CHAPTER 4
FINAL "As-Built" PLANS

~~(F)~~4.1 PURPOSE

To define the requirements for an acceptable set of **Final "As-Built" Plans** and present some standards for their utilization in delineating final quantities, revisions and changes in the construction that must be reflected in the final estimates for the project.

4.2 AUTHORITY

Section 334.044 (2) Florida Statutes (F.S.)

~~(4)~~4.3 GENERAL

One complete set of the signed and sealed Contract Plans on 11" X 17" plan sheets shall be maintained as the Final “As-Built” record for each construction project completed. This may include the electronic signed and sealed Contract Plans set which will be maintained in a different fashion. If the electronic package is received, then the procedures set forth in the following manuals and their respective chapters will be followed: ***Plans Preparation Manual(PPM), Chapters 19 & 20*** , ***CADD Manual, Chapter 5***, ***CADD Production Criteria Handbook, Chapters 8 & 21***. The contents of the Final “As-Built” Plans will vary, but shall always contain those sheets necessary to completely cover all work performed. The Final “As-Built” Plans shall include all changes, both design and construction, with all shop drawings, including adequate sketches, dimensions, and notes. The Contract Plans including all changes, are the Final "As-Built" Plans after construction is complete. All revisions including those occurring during construction will be included in the Final "As-Built" plans set.

4.4 RECEIVING THE CONTRACT SET OF PLANS

The State Specifications Office Plans Processing ~~unit~~ section sends the District Construction Office a sealed Contract Set of Plans. The District Construction Office will then send the Contract Set of Plans and copies to the Resident Engineer.

The sealed Contract Set of Plans will be kept in a place that protects the plans but allows ready access to them. Any and all changes made to the project will be reflected on these plans. No pages shall be discarded from this set. This set of plans will be the Final "As-Built" Plans~~,~~ and made a part of the Final Estimates package. ~~at~~ At the conclusion of the project ~~and~~ the Final "As-Built" plans along with the final estimates package will be sent to the District Final Estimates Office (DFEO) per district policy.

For bridge and other structures, shop drawings should be processed according to the ***Plans Preparation Manual Volume I, Chapter 28 Shop ~~Drawings~~ and Erection Drawing.***

4.5 UPDATING THE FINAL "AS-BUILT" PLANS AFTER CONTRACT AWARD

When changes to the plans are required after contract award, all final drawings, specifications, plans, reports, computation books, or documents prepared or issued by the Responsible Engineer must be signed, dated and stamped with the engineer's seal as required. The Engineer of Record must be notified also if changes are required under his responsibility. The following steps must be followed in the revision process:

~~(1)~~(A) On a Federal Aid oversight project, FHWA approval must be obtained prior to making revisions.

~~(2)~~(B) Depending upon the nature of the changes, design issues would be directed to the District Design Engineer, structural issues would be directed to the District Structures Design Engineer, drainage issues would be directed to the District Drainage Engineer or the Engineer of Record should be contacted to concur in the proposed revision(s). The Project/Program Manager should be notified of all changes.

~~(A)~~(C) The Responsible Engineer will send a letter addressed to the District Construction Engineer with the signed and sealed bond copies of the revised sheets. ~~The~~ This letter will address the reason for the revision, who requested the revision, who approved the revision and if FHWA has concurred. All existing pay items that are affected must also be shown. Copies of the letter will be sent to the District Design Engineer. The District Construction Office shall make the bond copies part of the Final "As-Built" Plans.

~~(4)~~(D) A Field Supplemental Agreement or Work Order may be issued. See below:

When revisions to the specifications package are required after the letting, the following process will apply.

~~1~~(1) The revision shall be dated, signed and sealed by the Responsible Professional Engineer making the revisions.

~~2~~(2) Authorization from the ~~State Construction Engineer~~Director, Office of Construction is required before changing contract specifications on all projects.

~~3~~(3) A Supplemental Agreement or Work Order must be issued.

4.5.1 Changes to the Construction Contract

If the revisions to the plans or specifications are minor, a Field Supplemental Agreement/Work Order may be required (***See CPAM Section 7.4***). Major changes to the plans or specifications may have to be incorporated by a Supplemental Agreement (***See CPAM Section 7.3***).

~~4.5.1~~4.5.2 By Engineer of Record (EOR)

There are situations when it would be necessary or desirable to require the modification of the plans after a project is awarded: the plans may have contained errors or omissions; field conditions may have changed; or the scope of the project may have been revised.

The Resident Engineer (RE) may decide to go to the EOR to have the plans revised. If the revisions are due to errors or omissions, the EOR has a professional obligation to correct the plans. The RE may also elect to go to the EOR to have revisions made if the revisions are beyond the capabilities of the Construction Office or if manpower is not available.

If the revisions are due to errors or omissions on the part of a Consultant Engineer of Record, no additional compensation shall be made. If changes of another nature are necessary and the EOR is a Consultant, then the services requested and payment for the services may be authorized by the Department's Design Project Manager through a supplemental agreement to the original design contract (post-design services). The Consultant design contracts may be altered by a supplemental agreement up to 10 years after the date of execution of the design contract.

The EOR shall sign, date, and emboss with a seal any changes that he has made to revise the original sheet.

~~4.5.2~~4.5.3 CADD

If CADD is utilized to make changes, the requirements in this Chapter, and the ***CADD Manual, Topic No. 625-050-001*** must be met.

~~4.5.3~~4.5.4 Rapid Response Initiative

~~a.~~(A) Resident Level Responsibility

To rapidly address and resolve major unforeseen problems, which have the potential to seriously delay or disrupt construction progress, the RE should convene a field meeting with key technical and project management personnel.

The RE shall sign, date, and seal those changes for which the Resident Engineer is solely responsible. Sheets that are not modified in any way will not be signed and sealed as part of the changes. The certification stamp on the key sheet will reflect that these plans were built in substantial compliance to the EOR's design.

~~4.5.4~~4.5.5 Consultant Design Liability

A design Consultant is responsible for cost increases to a project if errors and omissions in the design plans or contract documents result in costs above what they would have been if the plans and contract documents had been correct. When there are changes to a project, as evidenced by a Supplemental Agreement or Field Supplemental Agreement/Work Order, an assessment must be performed to determine the extent of the design Consultant's responsibility for the errors and omissions. ***Identifying and Assigning Responsibility for Errors and/or Omissions by Design Consultants, Procedure No. 375-020-010,*** must be followed when performing this assessment.

~~(B)~~(A) Resident Level Responsibilities

Whenever a situation occurs in which it appears that an error or omission has occurred, the Construction Resident/Project Administrator (PA) should notify the Design Project/Program Manager that an error or omission has been tentatively identified. This contact should be made as early as possible so that the Design Project/Program Manager can contact the Engineer of Record to assist the Department to mitigate the liability. The initial contact may be by telephone or email, and followed up in writing. In all cases the Construction Resident Engineer/PA will send a written notification to the Design Project/Program Manager describing the error or omission.

~~(C)~~(B) District Level Responsibilities

The District Construction Engineer and staff will work with the Design Project/Program Manager to quantify the extent of the Consultant's liability, as per ***Claims Against Consultants for Substandard Work and Time Overruns, Procedure No. 375-030-012***. The Department is required by law to vigorously pursue claims against Contractors and Consultants for cost and time overruns and substandard work products.

~~4.5.5~~4.5.6 In-House Engineer's Obligation to Assist

Department employees do not have the same financial liability as Consultant engineers, but they do have a responsibility to assist the Department's Construction Office and the Contractor to mitigate the cost that results from any errors and omissions. When notified that a problem has occurred on a construction project, an Engineer of Record who is the Department employee, will make mitigation assistance a high professional

priority since the timeliness of assistance will usually impact the final cost of the final solution to the problem.

~~4.5.6~~4.5.7 Revision Process

The Final "As-Built" Plans to be submitted with the final estimates package shall be updated as the project progresses. All additions, deletions, and revisions shall be clearly delineated to reflect the Final "As-Built" conditions of the completed project. If a plan sheet is revised, the original plan sheet shall have **VOID** written on it and the new plan sheet shall be inserted after the original (old) sheet in the set of Final "As-Built" Plans. All revised sheets will be signed and sealed by the responsible Professional Engineer or Engineer of Record (EOR). Major revisions are defined as requiring an engineering analysis, which shall be returned to the EOR for modifications. Minor changes may be revised by a Responsible Engineer or the EOR, but will require that the change to be signed, sealed and dated also. If the plans furnished to the PA are not suitable to clearly show revisions and changes, a more legible sheet or complete set, if necessary, shall be requested from the reprographics center.

For revisions not made by the EOR the proper language of qualification is recommended on the cover sheet (the first page of the plans only). This language should note that, by signing the disclaimer, the Responsible Engineer is only taking responsibility for the changes in the plans and not the entire set of plans. By sealing the page of the change, the Responsible Engineer is taking responsibility for the specific change(s) only, not for the entire page. Language of qualification: (***"This project was constructed in substantial compliance with these plans as provided by the Engineer of Record. If changes were made, those changes are indicated by black ink revision and bear the seal and signature of the Responsible Engineer."***)

Sealing means sheets will be signed, dated, and embossed with a seal. No pages shall be discarded from this set. ~~If the plans furnished to the PA are not suitable to clearly show revisions and changes, a more legible sheet or complete set, if necessary, shall be requested from the reprographics center. The following information shall be considered minimum standard for preparing Final "As-Built" Plans on a typical project. At the discretion of the PA, he may request a full size set of plans.~~

~~Once the~~ Final "As-Built" Plan~~s~~ sets with no change~~shave been completed and no changes were~~ made to the plans, the Resident Engineer (RE) shall **only sign and date** the certification on the key sheet that states: ***"This project was constructed in substantial compliance with these plans as provided by the Engineer of Record. These plans reflect "As-Built" conditions and no changes were made to the plan sheets."***

The following process will be guidance for plan sets that are revised by conventional method (meaning "marked-up" by hand) and electronically. Plan sets that are "marked-up" by hand will continue to clearly delineate those changes, and will be signed, sealed and dated. Plan sets revised or updated to reflect "as-built" conditions maybe prepared electronically. This means that if a Resident's Office wants to make changes electronically to show as-built conditions (ie. field changes such as extended sidewalk or curb and gutter) they may use the cloud revision utility from the Bar Menu in MicroStation. If revisions are performed other than cloud revision, such as completely manipulating the native MicroStation DGN file, all changes will conform to the same procedures and requirements outlined in the ***CADD Production Criteria Handbook, Chapter 8 & 20***, ***CADD Manual, Chapter 5*** and the ***PPM, Chapter 19 & 20***. After the native MicroStation DGN file has been revised to reflect "as-built" conditions, the final plan set shall be in a format that is acceptable for scanning and attributing by Image API in accordance with the "As-Built Plans Management System User Guide".

The following information shall be considered minimum standard for preparing Final "As-Built" Plans on a typical project. At the discretion of the PA, he may request a full size set of plans.

~~4.5.7~~4.5.8 The Key Sheet

The Key Sheet of the sealed set of Final "As-Built" Plans shall show the following data (See Figure No. 4-1):

(A) **Final "As-Built" Plans** shall be prominently inked or stenciled across the top of the sheet in place of or above the Contract Plans or Plans of Proposed preprinted line and those words shall be lined through or completely deleted.

(B) On the right side and near the lower corner, the following information shall be lettered, stamped, or typewritten on white paper and securely pasted or taped on the Key Sheet:

(1) Name of Contractor

(2) Name of all consultants involved in construction. (If none, so state)

(3) Name of District Secretary, Resident Engineer, and Project Manager

~~(1)~~(4) Project Administrator

(E) Date Work Started

(F) Date Work Final Acceptance or Completed

(7) Certification Final "As-Built" Plans signed by Resident Engineer

~~(5)Certification Final "As-Built" Plans signed by Resident Engineer~~

(C) A complete Index of the Final "As-Built" Plans shall be shown on the left side of the Key Sheet.

(1) A complete list of permanent field books and a general description of their contents shall be shown.

(2) All Computation Books shall be indexed as to content and cross-referenced on the Key Sheet, as necessary.

(D) All major revisions to the Final "As-Built" Plans during construction shall be added to the revision list on the left side of the sheet below the Index of Roadway Plan Sheets. This information shall be lettered or typewritten on a piece of white paper and securely pasted or taped on the Key Sheet. The information shall include:

(1) Sheet number on which the change is shown in the plans

(2) Effective date of the sheet revision

(3) A brief description of the revision

(E) All project descriptions, Financial Project ID Numbers, length, etc., shown on the Key Sheet shall be corrected to agree with the actual construction before the Final "As-Built" Plans are submitted.

(F) Additional plans such as shop drawings, working drawings, etc., shall be added to the plan set and shown in the Index of Roadway Plan Sheets on the Key Sheet of the Final "As-Built" Plans.

4.5.9 Typical Section Sheets

Authorized revisions to the typical section shall be marked on these sheets. Documentation for such revisions shall be included as a part of the final estimates package. Some typical examples include:

(A) An increase or decrease in thickness

(B) A change in type of material

(C) Substitution of pay items

(D) Change in limits of work

~~(B)~~(E) Addition/Deletion of items of work

4.5.10 Roadway-As-Built Pavement Data Form

The purpose of the Roadway-As-Built Pavement Data form is to record main line pavement data as the pavement operation progresses. This form is to be updated and maintained throughout paving operations and will provide a complete record of pavement operations at the end of each project. The objective is to provide a Pavement Design Engineer with sufficient information and necessary data that can be used to develop and apply proper engineering practices for future ~~Roadway~~ roadway ~~Development~~development, ~~Maintenance~~maintenance, ~~Design~~design, etc. ~~On conventional projects t~~The Project Engineer/Designee will be responsible for recording and entering this information on the form and entering into the ~~CQR (Construction Quality Reporting)~~***LIMS*** (Laboratory Information Management System) database.

NOTE: ~~The procedure is as follows:~~ This form will be filled out only once during the project's paving operations and the information on this form would be entered into ~~CQR/~~LIMS only one time. If the typical section/characteristics changes then you would need to complete another form to reflect those changes. ~~If the project is a CQC (aka QC2000) contract t~~**The Roadway - "Verification Technician" will perform this operation and complete the~~. *Roadway-As-Built Pavement Data Form No. 700-050-12*** (See Figure No 4-2). This form will be attached to the Final "As-Built" Plans directly behind the Typical Section sheets and will be scanned into the CDMS for retention.

4.5.11 Summary of Pay Items

The original sealed plan summary sheets for each of the major groups of pay items are to be included in the Final "As-Built" Plans.

4.5.12 Plan Sheets

The plan sheet details for all the major groups of plans become the permanent historical record of the construction project. All changes in construction that would constitute a conflict in this record shall be clearly delineated on the Final Plan Sheets. Insert revisions and cross out all incorrect data. The following revisions must be noted:

(A) Revisions to the horizontal and vertical alignments as shown on the original plans.

(B) Stations or equations that have been introduced or revised during construction.

(C) Intersection and crossover details that have been modified or relocated.

(D) Inlets, manholes, box culverts, and end walls that were added, relocated, revised, or deleted.

(E) All sidewalk that was modified in thickness or otherwise, and all curb and gutter, and shoulder gutter that was added, revised, or deleted.

(F) All driveways that were not shown on the original plans, or were shown but are no longer in existence, or were modified in thickness or otherwise.

(G) All ditch locations and grades that were adjusted during construction.

(H) Changes in fencing items.

(I) Sign locations that were changed and pavement markings that were modified.

(J) All signal details that change during construction.

(K) All Bridge, Approach Slab, and Lighting details that is different from the actual construction.

(L) Bench Mark<u>s (BM) and their</u> descriptions ~~for BM's or~~ that ~~was~~<u>were</u> set during construction shall be added to the profile portion of the plan sheets.

(M) All Utility relocates and<u>/</u>~~/~~or conflicts shall be reflected on the Utility Adjustment sheets.

4.5.13 <u>Summary of Drainage Structures, Optional Materials Tabulation and Drainage Structure</u>~~Drainage Summary~~ Sheets

Revisions shall be made on the Final "As-Built" Plans set, if required. ~~Some typical examples may include:~~

(A) Plan lengths shall be changed to reflect the actual construction length ~~only~~ when an authorized field change is made or a plan error is noted.

(B) Changes in flow line elevations shall be shown on the plan profile sheets.

(C) Changes in stations or offset dimensions.

(D) Changes in size of structures.

(E) Added/Deleted structures.

~~(G)~~(F) Type of pipe material and thickness used at each structure to be shown on the Drainage Structures Sheets and the Optional Materials Tabulation Sheets As Built column will be checked to indicate what type of pipe material and thickness was used at each Structure.

(~~F~~G) Types of inlets and manholes constructed shall be indicated.

(~~G~~H) When the method of measurement is on the basis of plan quantity for cross drain and storm sewer pipes, plan errors shall be distinguished from field revisions due to different tolerances being applicable. ~~(Refer to ***Section 7.3.8***)~~

(~~H~~I) Lateral Ditch Sheets: All adjustments in horizontal alignment of flow line grade shall be delineated on the plan and profile sheets. The cross section shall be adjusted to reflect the revision if a pay quantity adjustment is required.

4.5.14 Cross Section Sheets

The disposition of the cross section sheets with regard to a set of Final "As-Built" Plans depends on the method of payment set up for the earthwork items. (Refer to ***Special Provisions of each Contract***)

(A) **Excavation Borrow Pits, Excavation Subsoil, and Excavation Channel on Cubic Yard Basis**: Final cross section sheets and volumetric computations are to be prepared and included in the Final "As-Built" Plans. They are required to reflect the actual work accomplished and are the basis of final pay quantities. “The original plan cross sections shall remain a part of the Final "As-Built" Plans.”

(B) **Embankment, ~~Excavation~~ Regular Excavation, and ~~Excavation~~ Lateral Ditch Excavation on Cubic Yard Plan Quantity Basis**: The original design cross sections are used as the basis for both plan and final pay quantities and to control grading operations. They are to be retained as part of the Final "As-Built" Plans. Additional cross sections to correct plan errors and/or to reflect

field revisions are prepared and added to the Final "As-Built" Plans. Detailed instructions pertaining to earthwork are included in ***Chapter 8*** of this manual.

4.5.15 Final "As-Built" Bridge Plans

This procedure details the ~~handling~~ process for revising Final "As-Built" Bridge Plans. The following information shall be recorded on the proper matrices, plans sheets, log books, and forms:

(A) Load Ratings based on "As-Built" condition shall be recorded on the appropriate forms and kept with the Final "As-Built" Plans.

(B) Drill Shaft Inspection Records shall be kept with the Final "As-Built" Plans.

(C) Pile Driving Log Books/Pile Driving records shall be recorded appropriately, marked as permanent record and scanned into CDMS.

The electronic design files for the bridge plans (Category II only) will be updated to reflect as-built conditions in the native MicroStation DGN format. The Structures Designer and Facilities Engineers need to have accurate bridge records available for inspection, maintenance, rehabilitation, and emergency repair operations and any future widening operations. The Engineer of Record or the CEI consultant will perform this CADD service. The consultant contracts scope will ~~be expanded to~~ require that as-built bridge plans (Category II) be prepared/updated electronically (CADD) during the construction process. The plans should be completed by the time the project is final accepted or shortly thereafter. The districts will have the option to have the Engineer of Record or the CEI consultant perform this CADD service. The districts will be accountable for ensuring that electronic as-built plans for Category II bridges are provided. The Engineer of Record post design services of consultant contracts scope will ~~be expanded to~~also require bridge load ratings be updated near the end of the construction process based on the as-built bridge plans.

The CEI consultant will sign, seal and date sheets requiring minor (meaning non-engineering analysis) as-built changes. For major changes, the CEI consultant will send these changes back to the EOR as ~~is the process today~~outlined in the ***Chapter 21 of the PPM***. Any changes made by Value Engineering decisions will be signed, sealed, and dated by the responsible engineer. The EOR will send the signed, sealed, and dated plans changes back to the CEI consultant for inclusion into the official record set.

Prior to final acceptance of the construction contract, the electronic as-built bridge plans will be secured ~~by generating a hash code~~ using Professional's Electronic Data Delivery System (PEDDS). The CEI consultant will authenticate the electronic plans using PEDDS, generate the hash code on a sheet of paper, and sign, seal and date the

sheet. This will signify the CEI's authentication of the electronic as-built bridge plans. The signed, sealed and dated sheet with the hash code will be scanned into the CDMS. The electronic plans would also be copied to a tiff format for long-term storage in CDMS for the required retention period (99 years) according to DOS procedures.

~~The target date for implementation of Phase Three is January 2004 for CEI consultant contracts executed on or after this date. If the Engineer of Record performs this service, this date applies to post design services executed on or after this date. An earlier implementation date is recommended for those contracts that can be modified without negatively affecting the work program.~~

Updating Final "As-Built" Bridge Plans through the electronic deliverables process will be ~~done~~ performed according to the CADD Production Criteria Handbook, CADD Manual and ~~Plans Preparation Manual~~PPM.

4.6 FINAL "AS-BUILT" PLANS HANDLING PROCESS

~~This procedure details the handling process for Final "As-Built" Plans. This process is going to be handled in three phases:~~

~~**Phase 1 (effective immediately)**~~
After the final payout, the DFEO will mail the Final "As-Built" Plans set to Image API for scanning and attributing in accordance with the As-Built Plans Management System User Guide".~~the Department of State with~~ The Department's procedure for Record Retention shall be adhered to as outlined in the ***Records Management and Distribution Manual (Topic No. 050-020-025c)*** which is also outlined in the User Guide.~~the ***Records Disposition Form # 050-020-06***. The Department of State will microfilm the Final "As-Built" Plans set and send a copy of the microfilm to the DFEM and then destroy the paper Final "As-Built" Plans set. The Department of State will then retain the silver copy for archives and return the Records Disposition form to Document Control. Once the DFEO receives the microfilm from Department of State it will then be turned over to the appointed records custodian for the remaining required retention time as set forth in the guidelines from the Document Control Office. The District will appoint who the designated custodian will be at their discretion. This process will be effective immediately and remain so until the next phase is accepted by the Department's standards and/or requirements for document retention.~~
(See Figure 4-3)

~~**Phase 2**~~
~~The department can advance to this phase of scanning all plans, and not having to send the final "as-built" plans to be microfilmed by the DOS, as soon as an acceptable procedure is in place. It includes scanning all components of the final as-built plans into the Construction Document Management System (CDMS) under the appropriate Document Groups and Types.~~

~~The implementation date for Phase Two becomes effective on construction projects not complete by December 2003. This will allow sufficient time for the Construction Offices to migrate to the new enterprise EDMS by Hummingbird (replaces Arcis) and to obtain the necessary resources.~~

In the event that there becomes a problem with the scanning process, then the Final "As-Built" plans records set will ~~follow the previous phase and be sent to the DOS for microfilming~~be retained until further direction from the Director, Office of Construction.

~~**Phase 3**~~
~~This phase will be implemented when an approved process has been developed.~~

4.7 FINAL FLIGHT AREIAL PHOTOGRAPHS

Many changes, though minor, are of interest to Final Estimates and others who have occasion to use the Final "As-Built" Plans. Aerial photographs have proven to be an ideal way to document changes, especially for surface items on a project. (Refer to ***Chapter 10*** of this manual).

These photos, processed by the Surveying and Mapping Office are usually transmitted directly to the DFEO where they are added to the Final "As-Built" Plans.

Blue line prints of the photos are available by request to Project Personnel through the District Final Estimates Manager.

4.8 LIST OF FIGURES FOLLOWING THIS CHAPTER

Figure 4-1
KEY SHEET

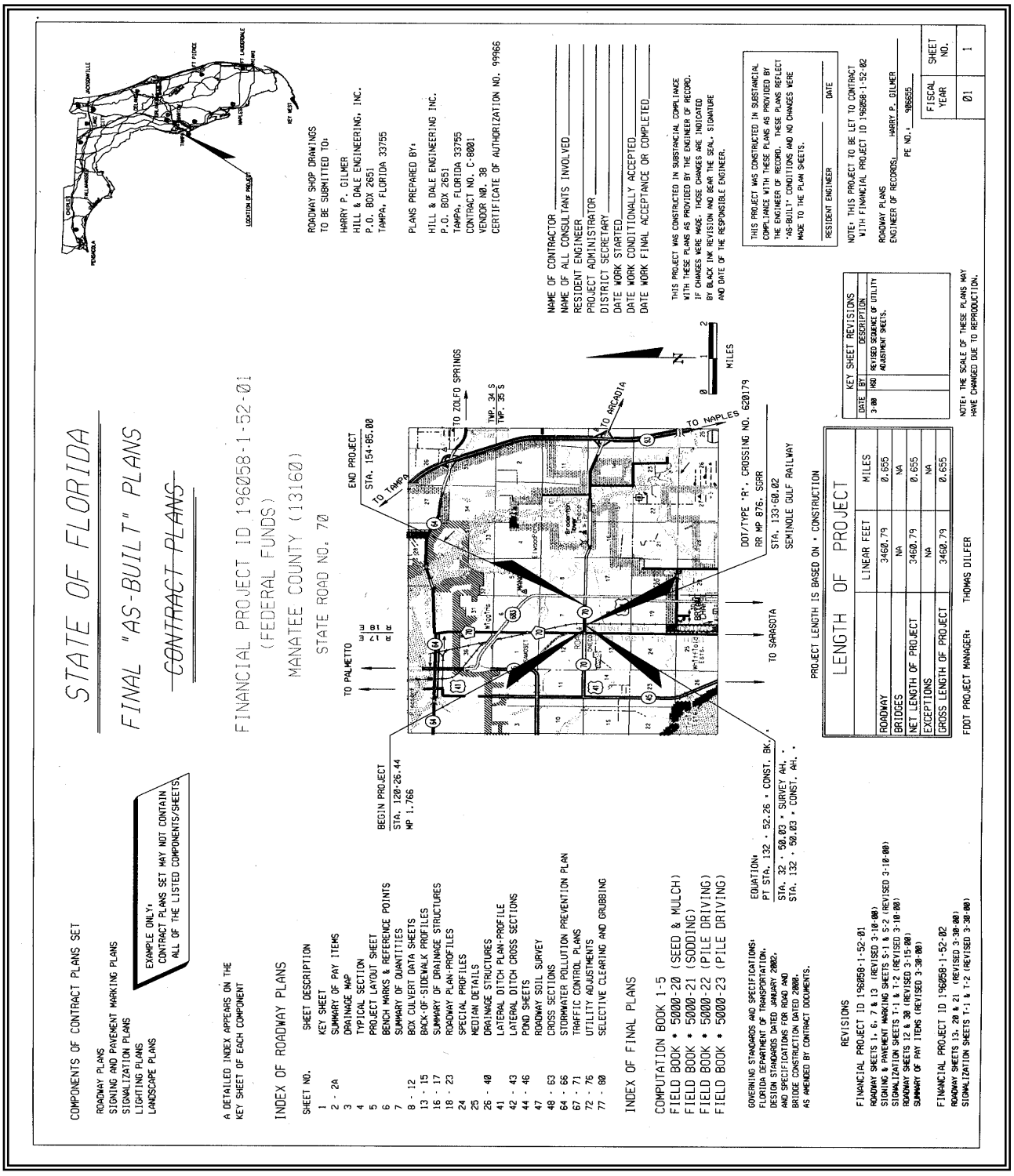

Figure 4-2
ROADWAY AS-BUILT PAVEMENT DATA FORM

State Of Florida Department Of Transportation

700-050-12
CONSTRUCTION
01/03

Roadway - As-Built Pavement Data
Date **Page No.** **of**

Fin. Project ID:	Material No.:	Sample No.:	Date Smpl:		
Station From:	Station To:	Rdwy Side:	Mainline:	Y	
Reference Line:	N/A	Source: 07	Plant No.:	Quantity:	1 each
Intended use:	Inspec ID (TIN):	Date Recd:			
Date Tested:	Tested by code	Status: UN	Tester ID (TIN):		

Pavement Information
(Enter Only New Pavement Layers - Start With First Pavement Layer Placed)

	Layer Number	Subgrade (if new)	Base (if new)	1	2
Milling Depth	Layer Code				
	Approx. Thickness in./mm				

Layer Number	3	4	5	6	7
Layer Code					
Approx. Thickness in./mm					

Remarks:

Figure 4-3
FINAL PLANS PROCESS