CADD. When a .dgn file does not exist, then the original hard copy As-Built print shall be scanned to a TIFF file.

For archiving purposes, As-Built plans must be submitted to the DRS Unit within the allotted time as described in the Project Development Procedures Manual (PDPM.) For further guidance on archiving of As-Built plans to the DRS Unit, see Chapter 4 of the CADD Users Manual and Chapter 15-Section 3 of the PDPM.

2-3.6 As-Built (Structure Plans)

After construction is complete, the As-Built plans redline corrections can be placed on either a hardcopy set of the As-Awarded (Second Notice files) plans or a copy of the “Second Notice” project CADD files. For redline corrections made, the Structure Representative uses the records of changes made to the structures during construction, to redline a set of contract plans. The corrections are shown, in red, to depict what was actually constructed. The Structure Representative then sends the As-Built plans redline corrections (either hardcopy or electronic) to DES Structure Construction. Structure Construction will log the redline corrections and forward them to the

appropriate Design Branch (which may be a consultant if it was a consultant design project.)

When making the redline corrections on a copy of the As-Awarded project CADD files, a MicroStation redline program is used by the Structure Representative. Changes are to be made on Level 62 using Color 62. Drafting standards will be maintained using Caltrans Metric Structural Detailing Standards or Caltrans U.S Customary Units Structural Detailing Standards. Contact DES-Structures for further information about detailing standards.

The appropriate Design Branch or consultant (if it was a consultant design project) will finalize the As-Built plan process. The Design Branch or consultant will request the “Second Notice” files to add the redline corrections. The responsible Project Engineer must submit the form DS-D0144 (Change to Contract Drawings) or DS-D0144E (Request for Electronic Contract Drawings) to the Structure Design Document Unit to obtain hardcopies of the “Second Notice” files. The DS-D0144E form must also be sent to DES CADD Services in order to obtain the “Second Notice” original project CADD files. For more information please see Bridge Memo To Designers 1-16.

The Design Branch or consultant must follow the procedures for As-Built redline corrections as outlined in the Bridge Design Details Manual, pages 1-20.1 through 1-20.5, and Chapter 5 of the Construction Manual.

DES-Structures or consultant shall create TIFF files from the completed .dgn As-Built plans and send them to the DRS Unit. When a .dgn file does not exist, then the original hard copy As-Built print shall be scanned to a TIFF file. TIFF files shall also be placed in the Bridge Inspection Retrieval Information System (BIRIS.)

2-3.7 Projects Not on State Highways

For information concerning this topic, see Chapter 5 of the Construction Manual.

**CHAPTER 3
PRELIMINARY PROJECT
DEVELOPMENT DRAWINGS**

3-1 INTRODUCTION

3-1.1 General

This chapter deals with various drawings, which are prepared during the development of a project. Each drawing has a specific use, which dictates what needs to be shown on the map. The uses and minimum contents are described and illustrated by examples.

Frequently, the same basic drawing can be used to meet the needs of several specific drawings by the addition of appropriate notes, titles, and a minimum of delineation. Content along these lines are included in the discussion of the various preliminary project development maps which follow.

3-1.2 Maps

A map is a graphic representation of the existing features of the earth’s surface. These features consist of essentially two things - relief and planimetry.

Relief is normally shown by contours, breaklines and spot elevations. A map showing only relief is a "Digital Terrain Model" (DTM).

Planimetry is a representation of man-made culture and natural features. A map showing only planimetric features (not relief) is a “planimetry map.” A map depicting both relief and planimetry is a “topographic map.”

A map showing primarily the extent of property ownership, areas, definition of boundaries, and corners is a “cadastral map.” At the California Department of Transportation (Caltrans) such maps are commonly referred to as right of way maps.

Maps serve as means of locating, recording, and referring to planimetric, DTM or topographic features. They are utilized for studies, planning and designing improvements or replacements to existing facilities.

3-1.3 Photogrammetric Maps

On all projects, consideration should be given to maps produced by photogrammetric methods.

At Caltrans these maps are used for design and planning.

TABLE 3-1		
PURPOSE	SCALE	CONTOUR INTERVAL
Design	1”=50”	2 ft
	1”=100”	5 ft
Planning	1”=200’	10 ft

Photogrammetric map scales and contour intervals vary widely. Table 3-1 indicates the most commonly used scales and contour intervals on maps.

Photogrammetric map content may differ as indicated in Section 3-1.2. Features, such as cultural (man-made), DTM (contours and elevation information), hydrographic (water), vegetation (trees, brush orchards, etc.), etc., may be omitted or added depending on the particular map requirements.

Photogrammetric maps may be utilized for reports, working drawings, project plans, etc. For further information concerning the use of photogrammetric maps contact the District Photogrammetry Coordinator or the headquarters Office of Geometronics.

Caltrans Standard Plan A10E contains the standard symbols used for topographic mapping by photogrammetric methods. Standard Plan A10C contains standard symbols used for contract plan design. Symbols for topographic mapping and contract plan design are contained in the Caltrans MicroStation cell library (ctcellib.cel) and the MicroStation line style resource file (ctlstyle-ss3.rsc).

3-2 MAPS AND EXHIBITS - SPECIFIC DATA

3-2.1 General

Preliminary project development drawings are typically developed for a plot scale of 1"=200'. They are used extensively to show the relationship of a project to the surrounding road and street system and to study various alternate geometric designs for a project.

There are numerous sources of mapping for use in preparing project development drawings. Frequently, the same base map can be used to develop several of the drawings described in this chapter. This requires careful selection of the base map.

The Office of Highway System Information and Performance personnel maintain the California Road System mapping. Duplicates of these maps can be used as base mapping for several of the drawings discussed in this Section.

3-2.2 Strip Map

This is one of the most important maps for feasibility studies and for initial development of a project. It graphically shows the basic highway alignment and interchange locations.

Map scales should be kept in the 1"=200' to 1"=600' range. The date of preparation and

subsequent revisions must be shown. Special original drawings are not required. The following data is required:

(1) Plan

The map shall show the freeway lanes, crossroads, separation structures, interchanges including the complete interchange pattern and frontage roads. The local road pattern and prominent geographical features shall also be shown. Sufficient local street names at the interchanges and adjacent to the freeway should be shown to orient the drawings. A north arrow shall be provided, and shall generally be oriented to point to the right or up.

(2) Profiles

The freeway profile with its ground line shall be included. If the separate roadways have independent profiles, which are substantially different, both shall be shown. Profiles of ramps, crossroads, and frontage roads are not required.

(3) Typical Section

Include a schematic freeway geometric typical section (no ramps or frontage roads). The typical section shall show the number of lanes, median and shoulder widths.

(4) Traffic

All traffic movements for the design year with the AM and PM peaks and ADT shall be shown similar to the Design Designation on the Typical Cross Section plan sheets and by means of traffic diagrams. Indicate the design year or year of traffic count.

3-2.3 Route Adoption Map

The purpose of the Route Adoption map is to document the location and designation of a Highway route that has been approved by the California Transportation Commission (CTC).

A more in depth discussion of the policies and standards regarding Route Adoptions can be found in [Chapter 23](#) of the Project Development Procedures Manual (PDPM).

The following route adoption map formats are used in the selection or designation of highway routes by the CTC:

- (a) freeway or a controlled access highway
- (b) conventional highway
- (c) transfer of highway location
- (d) route re-designation

(1) Format

- (a) The form for the title and certificate for the various examples are shown in Figures 3-2.3A through 3-2.3E at the end of this chapter.

All type of Route Adoption maps, except for re-designations, must show the Caltrans District delegated Design Official Engineer's certification and signature at the top right corner of the map. The CTC Executive Director's certification and signature must be shown at the bottom left corner of the map.

For freeway adoptions, the phrase “A FREEWAY” is added to the title block, and the wording “and declared a freeway” is added to the CTC Executive Director’s certification. For controlled access highway adoptions, the phrase “A CONTROLLED ACCESS HIGHWAY” is added to the title block, and the phrase “and declared a controlled access highway” is added to the certification.

For conventional highway adoptions no special designation needs to be added to the title block or the certification.

Adoption maps of traversable highways are shown with the appropriate designation as discussed above.

A transfer of highway location occurs when a local agency requests that an existing conventional state highway be moved to a parallel local street or road. The title block for these maps will include “Transfer of Highway Location.” The map must clearly show the new route to be adopted and the portion of the existing route being superseded and to be relinquished to the local agency.

A route re-designation occurs when there is a need to change the existing route number to a different one. A route re-designation map does not require either a certification or a signature block. The title will reflect the route to be re-designated.

- (b) The original map shall be plotted on 11” tall paper and the length will vary as needed to clearly show all the pertinent information. The minimum length for a plotted map is 17” and the maximum is 42”. Other lengths for a plotted map are 24”, 30” and 36”. The preferred scale for route adoption maps is 1”=1500’. The scale used may vary as long as details are legible and clear. When the map is folded, the title block must be visible. General text sizes are found in the CADD User’s Manual. Templates for several size examples with default text sizes (in DGN format) are available on the intranet at:

<http://design.onramp.dot.ca.gov/route-matters-and-freeway-agreements>

Preparation of the base map shall follow standard mapping practice, showing the usual geographical features, for example: rivers, lakes, railroads, streets, and roads. The major arterials in the

corridor and all streets in proximity to the proposed route are to be shown in urban areas. In rural areas all existing public roads or streets are to be shown. Private roads are not to be shown in either case.

A roadway can be a “public road or public street” even though it is not an official “county road” or “city street.” One of the factors to be considered in determining if a roadway is a public road or public street is whether it is being maintained at public expense. Another factor is whether it is open for public use regardless of who pays for maintenance. It is not necessary that the roadway be paved to be considered a public road or public street. Another factor that can be applied is whether the roadway serves more than one of the ownership’s not adjacent to the adopted route. District files should clearly document the facts upon which the determination is based.

- (c) Existing divided freeways, and expressways with two or more lanes are shown by two parallel lines. Freeway to freeway interchanges are always shown. Other freeway interchange geometrics are not drawn unless an existing facility is shown for clarity.
- (d) An existing state highway is shown by two parallel lines and further identified by the phrase, “Existing State Highway.” Local streets or county roads are shown using two parallel lines. If needed, depending on the scale of the map, local streets and county roads could be shown using single lines, but avoid if possible.
- (e) The route adoption limits in the title block should refer to delineated features, for example: streets, roads, and rivers. Reference to either unincorporated towns or communities by name only or to incorporated city limit lines subject to

change should be avoided. When either end of the route adoption limits is identical to a previous adoption, the description at such coincidental points should be identical when possible.

- (f) When the adoption covers many miles, consideration should be given to using two or more maps with a match line.
- (g) The map drafting style to be used for all route adoption maps include:
 - A heavy solid line showing the location of the proposed state highway and identified by the phrase “Location of State Highway.”
 - The designation of the termini for the location of the highway as “Beginning of Adoption” and “End of Adoption.”
 - The identification of the present State highway shown by parallel open lines, as “existing State highway.”
 - A solid dashed line showing the location of an adopted, unconstructed freeway and labeled with the date of the freeway adoption.
 - An open dashed line showing the proposed location for another state highway concurrently being considered for adoption.
 - Superseded highway to be relinquished needs to be labeled as such.
 - A Legend may be added if needed for clarity.
- (h) Examples at the end of this chapter include additional instructional notes for drafting standards.

(2) Location Map and Vicinity Map

Location maps are needed for the request for approval of a Route Adoption alignment

location report to the CTC. If additional details need to be shown to describe the proposed route adoption location, a Vicinity map should also be prepared and included in the report.

A Location map is an 8 ½” x 11” map with two drawings, one is an area map of the proposed project showing the district, county or city limit lines, all state highways and major local roads when pertinent. The second drawing is a California County map showing the county where the project is located. The California map should always be at the bottom of the Location map.

The location of the requested route alignment should be in the central portion of the map with a text box "ROUTE TO BE ADOPTED" pointing to the route. On the California County map, the label "Location" shall be in bold lettering added with a large arrow (named "locarr" in the MicroStation cell library) pointing to the county where the project is located.

For examples of the "Location map", see Figures 3-2.3F and 3-2.3G at the end of this chapter.

Vicinity maps are similar to Location maps but show a closer look of the proposed route location. See Figure 3-2.3H at the end of this chapter.

(3) Processing

The Route Adoption Map, the Location Map and the Vicinity Map, if any (as a DGN or PDF file) are to be submitted to the Headquarters Division of Design for the CTC Report.

3-2.4 Freeway/Controlled Access Highway Agreement Exhibit

(1) General

The purpose of the freeway agreement or a controlled access highway agreement is to document the agreement between Caltrans and a local agency on how and where local streets and roads will be connected to the controlled access facility. Exhibit A shows the location of interchanges, separations, road closures, frontage roads, local streets, pedestrian crossing structures and non-motorized facilities (within the right of way). A more in depth discussion of the policies and standards regarding freeway agreements or controlled access highway agreements can be found in [Chapter 24](#) of the PDPM.

(2) Format

The freeway agreement and controlled access highway agreement exhibits are to be 11” tall by a length which varies depending on the limits of the agreement and the scale of the map. The scale of the map can vary from approximately 1”=100’ to 1”=1000’ (with a plotted map length of 11"x17", 11"x30" or 11"x42"). The length of the exhibit shall be sufficient to show at least one adjacent interchange or intersection on each side of the limits of the agreement or preferably should extend to the limits of the city or county, if practical. If a longer Exhibit map is needed, additional sheets should be used with labels like "Sheet 1 of 3", "Sheet 2 of 3", etc. added below the "Exhibit A" callout at the right, top corner of the map. The title block is to be visible when the exhibit is folded to 8 1/2” x 11” dimensions for filing purposes.

There are two types of freeway or controlled access highway agreement exhibits, geometric or symbolic. The symbolic type is always preferred unless the local agency objects to the

use of a symbolic exhibit before executing the freeway or controlled access highway agreement.

For more information on the preparation of these types of agreement exhibits see [Appendix CC](#) of the PDPM.

The ability to clearly read information contained on the map should be the determining factor when selecting the appropriate scale and number of sheets used for the exhibits. The preferred scale for a Freeway Agreement or Controlled Access Highway Exhibit is 1"=1000'. The scale used may vary as long as details are legible and clear. A graphic Bar Scale shall be used on all exhibits as they may be in effect for a long period of time. By including a graphic scale this document can be reduced or enlarged without the loss of dimensional information. Traffic data, cross sections and profiles are not shown on the agreement exhibits. General text sizes are found in the CADD Users Manual and templates (in DGN format) for preliminary maps with default text sizes are available at:

<http://design.onramp.dot.ca.gov/route-matters-and-freeway-agreements>

For an example of a geometric Freeway Agreement exhibit see Figure 3-2.4A at the end of this chapter. For examples of symbolic type exhibits, see Figures 3-2.4B through 3-2.4F at the end of this chapter.

3-2.5 New Public Road Connection Location Map

(1) General

A new public road connection (NPRC) request to the CTC is needed to ensure complete evaluation of all proposed revisions to access control so that current and future traffic safety and operations are not compromised. NPRC

approvals are also required to protect the investment in any improvements made to the controlled access highway, and to permit the ultimate development of a full freeway or an expressway when traffic and other conditions require. A DGN file or a PDF of the Location map file will need to be submitted to the Headquarters Division of Design for the CTC Report.

A more in depth discussion of the policies and standards regarding new public road connections can be found in [Chapter 27](#) of the PDPM.

(2) NPRC Location Map

A NPRC Location map is a 8 ½" x 11" map, with two drawings, one is an area map of the proposed NPRC showing all state highways and major local roads nearby when pertinent. The second drawing is a California County map showing the county where the project is located. This California map should always be at the bottom of the Location map.

The location of the requested route alignment should be in the central portion of the map with a text box "LOCATION OF REQUESTED CONNECTION" pointing to it. On the California County map, the label "Location" shall be in bold lettering added with a large arrow (named "locarr" in the MicroStation cell library) pointing to the county where the NPRC is located.

For examples of New Public Road Connection Location maps, see Figure 3-2.5A & 3-2.5B at the end of this chapter.

3-2.6 PUC Exhibits

not process the application without the approved environmental document.

(1) General

The Public Utilities Commission (PUC) requires certain exhibits whenever new railroad grade crossings are proposed, or an existing grade crossing is to be reconstructed, altered or abandoned. These exhibits are prepared in the district and forwarded to the Headquarters Division of Right of Way and Land Surveys, Railroads and Utility Relocation Office for review and assistance with the preparation of an application to the PUC for authorization of proposed work. These exhibits shall clearly show the location and the work affecting the railroad.

Pertinent dimensions within railroad right of way must be shown in English units. Pertinent dimensions include but are not limited to right of way widths, horizontal and vertical clearances, rail elevations and track layout dimensioning.

The exhibits for a formal PUC application consist of the following:

- Exhibit A - Two drawings, one which contains a location map and a vicinity map, the other drawing contains a strip map of the proposed project.
- Exhibit B - Drawing which shows the plan, topography, profiles and typical sections of the proposed improvements. If more than one crossing is involved, one Exhibit A will suffice, but a separate Exhibit B must be prepared for each crossing.
- Exhibit C - Narrative of the legal description of the easements required for the subject crossing.
- Exhibit D – Copy of the approved project environmental document. The PUC will

For existing crossings, a short form application under PUC General Order No. 88B may be used in lieu of a formal application.

Each railroad has specific requirements therefore District Railroad Coordination, in conjunction with Headquarters Division of Right of Way and Land Surveys, Railroads and Utility Relocation Office, will ensure that these requirements are met before the application is submitted. The initial submittal package must include the application form, Structure General Plan (if there is a structure involved), Location and Vicinity Maps, plans and profiles of work within railroad property, legal description of any required easements (only for the formal PUC application) and evidence of an approved environment document, such as its cover sheet identifying the project and its signed signature sheet showing approval.

Once the engineering plans have been approved by the Railroad, District Right of Way Coordinator submits the drawings of the required easement and legal description to the Railroad. It should be noted that all documents to the Railroad are to be submitted to the Headquarters Division of Right of Way Office and Land surveys, Railroads and Utility Relocations Office for review and concurrence prior to submitting to the Railroad.

Exhibits A and B should be plotted 11" x 17" but a 22" x 36" plot is acceptable when conditions will not conveniently fit on a 11" x 17" plot. A hardcopy is to be submitted to the Railroad.

(2) *Exhibit A*

The first drawing of Exhibit A shall contain the following two maps:

- (a) **Location Map** - The location map is a small-scale state map showing the county in which the crossing is located. The county lines are to be outlined with dark lines where the county in which the crossing is located. A location arrow shall be pointed to the appropriate county. The location map is to be shown on the left side of the 11" x 17" sheet.
- (b) **Vicinity Map** - This map is a small-scale map showing the crossing in relation to nearby towns, city, other political subdivisions, and major cultural features. Usually a letter size map of the county showing towns, major land lines, such as township, rancho lines, etc. and major highways will suffice. The crossing location is to be shown by means of a location arrow. The vicinity map is to be shown on the right side of the 11" x 17" sheet.

The second drawing of Exhibit A shall contain the following:

Strip Map - This map is basically a portion of the project map or title sheet. The bar scale is usually between 1" = 1000' or 1" = 2000' and the map should cover an area within a radius of 0.6 to 1.2 miles from the crossing. The strip map shows the relationship of the crossing to existing roads, railroads, and additional crossings. The PUC and the United States Department of Transportation crossing numbers must be labeled and shown for each crossing within the project limits.

For all new crossings, the strip map shall show the present state highway route now being used by the traveling public that will later use the new or reconstructed crossing.

For an existing crossing to be abandoned, the strip map shall clearly show the state highway route that the traveling public, now using the crossing, would be required to travel after the crossing is abandoned. The District Railroad Coordinator will work with the Railroad and PUC for any at-grade crossing closure. The Railroad will request approval from the U.S. Surface Transportation Board for any crossing closure.

(3) *Exhibit B*

(a) **New Crossings** (at-grade crossing or separated grade crossing) - This exhibit shall contain the following:

- **Plan** - Generally at a plotting scale of 1"=20' or 1"=50'. For separated grade crossings, a copy of the Structure General Plan would be appropriate for use as the plan portion of the exhibit. Plan coverage for at-grade crossings should extend about 400' each side of the crossing on the railroad and 200' on the highway. For at-grade crossings, the proposed crossing protection devices are to be identified and shown.
- **Profiles** - A separate profile for the railroad and one for the highway. The railroad profile shall show the railroad stationing, datum elevation, existing top of rail grades and rates, proposed rail grades, proposed Points of Intersection (PI's) and Vertical Curves (VC's) and the centerline of the highway crossing with station and elevation.
- **The highway profile** shall show stationing, datum elevation, ground line, grade line with rates, Line Designation and route identified and any other necessary components as described in Section 2-2.5 of this PPM.

Where each rail crosses the highway profile grade line, identify each rail with its elevation and the stationing of each rail or track centerline.

- Typical Cross Section - The structural section of the highway at the crossing. The typical section is to be normal to the highway. The statement that “Construction must follow PUC Standard No. 3, of PUC General Order 72-B, or equal” shall be added unless a different Standard is required by the Railroad.
 - Proposed Easements - The proposed easement is to be superimposed on the Structure General Plan portion of the exhibit for a separated grade crossing. For at-grade crossings, the proposed easement is to be shown on the plan view of this exhibit.
- (b) Existing Crossing to be Altered - The exhibit shall contain:
- Plan - Same instructions as new crossing. In addition, the location of the existing and the proposed protection, if required, shall be shown. Also, where additional lanes are to be constructed at the crossing site, it is necessary to clearly indicate whether the additional lanes are to be constructed throughout the highway project.
 - Profile - Same instructions as new crossing.
 - Typical Section - Same instructions as new crossing.
 - PUC Crossing Number- shall be shown on the plan.
 - Existing and Proposed Easements - Existing and proposed easements is to be superimposed on the Structure General Plan portion of the exhibit for a separated grade crossing.

For at grade crossings, the existing and proposed easement is to be shown on the plan view of the exhibit.

- (c) Existing Crossing to be Abandoned - An Exhibit B is not required.

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CHAPTER 4 RIGHT OF WAY ENGINEERING MAPPING

4-1 GENERAL

4-1.1 Introduction

Right of Way Engineering can generally be defined as that phase of transportation engineering and surveying which involves the determination of existing right of way lines and property boundaries, the preparation of maps and descriptions for the appraisal, acquisition, and disposal of real property rights, and the maintaining of records relating to the State's right of way.

Right of Way Maps are used extensively. There are many types of maps depending on the function to be served. The users are varied: property owners, public agencies, engineers, surveyors, attorneys, utility companies, potential lessees, buyers of excess land, and the California Department of Transportation (Caltrans).

This chapter will concentrate on standards for the preparation of maps in the Right of Way effort.

Right of way map preparation requires familiarity with the terminology used in land surveying, appraisals, acquisition, condemnation, sale or transfer of property, as well as many other Right of Way activities.

4-1.2 General Standards

Computer-aided Design and Drafting (CADD) is the standard for right of way map preparation. Standards and procedures for preparing CADD documents are contained in the CADD User's Manual of Instructions.

Lettering: Refer to Chapter 2.6 and Appendix A6 of the CADD User's Manual for lettering sizes and fonts.

Line Work: Refer to Chapter 2.7 and Appendix A4 of the CADD User's Manual for line work styles and weights.

Symbols: The Caltrans Right of Way Cell Library contains standard symbols used for mapping. Refer to Appendix A3 of the CADD User's Manual for a complete listing of the symbols.

Drawing Data Levels: Refer to Chapter 2.4 of the CADD User's Manual for leveling conventions.

Color & Symbolization for Right of Way Areas: Refer to Chapter 2.8 of the CADD User's Manual for coloring conventions.

Abbreviations: Refer to Appendix 4A of this chapter for abbreviations used in right of way map preparation. For additional abbreviations, refer to Standard Plan A10A and A10B.

Map Size: Unless otherwise noted size of maps will be 22" x 34".

Map Scale: Detail sheets 1" = 50', 1" = 100', occasionally 1" = 200'; usually determined by scale of base map and density of development. Urban: 1" = 50', Rural: 1" = 100', desert or remote mountain: 1" = 200', preferably 1" = 100'.

Index maps: If to scale, usually 1" = 1000', 1" = 2000' or scale adequate to show extent of project limits.

Plan dimensioning: Dimensions in feet, tenths of a foot or hundredths of a foot are to be shown with an accompanying single quote mark. Where a dimension is to be displayed in tenths of a foot or hundredths and the dimension is less than one foot, use a zero in front of the decimal point (example: 0.2', 0.35').

When copyright clearance is needed in using maps other than State of California mapping, place copyright note on each drawing. If no permission has been granted, avoid using map except for internal circulation. *Reproducing a copyrighted map without permission from the copyright owner is strictly prohibited.*

4-1.3 General Mapping Guidelines

- Overlap each sheet to show complete continuity of right of way line. Overlap carefully to keep sheets to a minimum number. Use of match lines is encouraged.
- Use arrows if there is a possibility of misinterpreting a distance shown.
- Be sure all dimensions clear access ticks.
- When record dimensions must be shown on the same sheet as calculated ones, designate by enclosing in parenthesis, i.e. (30 m rec.) or (25' rec.).
- When the right of way line is parallel or concentric to the Design line show width of right of way on each side.
- Follow numerical progress of Design line stationing when indicating the bearing of the right of way line (N,E,S,W).
- When a total take parcel is too large to fit on one sheet and cannot be clearly shown by break lines, insert a small scale inset showing dimensions around excess.
- Use a same-ownership symbol (- - Z - -) to tie together lots or parcels from one ownership.
- Label lines PL (property line) LL (lot line), etc. for clarity in conflicting areas.
- Use light grayscale for topography to ensure the topography does not conflict with right of way lines and related data.
- Date all prints to indicate the latest status of information contained on the original.
- Map must clearly show the intent, and be legible. Add sheets, details, explanatory notes, etc. as needed.

4-2 COST ESTIMATE MAPPING

To show approximate land requirements for a project in advance of precise design requirements. Initial Estimate Maps are prepared for the Project Initiation Document (PID) and updated as requested throughout the life of the project.

4-2.1 Use

- By Planning in studying alternative route locations.
- By Project Development in studying alternative design features.
- By Project Management in budgeting and rescheduling projects.
- By Right of Way Estimating to produce Data Sheets itemizing impacted utilities, ownerships, land areas, and cost estimates.

4-2.2 Map Requirements

- Existing mapping i.e. As-Builts, R/W maps, Assessor's maps, etc. may be used as base.
- Assessor's parcel numbers and boundaries.
- Street names.
- Section numbers, township and range.
- Ownerships.
- Current and proposed R/W lines including access restrictions.
- Areas - total, R/W requirements, remainder and excess (if any).
- Current topography or photo imagery as available.
- Change assessor's parcel numbers to permanent parcel numbers when assigned.
- Any other data for adequate map orientation that may be necessary.

See example of Right of Way Cost Estimate Mapping.

References: R/W Manual

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4-3 RIGHT OF WAY HARDSHIP MAP

Hardship maps are prepared to show parcels proposed for acquisition in advance of normal acquisition scheduling. Hardship is defined in Chapter 5 of the Right of Way Manual and is normally initiated by the property owner.

4-3.1 Use

- For appraisal of the property.
- By acquisition agent and property owner as an aid in understanding the proposed acquisition.
- As a base for a Resolution of Necessity map, if necessary.
- Temporary Record Map.

4-3.2 Map Requirements

4-3.2.1 Detail Map

- 1) Use project planimetric mapping, if available, otherwise use reproducible of the best available map - assessor's map, tract or subdivision map, parcel map, R/W estimating map or existing R/W Record map. Transfer mapping used to standard appraisal map sheet. Do not use copyrighted material.
- 2) Use standard symbology as described in Appraisal Map section.
- 3) Parcel number, including excess land number, if any.
- 4) Color, flood or outline parcel.

5) Dimensions

- a) Total ownership within R/W: Property line distances same as preliminary title report or deed of record (Bearings may be omitted). R/W line may be without dimensions and labeled approximate.
- b) Ownership partly within R/W: All dimensioning required on property lines and right of way lines (same as for regular appraisal mapping).

- 6) Proposed access restrictions, if any.
- 7) Existing access restrictions, if any, with the notation "Access Rights Previously Acquired".
- 8) General location data, streets, existing improvements.
- 9) Centerline, if available.
- 10) Owners name, areas of ownership, R/W requirements, and remainder or excess, if any.
- 11) Bar scale, north arrow, legend
- 12) County, Route, Post mile in title block

4-3.2.2 Location Map

Can be on same sheet as an inset.

- 1) Parcel Location
- 2) Parcel Number
- 3) Parcel Post Mile in plan view
- 4) North Arrow
- 5) County, Route, Post mile in title block if a separate sheet

See example of Right of Way Hardship Index and Detail Map.

References: R/W Manual

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4-4 RIGHT OF WAY PROTECTION MAP

Protection maps are prepared to show parcels proposed for advanced acquisition to prevent development or additional development of the parcels. Protection is defined in Chapter 5 of the Right of Way Manual and is normally initiated by the Department.

4-4.1 Use

- Part of the package submitted to the CTC requesting approval to appraise and acquire.
- Appraisal Map for appraising the property.
- By Acquisition Agent and Property owner as an aid in understanding the proposed acquisition.
- As a base for the Resolution of Necessity map, if condemnation required.
- Temporary Record Map

4-4.2 Map Requirements

4-4.2.1 Detail Map

- 1) Use project planimetric mapping, if available, otherwise use reproducible of the best available map - assessor's map, tract or subdivision map, parcel map, R/W estimating map or existing R/W Record map. Transfer mapping used to standard appraisal map sheet. Do not use copyrighted material.
- 2) Use standard symbology as described in Appraisal Map section.
- 3) Parcel number, including excess land number, if any.
- 4) Color, flood or outline parcel.

5) Dimensions

a) Total ownership within R/W:
Property line distances same as preliminary title report or deed of record (Bearings may be omitted). R/W line may be without dimensions and labeled approximate.

b) Ownership partly within R/W: All dimensioning required on property lines and right of way lines (same as for regular appraisal mapping).

- 6) Proposed access restrictions, if any.
- 7) Existing access restrictions, if any, with the notation "Access Rights Previously Acquired".
- 8) General location data, streets, existing improvements.
- 9) Centerline, if available.
- 10) Owners name, areas of ownership, R/W requirements, and remainder or excess, if any.
- 11) Bar scale, north arrow, legend
- 12) County, Route, Post Mile

4-4.2.2 Location Map

Can be on same sheet as an inset.

- 1) Parcel Location
- 2) Parcel Number
- 3) Parcel Post Mile in plan view
- 4) North Arrow
- 5) County, Route, Post mile in title block if a separate sheet

See example of Right of Way Protection Index and Detail Map.

References: R/W Manual

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4-5 RIGHT OF WAY APPRAISAL MAP

Right of Way Appraisal Maps are created to show land and improvements to be acquired for transportation facility right of way and non-operating right of way.

NOTE: When it is cost effective and timely to do so, use any available mapping (Existing RW Record Maps, subdivision map, previous appraisal map, etc.). For example, use existing RW Record Map for Temporary Construction Easement (TCE) only acquisition.

4-5.1 Use

Right of Way Appraisal Maps may be used by different functions for various purposes. The following are some examples of such use.

- By APPRAISALS: For location of and familiarization with property; for assistance in determining property value and severance damages, for use in Appraisal Reports.
- By ACQUISITION: For familiarization with property to be acquired and by property owner as an aid to understanding the proposed acquisition.
- By PROJECT DEVELOPMENT: For certification.
- By UTILITIES: For utility relocation.
- By R/W ENGINEERING: As base for additional mapping; for temporary record map and as the base for the final R/W maps.
- By R/W CLEARANCE: For relocation and clearance of improvements.

4-5.2 Map Requirements

The following information should appear on the Right of Way Appraisal Map, as applicable.

4-5.2.1 Location Data

- Rancho, Section, Township, Range, Meridian, subdivision, federal and state boundaries, property lines - Lines and corners labeled to indicate whether approximate, found, calculated, or record. Abbreviate Government Tracts and Lots as GOVT.
- Name of county, city, town; subdivision with recordation data, lot, block; city and county limit lines
- Street names and widths (if uniform)
- Waterways; rivers, creeks, lakes, etc.
- Railroad rights of way and widths
- Existing landmarks (by name), parks, schools, airports
- County, route, Post Mile (in title block)

4-5.2.2 Property Lines

- Annotate appropriately to indicate if lines were located or calculated from record information. Delineate the limits of the ownership on the appraisal map. If necessary use shortened lines, inset map, or show on index map.

4-5.2.3 Design Line / Record Right of Way Centerline Data

- Stationing, curve data, bearings, and distances.
- Design Line - Shall have same designation as design plans. (e.g. "A-1"). Ramp alignments, etc., only if necessary to clarify proposed R/W.

- Post Mile on Design Line at approximate center of sheet.
- Label record R/W centerline, Reference Lines, or Alignments as “Record ...”. Show other alignments, as needed, with stationing as a minimum to clarify the proposed right of way.

4-5.2.4 Topography

- Topography to be shown, if available.
- All building improvements within the proposed right of way.
- Building improvements on remainders unless such improvements are so remotely located that they will not be either physically or economically affected by State’s requirements.
- All pertinent man-made culture and natural features such as sidewalks, curbs, foundations, walls, fences, trees and shrubbery, wells, ditches, waterways (rivers, creeks, lakes, etc.), power lines and telephone lines, driveways and both surface and underground pipelines (or evidence of such).
- Contour lines where appropriate.

4-5.2.5 Parcel Data and R/W Lines

- Ownership numbers and parcel numbers assigned as described in Right of Way Manual. Each primary right of way requirement shall have the identical number as the ownership of which it is all or a portion and shall have the suffix “-1” added. Each secondary right of way requirement, or subparcel, will be identified by a dash and sequential numerical suffix following the parcel number.

- Excess identified by 10 digit (maximum) number, as described in R/W Manual.
- Remainders will not be given parcel number.
- If more than one remainder and/or excess exists for a specific parcel, show separate areas on plan view at proper location.
- Underlying Fee area (e.g. U.F. = 1.2 acres) shall be shown in plan view, for each separate area, if more than one area comprises the total shown in Ownership Record Block.
- Dimensions of ownerships*, R/W requirements and remainder. Dimensions shall include bearings, distances, and curve data. Radial bearings, if shown, shall read from center of curve. (* *A total take completely within the R/W may be described by its record dimensions and the area corrected if necessary by further calculation. Refer to the Right of Way Engineering chapter of the R/W Manual.*)
- Easements to be acquired: dimensioned and labeled as to purpose.

NOTE: If parcel becomes a total acquisition, as shown on example map in Section 4-5.2.12, rights to be acquired for others should continue to be shown. (See Parcel 31054-2.)

- Existing easements involved in the project are to be shown and labeled. Plot location of easements of record that are in or near the take area. Show evidence of unrecorded easements or encroachments such as utilities, fences or access. (See topography).
- Show proposed frontage roads and other collateral facilities.
- New R/W lines labeled as “Proposed R/W” and delineated with a heavier line weight than existing.
- Existing R/W - Dimension existing right of way lines with bearings, distances and curve data. Include an explanatory note if necessary to clarify relative accuracy of existing R/W. Label as “Existing R/W”.
- R/W lines that are superseded by the new acquisition will be broken and the same weight as existing.

4-5.2.6 Parcel Bubbles

- Regular acquisition use a hot dog shape, flooded with color assigned ownership.
- Parcels not to be vested in State use rectangular shape, flooded with color assigned ownership. There is no distinction between parcels acquired for third party vs. parcels acquired by State to be deeded to third party.
- Excess parcels use a hot dog shape flooded with color assigned ownership.

4-5.2.7 Ownership Record

- Parcels, numbers and ownership names tabulated in block.
- Flood each row in block with same color assigned ownership.

- Areas: total ownership (as defined in R/W Manual), R/W requirement, excess, and remainder.
- Underlying Fee: Area to be shown in parenthesis in same cell as related area above, e.g. R/W requirement area (UF area), excess area (UF area).
- If Underlying Fee is not easily ascertainable, do not map. Indicate existence by placing a (Y) where area would normally be shown in the cell. Note: “If any” clause to be used in legal description. District/Region discretion (in conjunction with R/W and Legal) to be used in relation to Resolution of Necessity descriptions.
- Where practical, use same units of measure for all areas shown.
- The sum of the required, excess, UF, and remainder areas should equal total area.
- Easements to be acquired: purpose and ultimate grantee (if not purchased for State) listed in remarks column of vesting block.
- Assessor’s Parcel Number in Plan View (Optional)

4-5.2.8 Coloring

- Individual ownerships shall have a distinctive color (except YELLOW) assigned. All ownerships with the same vesting shall be assigned the same color.
- Fee or Highway Easement – flood with color assigned ownership.

- Other easements (TCE, drainage, slope, utility, etc.) – outlined with solid line colored same as ownership.
- Excess parcels – flooded in YELLOW if identified prior to transmittal.
- Underlying Fee – if being acquired outlined with solid line colored same as ownership, if not being acquired line will be dashed.
- Remainder – outlined by long dashed line in color assigned ownership.

NOTE: Coloring is only an aid. All mapping information must be independently legible.

4-5.2.9 Coordinates

- Monuments that are referenced in the legal descriptions for the parcel to be acquired will be shown on the appraisal map with coordinates. Show tie to R/W line, if necessary.
- If no monuments are shown, then enough coordinate pairs on RW angle points will be shown so that coordinate locations of remaining RW angle points can be calculated.

4-5.2.10 Access Information

- Current requirements, identified by access denial ticks.
- Access rights previously acquired – labeled, with clarifying note if necessary.
- Access to remainders (topography or record easement).
- Frontage roads.
- Grade separation labeled.
- Access openings: symbol, size, ties to right of way line (DO NOT tie to Design line).

4-5.2.11 Map Background

- Topography.
- Contours, if needed.
- Basis of Bearing (when California Coordinate System used, include clause, grid factor and zone).
- North arrow, legend.
- Title block:
 - 1) Title: Right of Way Appraisal Map
 - 2) County, route, Post Mile.
 - 3) Bar Scale.
 - 4) To Design: (Date of initial transmittal to Design – does not change with revisions)
 - 5) Map file number. (Optional – per District system)
 - 6) Project EA
 - 7) Federal Aid Project (FAP) number to right of EA. Note: Contact R/W Planning and Management Branch for proper numbering.
- Revision block - with date, description of changes, and First Initial – Last Name of person making revision.
- Reference block - (optional) but refer at least to R/W EA.
- References to other highway routes and map numbers of intersecting projects.
- Drawing path name – lower left, below border.

4-5.2.12 Use of Details

- Use when needed to clarify dimensioning. Place close to parcel, or add note “See Detail ‘A’ ”, etc.
- If not drawn to scale must be so labeled.
- Repeat at least one parcel number and one dimension for reference.
- If necessary to rotate detail, use additional north arrow.
- Labels in bold to stand out
- Coloring and delineation should be the same as rest of appraisal map.
- Border details with a dashed black line or show detail on a separate page.

See example of Right of Way Appraisal Map.

4-5.3 Right of Way Appraisal Index Map

Utilize existing city or county map, freeway exhibit map or any available map of adequate scale. Reproduce by using template or by cut and paste drafting.

4-5.3.1 Index Map Requirements

- Limits of map set (layout of map sheets) and limits of project.
- Existing roads and streets.
- City names, ranchos, section and township information.
- Landmarks - schools, parks, etc., as necessary (by name)
- County, route, Post Mile range (e.g. 0.0/10.0) Note: Map should be oriented with Post Miles increasing from left to right.
- Direction arrows to neighboring cities or towns. Also, for rural projects show approximate mileage.

- Ownership numbers only will be shown on the index map.
- Outline of each map identified by sheet number.
- Title - **Right of Way Appraisal Index Map**
- Bar Scale (optional).
- North arrow.
- Legend, if applicable.
- Reference to adjacent and intersecting state routes.
- Coloring may be used to delineate boundary of larger parcels that cannot be shown on appraisal map sheet.
- Revision block will be shown on index map and used only to record revisions to the index map.
- Index Map to be numbered as sheet 1.

See example of Right of Way Appraisal Index Map.

References: R/W Manual

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4-6 FEDERAL LANDS APPLICATION MAPS

Federal Land Application Maps are used to secure rights of way, material sites or other transportation interests in Federal lands covered in the Federal Highway Act of August 27, 1958 (23 USC 107 (d) and/or 317, (see Chapter 5 of Right of Way Manual). The major classifications of land involved are unpatented public lands, national forests, Indian lands and surplus U.S. Lands.

4-6.1 Use

- By a Federal Agency in reviewing and approving the application.
- By Headquarters R/W in reviewing and processing the transaction
- For recording in the State Highway Map Book in the County recorder's office when the map is referenced by the conveyance instrument.
- By R/W Engineering as Exhibit in the conveyance instrument.

4-6.2 Map Requirements

4-6.2.1 Detail Map

In addition to the information shown on the R/W Appraisal Map, all application maps must meet the following requirements:

- The Right of Way Appraisal Map shall be used whenever possible as the base for preparation of the application map.
- All application maps shall be 22" x 34" or 11" x 17".
- All application maps shall include a location or index map to graphically depict the right of way plan for the highway facility. Both the Detail Sheet and location or index map should be combined on one sheet wherever practical.

- The right of way parcel(s) applied for shall be depicted by gray shading as appropriate.
- Map information must be legible. Outlining, shading or reduction must not affect legibility.
- Parcel numbers and areas for the required right of way must be shown within or adjacent to each delineated parcel. The standard Appraisal Map grantor block will not be used.
- An adequate legend for clear, complete interpretation of the map, covering symbols of all pertinent items shown on the map such as: access control, control points, parcel or area definition, special items, etc.
- Sufficient information to physically locate the parcel or area on the ground using standard land surveying procedures.
- Basis of Bearing (when California Coordinate System used, include clause, grid factor and zone).
- California Coordinate System coordinates shown on at least two significant points per map sheet, if applicable.
- Show design line and right of way requirements.
- The right of way limit shall be shown by a dominant line and gray shading. All courses shall show bearings and distances or curve data as appropriate. For right of way of uniform width, complete design line data with right of way width noted will be adequate.

- The right of way and/or design line must be tied to the existing land net. Intermediate ties at section lines and at lesser subdivisions shall be included to clarify location of right of way with respect to the smallest legal subdivision.
- Show relationship of the right of way to Ranchos, sections or subdivisions, cities or counties. The smallest legal subdivisions ((40 acre) tracts and lots) must be shown on all surveyed public lands affected by the right of way requirement. Such lines should not show precise bearing and distance data for their location unless re-established through standard surveying procedures. Lines not meeting this criterion shall be shown and labeled “approximate.”
- Show all field evidence uncovered, recovered, and all monuments found or set.
- Access restriction shall be clearly delineated and designated openings clearly defined. Frontage road areas and interchange locations shall be shown.
- Areas of exclusion (private lands, etc.) must show recording information when precise location of boundaries cannot be defined on the map and it is not economically feasible to survey the boundaries.
- The route number in the Federal Aid System, whether primary or secondary, must appear on the map. The Interstate route number must also be shown if the route is in the Interstate System.

See example of Federal Lands Application Map. Index Map:

Combine on same sheet with Detail Map when practical

- Location of application denoted by arrow.
- Roads, other reference information to locate project in relation to the area.

References: R/W Manual



4-7 MAP APPLICATION FOR STATE SOVEREIGN LANDS

To obtain a reservation across State sovereign land for highway purposes.

4-7.1 Use

To accompany the Department’s request for a reservation over State sovereign lands.

4-7.2 Map Requirements

- Map shall be 22" x 36"
• Show relation of the right of way to ranchos, sections, or subdivisions.
• Basis of Bearing (when California Coordinate System used, include clause, grid factor and zone).
• California Coordinate System coordinates shown on at least two significant points.
• Adjacent record owners and their vesting document references.
• Surveyor’s statement attesting to accuracy of information shown on map, signature, Surveyor’s license number and date of signature.
• All field evidence uncovered, recovered, and all monuments found or set should be shown.
• Symbols must be explained by legend; distances and bearings shown for all lines, and all other data necessary for the intelligent interpretation of the map.

- Insert the following on the map:

STATE OF CALIFORNIA STATE LANDS DIVISION

This map is hereby approved and filed for record with the Division of State Lands pursuant to the provisions of Section 101.5 of the Streets and Highways Code. The sovereign lands under the jurisdiction of the State Lands Commission as they may lie within the right of way lines shown upon this map are hereby reserved for highway purposes.

APPROVED: Meeting of ____, 20 __.

STATE LANDS COMMISSION

by _____

Title

See example of the Map Application for State Sovereign Lands.

References: R/W Manual.

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4-8 RESOLUTION OF NECESSITY MAP

Resolution of Necessity Maps are required:

- To comply with Section 1250.310(e) of the Code of Civil Procedure.
- To accompany the resolution of necessity and present a visual picture of the parcel described in the resolution.

4-8.1 Use

The maps are used by Headquarters Right of Way and Land Surveys (R/W&LS), District Acquisition Branch, Legal Division, State and Local Project Development Program, property owners, and the CTC in the review, analysis, and approval to proceed with condemnation.

4-8.2 Index Map (Exhibit A)

Made from Appraisal Index or Construction Plans Index. Other mapping may be substituted if it meets minimum legal requirements.

- Size to be 8.5” x 11”
- Title: Exhibit “A”
- Location, general route, and termini of the project.
- Parcel to be condemned with arrow pointing to the location.
- Direction to adjacent cities, or other major landmarks.
- County, Route, Post Mile. Note: For large parcels use a range of PM.
- North arrow, and legend, if necessary. Add “Not to scale”.

See example of Resolution of Necessity Index Map.

4-8.3 Detail Map (Exhibit B)

- Size to be 8.5” x 11”
- Title: Exhibit “B” (Second sheet “C”, etc.)
- County, Route, Post Mile. Note: For large parcels use a range of PM.
- North arrow, legend, bar scale. State “Not to scale”, if applicable.
- General location in relation to streets, roads and centerline stationing.
- Show planimetrics, where practical. (Do not show contours)
- Resolution of Necessity parcel number(s) as described in R/W Manual.
- Parcel outlined or shaded unless some other method approved by the Legal Division. (Do not use color)
- Property lines and right of way lines.
- Access restrictions.
- Point of beginning for the description, when practical.
- Distances in the description are shown on the map unless otherwise directed by the Legal Division. Bearings are optional unless otherwise directed by the Legal Division. When bearings are shown for the parcel, they must follow the same direction as the description.

See example of Resolution of Necessity Map.

References: R/W Manual

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4-9 COURT EXHIBIT MAP

Court Exhibit Maps are used by EXPERT WITNESSES and LEGAL STAFF to support testimony in Condemnation trial.

4-9.1 Map Requirements

Map preparation and requirements will be determined by needs of the case and specific requests of legal staff and witnesses. One map is prepared to represent the “Before” condition, and another the “After”. Contour lines, design geometrics, aerial overlays may be used in the preparation.

The information below describes “a typical case”.

“BEFORE” condition

- Parcel in its entirety.
- Location with relation to proposed highway, existing streets.
- Area of R/W requirement and remainder.
- Dimensions if requested.
- R/W lines, topography.
- Last name of property owner.
- North arrow - straight up.
- Parcel number.
- Scale, legend (optional).
- Arrow and name of nearest city in each direction.

See example of the "Before" Court Exhibit Map.

“AFTER” condition

- Parcel as it will appear after construction.
- Remainder area.
- R/W line and geometrics.
- Dimensions if requested.
- Last name of property owner.
- North arrow - straight up.
- Parcel number.
- Arrow and name of nearest city in each direction.

See example of the "After" Court Exhibit Map.

References: R/W Manual

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4-10 DIRECTOR'S DEED MAPS

Director's Deed Maps are used to depict State land slated for disposal. Director's Deed Maps are submitted to the California Transportation Commission (CTC) to provide the Commissioners information with respect to properties the Department seeks to convey to other parties, either by direct sales (including exchanges and contract obligations) or competitive public sale (auctions).

Director's Deed Maps should contain enough information to clearly show the property and its relationship to its surroundings, including transportation facilities and adjacent properties; however, they should not contain engineering data likely to be unfamiliar or confusing to a layperson. Director's Deed Maps are not intended to represent a survey of the property or be included as part of the Legal Description.

The mapping will be produced on a 8.5" x 11" format.

4-10.1 Director's Deed Mapping

The following information will be common to all Director's Deed mapping.

4-10.1.1 Detail Maps

The following data must be included on the Director's Deed Map.

- 1) Director's Deed Numbers are boldly shown on field of drawing with arrow, if necessary, to excess parcel.
- 2) Boundary of area being Director's Deeded is clearly identified by outlining or shading.
- 3) Areas of excess parcel and reservations must be shown
- 4) Dimensions of parcel boundary lines as shown in legal description (distances only, no bearings).

- 5) Centerline, R/W lines, access restrictions.
- 6) Name of city, adjacent local streets, county roads and frontage roads.
- 7) Reservations, if any, as described in legal description (slope and drainage easements, etc.)
- 8) County, Route, Post Mile.
- 9) Bar scale, north arrow, legend.
- 10) Location by Rancho, Public Lands or Subdivision.
- 11) Other information as requested by Excess Lands.

The following data should not be included on the Director's Deed Map.

- 12) "Before" conditions that no longer exists.
- 13) Alignment Data.
- 14) Bearings
- 15) Ownership Record (from Appraisal or Record Map)
- 16) Individual parcel numbers (unless pertinent)

4-10.1.2 Index Maps

- 1) Mapping information must be clearly legible and provide potential buyer with picture of general vicinity of excess parcel and precisely how to get to the excess from nearby roads and streets.
- 2) Location of parcel with relation to Cities, State highway, local streets and roads.
- 3) Graphical outline of parcel.
- 4) Parcel number in field of drawing with arrow to excess.
- 5) County, Route, Post Mile.
- 6) North arrow, legend. Note "Not to Scale".

The following is specific information relating to the mapping for the various disposal methods.

4-10.2 Director’s Deed Map (PUBLIC SALE)

To show excess State land to be disposed of by public auction or public sealed bid sale.

4-10.2.1 Director’s Deed Map (PUBLIC SALE) Use

Used as a visual aid for:

- Excess land appraisal map.
- Inclusion into sales notice to provide prospective purchasers a visual picture of excess property and how to locate the property for field inspection and appraisal.
- Review of the transaction by Headquarters R/W&LS.
- Review of transaction by CTC.
- Updating of County Assessor’s Records.

4-10.2.2 Director’s Deed Map (PUBLIC SALE) Map Requirements

Detail Map

- No additional requirements. (See Above)

See example of Directors Deed Map (Public Sales).

References: R/W Manual

4-10.3 Director’s Deed Map

To show excess State land to be disposed of by direct sale to an adjoining owner.

4-10.3.1 Director’s Deed Map (Finding A and B) Use

Used as a visual aid for:

- Excess land appraisal map.
- Review of the transaction by Headquarters R/W&LS and CTC.
- Updating of County Assessor’s Records.

4-10.3.2 Director’s Deed Map (Finding A and B) Map Requirements

Detail Map

- Adjacent owner acquiring excess is shown by name and limits of ownership adjacent to state ownership (or as directed by Excess Lands Section).
- The above information is required in addition to the information stated in 4-10.1 above.

See example of Directors Deed Map (Findings A and B).

References: R/W Manual

4-10.4 Director’s Deed Map (Exchange)

To show excess State land to be exchanged (normally with an adjacent property owner) for a right of way requirement.

4-10.4.1 Director’s Deed Map (Exchange) Use

Used as a visual aid for:

- Excess land appraisal.
- Negotiation with property owner.
- Review of the transaction by Headquarters R/W&LS and CTC.
- Updating of County Assessor’s Records.

4-10.4.2 Director’s Deed Map (Exchange) Map Requirements

Detail Map

- Boundary of the excess is clearly identified by outlining.
- Boundary of right of way being acquired is clearly identified by shading.
- R/W parcel to be acquired is identified by parcel number and notation “Acquired in Exchange”.

- The above information is required in addition to the information stated in 4-10.1 above.

See example of Directors Deed Map (Exchange).

References: R/W Manual

4-10.5 Director's Deed Map (Contract Obligation)

To show State land being Director's Deeded pursuant to a contract obligation (Utility Agreements, Cooperative Agreements, Clearance of cloud on title, etc.).

4-10.5.1 Director's Deed Map (Contract Obligation) Use

Used as a visual aid for:

- Communicating with receiver of Director's Deed.
- Review of the transaction by Headquarters R/W and CTC.
- Updating of County Assessor's Records.

4-10.5.2 Director's Deed Map (Contract Obligation) Map Requirements

Detail Map

- No additional requirements. (See Above)

See example of Directors Deed Map (Contract Obligation).

References: R/W Manual

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**4-11 TRANSFER OF JURISDICTION
MAP**

To show State land under the control of Caltrans to be transferred to other State agencies.

4-11.1 Use

- Appraisal
- Review of the transaction by Headquarters R/W&LS
- Review by the Director prior to approval of the transaction.
- Update of County Assessor’s Records (if the transaction is recorded).

4-11.2 Map Requirements

4-11.2.1 Detail Map

- Size normally will be 22" x 36". It may be reduced to half size for ease of handling. Use existing record map or appraisal map as a base.
- The appraisal or record map should normally be sufficient when the following is added or revised:
 - 1) Boundary of area(s) being transferred is clearly identified.
 - 2) Excess Land Deed Number and area are boldly shown on field of drawing with arrow, if necessary, to excess area.
 - 3) Title block is changed to show that it is a Transfer of Jurisdiction Map.

See example of Transfer of Jurisdiction Map.

4-11.2.2 Index Map

- Size normally will be 22" x 36". It may be reduced to half size for ease of handling. Use existing record map or appraisal map index as a base.
- The record or appraisal map used for the appraisal, acquiring and record of the excess is normally sufficient when the following is added or revised:
 - 1) Director’s Deed Number is boldly shown on field of drawing with arrow to approximate location of excess clearly evident from a casual glance at the index map.
 - 2) Title block is changed to show that it is a Transfer of Jurisdiction Map.

See example of Transfer of Jurisdiction Index Map.

References: R/W Manual

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4-12 RIGHT OF WAY RECORD MAP

To present the current status of all real properties including interest in real properties under the jurisdiction and control of the Department of Transportation. This includes operating r/w, (fee, easements, etc.), excess lands, access rights or other interests. **Note:** The Right of Way Record Map is typically developed from the Right of Way Appraisal Map.

4-12.1 Use

- By R/W ENGINEERING: To provide information on R/W status, excess lands; for posting of acquisition parcels, relinquishments, abandonments, vacations, director's deeds and utility easements.
- By DISTRICT MAINTENANCE: For designation of limits of responsibility; for access control information.
- By RIGHT OF WAY: For information on R/W and parcel status.
- By OTHERS: To county offices, city engineers, title companies and the public for information.

4-12.2 Map Requirements

4-12.2.1 Location Data

- Rancho, Section, Township, Range, Meridian, subdivision, federal and state boundaries, property lines - Lines and corners labeled to indicate whether approximate, found, calculated, or record. Abbreviate Government Tracts and Lots as GOVT.
- Name of county, city, town; subdivision with recordation data, lot, block; city and county limit lines
- Street names and widths (if uniform)

- Waterways; rivers, creeks, lakes, etc.
- Railroad rights of way and widths
- Existing landmarks (by name), parks, schools, airports
- County, route, Post Mile (in title block)

4-12.2.2 Property Lines

- Annotate appropriately to indicate if lines were located or calculated from record information. Delineate the limits of the ownership on the Record Map. If necessary use shortened lines, insert map, or show on index map

4-12.2.3 Design Line / Record Right of Way Centerline data

- Stationing, curve data, bearings, and distances.
- Design Line - Shall have same designation as design plans. (e.g. "A-1")
- Post Mile on Design Line at approximate center of sheet.
- Label historical R/W centerline, Reference Lines, or Alignments as "per ...". (Enter recording data or other reference)

4-12.2.4 Topography

- Topography to be shown if appropriate.
- All building improvements within the proposed right of way.
- Building improvements on remainders unless such improvements are so remotely located that they will not be either physically or economically affected by State's requirements.

- All pertinent man-made culture and natural features such as sidewalks, curbs, foundations, walls, fences, trees and shrubbery, wells, ditches, waterways (rivers, creeks, lakes, etc.), power lines and telephone lines, driveways and both surface and underground pipelines (or evidence of such).
- Contour lines where appropriate.

4-12.2.5 Parcel Data

- Identified by parcel and subparcel numbers (ex.: 12345-1)
- Fee parcel (part take): dimensions around area taken.
- Fee parcel (total take): dimensions around area required and dimensions around excess, if any. Include excess parcel number.
- Easement parcel, dash lines, dimensioned, labeled (slope, drainage, etc.). Existing (non-state) easements need not be shown unless they affect excess land.
- Other parcels - JUA, CCUA, Director's Deed, Relinquishment, Abandonment, Vacation, etc. all with identifying parcel number.

4-12.2.6 R/W Lines

- Bearings, distances, and curve data.
- Non-tangent curves - designate by radials or tangent bearings. (Radials read from center of curve)
- Bearing of R/W line (N, E, S, W,) to follow numerical progress of Design line stationing.
- Coordinates at two points on the R/W line, one near each end of sheet, or at found monuments.

4-12.2.7 Access Control

- Access denial "ticks" designate access prohibited or controlled. The access denial line is not necessarily the fence line.
- If less than full abutter's rights, note it. (i.e. *Vehicle Access Restrictions*)
- Grade separation - labeled, with information as to type.
- Frontage road, labeled, dimensioned.
- Access openings, symbol, size of opening, tie to right of way line.

4-12.2.8 Prior Parcel Data

(Refer to R/W Manual)

- Graphically shown property lines.
- Recording data.
- Type of title.
- Prior access restrictions, if still applicable.
- Revised excesses including dimensioning and areas resulting from new alignments.
- Recorded relinquishments, abandonments, vacations, director's deeds, JUAs/CCUAs, with parcel number and proper symbol.

4-12.2.9 Ownership Record

- List all parcels that have been acquired or disposed of.
- Show name of grantor or grantee.
- Show area of total ownership, R/W acquired, remainder and excess.
- Indicate type of title in the Acquisition Code column.
- Show type of instrument (GD, FOC, QC, etc.)

4-12.2.10 Use of Details

- Use when needed to clarify dimensioning. Place close to parcel, or add note “See Detail ‘A’ ”, etc.
- Labels in bold to stand out
- Coloring and delineation should be the same as on map.
- Border details with a dashed black line or show detail on a separate page.
- If not drawn to scale must be so labeled.
- Repeat at least one parcel number and one dimension for reference.
- If necessary to rotate detail, use additional north arrow.

4-12.2.11 Map Background

- Basis of Bearing (when California Coordinate System used, include clause, grid factor and zone).
- North arrow, legend
- Title block –
 - 1) Title: R/W Record Map
 - 2) County, route, Post Mile.
 - 3) Bar Scale
 - 4) To Design Date. (Original date from Appraisal Map)
 - 5) Map file number. (Optional – per District system)

- Revision block –
 - 1) Date Record Map initiated
 - 2) Date, description of changes, and First Initial / Last Name of person making revision.
- Reference block - (optional) but refer at least to R/W EA.
- Reference to adjoining map numbers if needed to clarify.
- References to other highway routes (and map numbers) of intersecting projects.

See example of Right of Way Record Map.

4-12.3 Record Map Index

- The Record Map Index is optional. Use District convention.

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4-13 RELINQUISHMENT MAPS

4-13.1 Relinquishment Map (Superseded Highway or Legislative Deletion)

To describe in map form State right of way being relinquished to a local agency pursuant to Section 73 of the Streets and Highways Code. Note: See Section 4-13.4 for Collateral Facilities.

4-13.2 Use

- For recording in the State Highway Map Book in the County Recorder's Office. The map is a part of the conveyance instrument.
- Used as an aid by:
 - 1) District functional units to review and approve proposed Relinquishments.
 - 2) Headquarters R/W&LS in reviewing and processing the transaction.
 - 3) By CTC in reviewing the proposed transaction.
 - 4) By the local agency in reviewing the 90-day notice package and as a permanent local agency record.
 - 5) By District R/W Engineering for posting on record map.

4-13.3 Map Requirements (Superseded Highway or Legislative Deletion)

4-13.3.1 Detail Map

- Map size to be 22" x 36", including margins, per Streets and Highways Code Sections 128 & 129.
- Title block including statement "RELINQUISHMENT NO _____".
- County, Route, Post Mile.
- Bar Scale, North Arrow, Legend
- Sheet Number (1 of 6, etc.)

- Signature - District Director or designated representative and date of signature.
- Location data when necessary for analysis of relinquishment description. Examples: city names, city limits, streets, subdivision data, sections, ranchos, etc.
- Access reserved and relinquished.
- Segments identified by number (see R/W Manual).
- Segment clearly identified by standard symbology (see Relinquishment Map exhibits).
- P.O.B. and metes and bounds of segment terminals (may be omitted when segment terminal is county or city limit line).
- Basis of Bearing (when California Coordinate System used, include clause, grid factor and zone).
- Excess land must be excluded from segments (see Chapter 6 of R/W Manual).
- Filing data block if map is to be used as the recording instrument, subject to County standard.

See example of the Relinquishment Map (Superseded Highway/Legislative Deletion).

4-13.3.2 Index Map

- Location of the segment relative to major landmarks such as: cities, streets, roads, rivers, state highways and freeways, railroads, etc.
- Segment identified by number.
- Segment clearly identified (see Relinquishment Index Map exhibit).
- Title block including statement "RELINQUISHMENT NO _____".
- County, Route, Post Mile.

- Bar Scale, North Arrow, Legend
- Sheet Number (1 of 6, etc.)
- Signature - District Director or designated representative and date of signature.
- Filing data block if map is to be used as the recording instrument, subject to County standard.

See example of the Relinquishment Index Map (Superseded Highway/Legislative Deletion).

References: R/W Manual

4-13.4 Relinquishment Map (Collateral Facilities)

Relinquishment maps used in the relinquishment of collateral facilities serve the same purpose and use as relinquishment maps for superseded highways and highways deleted by Legislative Act. Preparation of the Detail Map and Index Map is the same as stated for superseded and legislative deleted mapping. Map requirements are also the same except for the following:

- The segment must have calculated bearings and distances around the entire perimeter.
- It is not necessary to show excess land excluded from the segment.
- The mapping should show the relationship of the segments to the highway or freeway, including Design line.

See example of the Relinquishment Map (Collateral Facilities).

References: R/W Manual

4-14 VACATION MAP

To describe, by map, the extinguishment of the public's right of use in State highway right of way easement.

4-14.1 Use

Used as a visual aid for:

- Review of the transaction by Headquarters R/W&LS and the CTC.
- Updating of County Assessor's Records;
- and -
- May be used as a part of the vacation instrument and recorded in the State Highway Map Book in the County Recorder's Office.

4-14.2 Map Requirements

4-14.2.1 Detail Map

- Map size to be 22" x 36", including margins, per Streets and Highways Code Sections 128 & 129.
- Title block including statement "VACATION NO _____".
- County, Route, Post Mile.
- Bar Scale, North Arrow, Legend
- Sheet Number (1 of 6, etc.)
- Signature - District Director or designated representative and date of signature.
- Location data when necessary for analysis of vacation description. Examples: city names, city limits, streets, subdivision data, sections, ranchos, etc.
- Access reserved and relinquished.
- Segments identified by number (see R/W Manual).
- Segment clearly identified by standard symbology (see Vacation Map exhibit)

- Show all easements to be reserved from Vacation.
- P.O.B. and metes and bounds of segment terminals (may be omitted when segment terminal is county or city limit line).
- Basis of bearings (include Calif. Coordinate System clause, if applicable).
- Show all easements (public utilities, coastal access, etc.) to be reserved from Vacation.
- Filing data block if map is to be used as the recording instrument, subject to County standard.

4-14.2.2 Index Map

- Location of the segment relative to major landmarks such as: cities, streets, roads, rivers, state highways and freeways, railroads, etc.
- Segment identified by number.
- Segment clearly identified by proper symbology (see Vacation Index Map exhibit)
- Title block including statement "VACATION NO _____".
- County, Route, Post Mile
- Bar Scale, North Arrow, Legend
- Sheet Number (1 of 6, etc.)
- Signature - District Director or designated representative and date of signature.
- Filing data block if map is to be used as the recording instrument, subject to County standard.

See example of Vacation Map and Vacation Index Map.

References: R/W Manual

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4-15 FREEWAY LEASE AREA MAP (FLA)

To show State-owned property (adjacent to or under freeways) available for leasing.

4-15.1 Use

- By R/W AIRSPACE: For inventory of lease areas; for information to potential lessees; for district circulation prior to leasing.
- By R/W APPRAISALS: For estimating or appraising value.

4-15.2 Map Requirements

- Use existing maps, R/W Map Appraisal or Record, by duplicating portion of map required, or trace parcel, if simpler to do so.
- Add pertinent data from:
 - 1) As Builts (Bridge Plans).
 - 2) R/W Record Maps.
 - 3) Field information as needed.
 - 4) Utility plans for easement data.

4-15.2.1 Freeway Lease Area Parcel Maps (Inventory).

Drawn or reduced to 8-1/2" x 11".

Information to be shown:

- Perimeter of FLA and as a minimum, scaled dimensions.
- Right of way lines.
- Design line of freeway with stationing.
- Graphically depict outside edge of viaduct structure.
- Graphically depict ramps.
- Top of slope - if any.
- Toe of slope - if any.
- Approximate size and location of bridge supports.
- Gross FLA (scaled).

- Area covered by structure (scaled).
- Area of supports (scaled).
- Location and width of easements (graphical).
- Area outside the right of way lines (excess).
- Fences and size and location of gates.
- FLA identification number.
- County, Route and Post Mile.
- Distance from existing ground to underside of bridge structure (minimum number to identify vertical clearance).

4-15.2.2 Freeway Lease Area Parcel Maps (Appraisal).

Drawn to scale with sufficient detail to enable the preparation of a legal description. Map size should be 22" x 34".

Information to be shown:

- Perimeter of the FLA showing bearings and distances with points of reference.
- Right of way lines.
- Design line of freeway with stationing.
- Edge of pavement or outside edge of viaduct structure (graphical).
- Ramps, abutments and retaining walls (graphical).
- Height-Limitation Zone 15 feet from edge of viaduct structure) (optional with Districts) (graphical if used).
- Top of slope.
- Toe of slope.
- Size and location of bridge supports.
- Approximate location, width and purpose of all easements including joint use agreements.

- Distance from existing ground to underside of bridge structure to the nearest foot (minimum number to identify vertical clearance).
- Typical Viaduct Section.

Information to be calculated:

- Gross Freeway Lease Area.
- Area of supports.
- Net FLA (Gross Freeway Lease Area. minus Area of supports)
- Area covered by viaduct (graphical).
- Area of Height Limitation Zone (graphical and optional with Districts).
- Area outside Height Limitation Zone within the right of way lines (graphical and optional with Districts).
- Area outside right of way lines (excess)

An index map should accompany each Lease Area Map and show:

- Parcel location.
- Relation to State Highway.
- Nearest streets, roads and identifiable locations.

All lease area maps shall include the District, County, Route and Post Mile designation and shall be assigned Freeway Lease Area numbers.

See example of Lease Area Map.

References: R/W Manual

4-16 RIGHT OF WAY MAP FILES

4-16.1 General

State law requires that each district office maintain a file of Right of Way Record Maps of all completed State highway projects located within the district. Streets and Highways Code, Section 128 refers to “right-of-way record maps”. The term is used interchangeably with “Right of Way Map”.

Upon completion of a right of way mapping project, a print of each map shall be obtained and each set of maps bound together in a R/W MAP FILE.

Maps in the R/W MAP FILE must be kept current. Documents must be posted as they are recorded and maps must be revised to conform to design changes made subsequent to acquisition

When documents are recorded:

- Add recordation data for fee parcels, easements relinquishments, abandonments, vacations, director’s deeds, utility agreements, etc.
- Add coloring, striping, and/or other symbolization for recorded parcels. Vary color for adjoining parcels unless ownership is the same.
- Add Porter Bill Lease of excess land parcels, pursuant to the provisions of Section 104.15 of Street and Highways Code.

When revisions are required -

- Strike out superseded data and delineate new information.
- Add references to new maps; to new intersecting routes.
- Examine map to determine if replacement is necessary when map is deteriorating or too cluttered by changes to be readable.

- A description of the changes should be listed in a revision block and dated.

4-16.2 Updating Right of Way Map Originals to Conform to R/W Map Files

Changes made on right of way map prints must be added to the originals. Since map prints are available to the public and to other departments upon request, the originals must always reflect the latest changes.

Whenever possible, these changes should be added to originals and R/W map file print simultaneously. If this is not feasible, the time lag for incorporating the data should be as short as possible.

Revisions should be noted and dated.

4-16.3 Check List For Updating Right of Way Maps

- Are all Director’s Deeds incorporated?
- Are all Relinquishments, Vacations, etc., shown?
- All JUA’s, CCUA’s shown?
- Recordation data for above items entered?
- Have excess parcel numbers been added where new excess has been created, or excess split, or on non-highway related easements across excess land?
- Have relinquished roads been assigned names? (Use Thomas Brothers or other map guides for information.)
- Have changed street names been added? Old ones put in parenthesis?

- Has new route number and post mile (per 1964 Legislative Act) been added? Has old route number been added on projects completed subsequent to 1964?
- Have references to adjacent maps been added?
- Has I-number been added to sheets on Interstate jobs?
- Is condition of print good, or does it need replacing?
- Is condition of original good (especially if cloth or vellum) or should it be converted to scanned image?
- Has latest revision and date been listed in revision block or column?

Appendix 4A

ABBREVIATIONS

	A		
Aband	Abandonment	Dr. Ease	Drainage Easement
Abn	Abandon	Dds	Deeds
Ac	Acre	DD	Directors’s Deed
Acq	Acquisition	Det	Detour
Add’l	Additional	Dia	Diameter
AH	Ahead	Diag	Diagonal
Appr	Appraisal	Dist	Distance, District
Approx	Approximate	Dr	Drive
Appurt	Appurtenance	Dwg	Drawing
Ave	Avenue	Dwy	Driveway
AO	Access Opening	DE	Director’s Easement Deed
A	Area	DK	Director’s Quitclaim Deed
		DL	Director’s Lease
		DB	Deed Book
	B		
BC	Begin Horizontal Curve	Ease, E	Easement
BT	Bearing Tree	EC	End of Horizontal Curve
BK	Back	Eqn	Equation
BK, PG	Book, Page	Et al	And Others
Bldg	Building	Et ux	And Wife
Blk	Block	Et vir	And Husband
Bldv	Boulevard	Exist	Existing
BM	Bench Mark	Ex	Excess
Brg	Bearing	E’LY	Easterly
	C		
CTC	California Transportation Commission	Fc	Fence
Calc	Calculated	FD, Fnd	Found
C/L	Centerline	Fr	Frontage
Co	County	FR	Frontage Road
Conc	Concrete	Fwy	Freeway
Cond	Condemnation	FLA	Freeway Lease Area
Const	Construct (ion)	F	Fee
Coord	Coordinate	F + A	Fee + Access Rights
CCUA	Consent to Common Use Agreement	FOC	Final Order of Condemnation
Corp	Corporation	FOD	Field of Drawing
Cr	Creek		
Ct	Court (Street Name)	G	
Culv	Culvert	GD	Grant Deed
		Geo	Geodetic
		Gov’t	Government

Appendix 4A

	H		N
ha	Hectare	NO.	Number
H.M.	Humbolt Meridian	N'LY	Northerly
Hse	House		
Hwy	Highway		O
		OR	Official Records
		OC	Overcrossing
		OH	Overhead
		Orig	Original
	I		
Irr	Irrigation		
I/C	Interchange		
	J		P
JUA	Joint Use Agreement	Pcl	Parcel
		Ped UC	Pedestrian Undercrossing
	K	PG	Page
		PI	Point of Intersection
		PP	Power Pole
		PL	Property Line
		PM	Post Mile, Parcel Map
		POC	Point on Curve
		POT	Point on Tangent
		Pt	Point
		PT	Point of Tangency
		Pvmt	Pavement
		Pvt	Private
		POB	Point of Beginning
		PRC	Point of Reverse Curve
		Prop	Property
			Q
		Qc	Quitclaim
	L		
L	Length		
Lat	Latitude		
LoL	Layout Line		
Lt	Left		
LL	Lot Line		
Ln	Lane		
	M		
Max	Maximum		
Mi	Mile (s)		
Min	Minimum		
M.D.M.	Mount Diablo Meridian		
Misc	Miscellaneous		
Mon	Monument		
Med	Median		
m	Meter		
		Rad	Radial
		R	Radius
		Rd	Road
		REC	Recorded
		Ref	Reference
		REL	Relinquishment
		Rem	Remainder
		Reqd	Required
		Rp	Ramp
		RP	Reference Point

Appendix 4A

RR	Railroad		U
Rt	Right		
RAR	Relinquishment of Access	UC	Undercrossing
Rights		UP	Underpass
RTE	Route	Ut	Utility (ies)
R/W	Right of Way	UF	Underlying Fee
Rd Ease	Road Easement		
			V
	S	Vert	Vertical
		Vol	Volume
S.B.M.	San Bernardino Meridian		
Sec	Section		
Sta	Station		W
Std	Standard	W	Wavier
St	Street	W'LY	Westerly
Subd	Subdivision		
Swr	Sewer		X
Sl Ease	Slope Easement	Xing	Crossing
Sht	Sheet		
S'LY	Southerly		
			T
T	Semi-tangent		
Tan Brg	Tangent Bearing		
TCE	Temporary Construction		
Easement			
Tel	Telephone		
Temp	Temporary		
Topo	Topography		
T.P.O.B.	True Point of Beginning		
TR	Title Report		
TP	Telephone Pole		
TS	Title Statement		
Typ	Typical		
T-R-	Township, Range		
TL	Tract Line		

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