Chapter 2

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Chapter 2

Sequence of Plans Preparation

2.1 General

The set of plans depicting in detail the desired construction work is known as the "Contract Plans Set". This set consists of all sheets pertaining to roadway design (Roadway Plans), and other component plans. The other component plans are comprised of:

- 1. Signing and Pavement Marking Plans
- 2. Signalization Plans
- 3. Intelligent Transportation Systems (ITS) Plans
- 4. Lighting Plans
- 5. Landscape Plans
- 6. Architectural Plans
- 7. Structures Plans

All plan details shall be included in the Roadway Plans or one of the component plans listed above. Components other than those listed above shall not be used unless approved by the State Roadway Design Engineer. Such approval should be requested prior to the Phase II submittal.

Utility Joint Participation Agreement Plans have a separate Financial Project ID and are placed in the back of the contract plans set.

The contract plans set should be prepared systematically, undergoing phases of review and revision to ensure technically correct and clear plans.

If the plans are structures plans and there is no work on the approach roadway, the structures plans become the lead project. Any other sheets incidental to the project typically found within the roadway plans or other component plans (i.e., traffic control plans, signing and marking, etc.), may be included in the structures plans and numbered consecutively in accordance with the **Structures Manual**, **Volume 2 – Structures Detailing Manual**.

2.2 Data Collection and Presentation

2.2.1 Type of Project

The type and amount of data required for each project depends on the project. For new construction and reconstruction projects which have had a Project Development and Environment (PD&E) phase the data to be used for plans preparation could include the following:

- 1. Preliminary Engineering Report
- 2. Project Scope
- 3. Project schedule
- 4. Field survey and/or CADD files (including existing features such as topography, ground elevations, drainage structures, and right of way)
- 5. R/W requirements
- 6. Soils information
- 7. Commitments for environmental permits or mitigation
- 8. Typical Section Package
- 9. Traffic Data
- 10. Pedestrian and bicycle considerations
- 11. Structural design requirements
- 12. Commitments to local government(s)

For projects without the PD&E phase, such as RRR or Safety projects, some of the items listed will not be required. Regardless of type, all projects should begin with a field review to determine other requirements such as additional survey needs, utility information, etc.

Additional information can be found in *Chapters 13-16* of *Volume 1*. These chapters contain a comprehensive discussion of the critical issues and major activities for the design process, from initial to final engineering.

2.2.2 Presentation of Existing Data

CADD files generated from the field survey will contain existing topography and other characteristics of the project site. These also include the existing utilities and drainage structures within the limits of the project.

All data pertaining to topography, horizontal location of existing utilities and drainage structures shall be shown on the plan portion of the appropriate sheets (whether they are plan view only, or plan-profile).

2.2.3 **Proposed Typical Section**

Typical sections show the cross sectional design elements of a roadway. In addition to the Typical Section Sheet, certain elements of the typical section are shown on various other plan sheets, such as the Plan-Profile Sheets and Cross Sections. The various chapters for individual plan sheets address the specific requirements for displaying data (including typical section elements) on those sheets.

2.2.4 Geometrics

The Engineer of Record (EOR) sets the horizontal and vertical geometrics for a project and develops or supervises development of the CADD files used in the production of various plans sheets.

Horizontal geometrics include the baseline survey/centerline construction with bearings, curve data, angles or bearings at street intersections, pavement widths, taper lengths, left turn lanes, and other geometric elements. These elements are plotted on the plan portion of the plan-profile sheets, as well as other appropriate plan sheets.

Vertical geometrics show the vertical curves and grades of the roadway along the profile grade line. On municipal projects back-of-sidewalk profiles are developed to provide a vertical alignment which addresses drainage requirements and harmonizes connections to adjacent properties. The back-of-sidewalk profiles may be included in the roadway plans as directed by the district.

On all projects which include the development of a vertical alignment the existing ground line along the baseline of survey and the proposed profile grade line shall be plotted on the profile portion of appropriate sheets in the roadway or structures plans.

2.2.5 Cross Sections

Information required for plotting existing cross sections is obtained from survey data and CADD files. These data, along with existing utilities and proposed templates, are shown on the cross sections. Refer to *Chapter 18* of this volume for additional information.

2.3 Phase Submittals

2.3.1 General

Requirements relating to the *design process* for various submittals are given in *Chapter 16, Volume 1* of this manual. Refer to that chapter for additional guidance in preparing submittals for review by the Department.

For bridge submittal requirements see *Chapter 26, Volume 1*.

2.3.2 Phases

The remainder of this chapter outlines, in detail, the sequence for contract plans preparation and assembly, as well as the information required to be presented on the various plan sheets which are included in design phase submittals.

As stated in **Section 16.4** of **Volume 1**..."The number of submittals and phase reviews shall be determined on a project-by-project basis and shall be defined in the scope. Submittals allow functional areas to review the development of the project as contained in the scope."

Standard submittal phases are as follows:

SUBMITTAL PHASES Phase I Phase II Phase III Phase IV

Minor projects should typically have two phase reviews.

Figure 2.1 summarizes the plans sheet status for each submittal. No phase is complete until all review comments have been resolved and documented.

The technical accuracy required for the design is the responsibility of the Engineer of Record. Prior to submitting the plans for a formal FDOT Phase review, the design organization (in-house or consultant) shall conduct a review to ensure technically correct and complete plans. Any revisions or corrections noted during the review shall be incorporated into the plans before submittal for the formal Phase review.

When deemed necessary by the Engineer of Record, or as requested by the district, phase submittals may include an additional plan sheet titled "Notes for Reviewers." This sheet is placed as the second sheet in the submittal package. It contains information pertinent to design criteria and special project requirements, as well as other details or notes which call the reviewer's attention to issues and features unique to the project design. The sheet is to be used only in the review process and is not included in the final plans.

ITEM	PHASE I	PHASE* II	PHASE III	PHASE IV
Key Sheet	Р	Р	С	F
Summary of Pay Items		Р	С	F
Drainage Map	Р	Р	С	F
Interchange Drainage Map	Р	Р	C	F
Typical Section	Р	С	С	F
Summary of Quantities			С	F
Summary of Drainage Structures			С	F
Optional Materials Tabulation		Р	C C C	F
Project Layout	Р	С	С	F
Roadway Plan-Profile	Р	Р	С	F
Special Profile	Р	Р	С	F
Back-of-Sidewalk Profile	Р	С	С	F
Interchange Layout	Р	Р	С	F
Ramp Terminal Details		Р	С	F
Intersection Layout/Detail	Р	Р	С	F
Drainage Structures		Р	С	F
Three-Sided/Box Culvert Details			с с с с с с с с с с с с	F
Lateral Ditch Plan-Profile		P	С	F
Lateral Ditch Cross Section		Р	С	F
Retention/Detention Ponds		P	С	F
Cross Section Pattern		Р	С	F
Roadway Soil Survey	_	P	С	F
Cross Sections	Р	P	С	F
Stormwater Pollution Prevention Plan	_	Р	С	F
Traffic Control Plans	Р	P	С	F
Utility Adjustment		P	C C	F
Selective Clearing and Grubbing		P	C	F
Mitigation Plans		Р	C C	F
Miscellaneous Structures Plans		P	C	F
Signing and Pavement Marking Plans		P	C C	F
Signalization Plans		Р		F F
Intelligent Transportation System (ITS) Plans		P P		F
Lighting Plans	Р	P	C	
Landscape Plans	۲	Г	С С С С С С	F F
Utility Joint Participation Agreement Plans Computation Book			C	F
Computation Book			P	F
Contract Time			Г	Г

Figure 2.1 Summary of Phase Submittals

Status Key:

- P Preliminary
- **C** Complete but subject to change
- F Final

* Projects which have a structures plans component are required to submit the latest set of structures plans with the Phase II roadway submittal.

2.3.2.1 Requirements for Phase I Submittal

Unless otherwise directed by the district, the following elements are required for a Phase I set of plans.

KEY SHEET

Location Map w/ location of project on map All applicable Financial Project ID's (Federal Funds) notation, if applicable **Exceptions & Equations County Name** State Road Number Length of project box North arrow and scale Approval signature lines Railroad crossing (if applicable) Revision box Governing Standards & Specifications dates **Project Manager's Name** Begin & end project station and begin mile post Begin & end bridge stations Consultant's name, address, contract number, Certificate of Authorization number and vendor number (if applicable)

DRAINAGE MAP - PLAN VIEW

North arrow and scale Drainage divides and ground elevations Drainage areas and flow direction arrows Equations High water information as required Preliminary horizontal alignment Section, township, range lines Street names Begin & end stations of project, bridge, bridge culverts & exceptions Existing structures & pipes with relevant information State, Federal, county highway numbers (as appropriate)

DRAINAGE MAP - PROFILE VIEW

Preliminary profile grade & existing ground line Horizontal & vertical scale Begin & end stations of project, bridges, bridge culverts & exceptions Equations

INTERCHANGE DRAINAGE MAP

North arrow and scale Stationing along baselines Ramp baselines with nomenclature Begin and end bridge stationing Preliminary interchange configuration R/W lines Preliminary interchange drainage with drainage areas and flow direction arrows

TYPICAL SECTIONS

Mainline and crossroad typicals R/W lines Special details (bifurcated sections, high fills, etc.) Traffic data

PROJECT LAYOUT / Reference Points

Plan-profile sheet sequence (mainline and crossroads) Reference points (if layout sheet is required)

PLAN AND PROFILE - PLAN VIEW

North arrow and scale Baseline of survey, equations Curve data (including superelevation) Existing topography including utilities Preliminary horizontal geometrics/dimensions Existing & proposed R/W lines (if available) Centerline of construction (if different from the baseline of survey) Begin and end stations for the project, bridges, bridge culverts and exceptions

Reference points (if project layout sheet not included in plans set)

PLAN AND PROFILE - PROFILE VIEW

Scale

Appropriate existing utilities Bench mark information

Preliminary profile grade line

Equations

Existing ground line with elevations at each end of sheet

Begin and End Stations for the Project, bridges, bridge culverts and exceptions.

SPECIAL PROFILE

Scale

Ramp profile worksheet including nose sections Existing ground line of intersections Preliminary grade line of intersections Preliminary curb return profiles, if applicable

BACK-OF-SIDEWALK PROFILE (Worksheet) Scale

Begin and end project stations Begin and end sidewalk stations Cross-street locations and elevations Drainage flow direction arrows Mainline equations Existing driveway locations and details Superelevation details

Back-of-sidewalk profile grades and vertical curve information

Building floor elevations with offset distance left and right

Gradeline notation: Specifically the numeric difference relative to roadway profile gradeline

INTERCHANGE DETAIL

North arrow and scale Schematic of traffic flow and volumes Proposed bridge limits R/W lines Preliminary configuration and geometrics Quadrant Identification Ramp Labels

INTERSECTION LAYOUT

North arrow and scale Existing topography (if applicable) Proposed R/W limits Length of turn lanes Taper lengths Existing Utilities Geometric dimensions (radii, offsets, widths)

CROSS SECTIONS*

Scale Existing ground line Existing survey baseline elevations Station numbers Baseline of survey labeled Existing utilities Proposed template with profile grade elevations along mainline and cross-streets as necessary

TRAFFIC CONTROL PLANS

Project specific Other worksheets as necessary to convey concept and scope.

LANDSCAPE PLANS

Conceptual landscape plan

*May require accompanying cross section pattern sheet

2.3.2.2 Requirements for Phase II Submittal

Unless otherwise directed by the district, the following elements are required for a Phase II set of plans.

KEY SHEET

Index of sheets Contract plans and component plans list

SUMMARY OF PAY ITEMS

Item numbers with descriptions (on 8 ½" x 11" paper until the project proposal has been created)

DRAINAGE MAP - PLAN VIEW

Proposed structures with structure numbers Proposed storm drain pipes Flow arrows along proposed ditches Retention/Detention ponds, pond number and area size Cross drains with pipe sizes and structure numbers Bridges/bridge culverts with begin and end

stations Flood data (if applicable)

DRAINAGE MAP - PROFILE VIEW

Ditch gradients including DPIs Final roadway profile grade line Mainline storm drain pipes Mainline flow line elevations Mainline structures with structure numbers and pipes Bridge, Bridge Culvert Cross drains with pipe sizes, structure numbers and flow line elevation

INTERCHANGE DRAINAGE MAP

Final geometrics including PC and PT Proposed structures with structure numbers Proposed storm drain pipes Special ditches with DPI and elevation

TYPICAL SECTIONS

Pavement Design

OPTIONAL MATERIALS TABULATION

Material type Structure number station and description Durability, cover requirements Optional culvert material application Culvert service life estimator Design service life

PROJECT LAYOUT

Complete

PLAN AND PROFILE - PLAN VIEW

Curb return numbers, station ties and elevations Proposed drainage structures with structure no. Proposed R/W lines Existing utilities Proposed side drain pipe requirements (including size) for access and intersections Final geometrics and dimensions including radii, station pluses, offsets, widths, taper/transition lengths, curve data General notes (if project layout sheet not included) Flood data if not shown elsewhere

Limits of wetlands

PLAN AND PROFILE - PROFILE VIEW

Final profile grades and vertical curve data Mainline storm drain pipes Proposed special ditches Ditch gradients with DPI station and elevation Non-standard superelevation transition details High water elevations Existing utilities Mainline drainage structures with structure numbers Cross drains with structure number, size and flow line elevations

SPECIAL PROFILE

Final intersection profile grades Final curb return profiles (if applicable) Superelevation diagrams as required Final ramp profile grades including nose sections Preliminary access and frontage road

profiles (may contain one or more types of special profiles.)

BACK-OF-SIDEWALK PROFILE Complete

INTERCHANGE LAYOUT

Curve data including superelevation and design speed Coordinate data, stationing and ties Access and/or frontage roads with dimensions and R/W Fence location Ramp identification

RAMP TERMINAL DETAILS

Preliminary geometrics Radii, transition/taper lengths Ramp identification

INTERSECTION LAYOUT

Limits of proposed construction along side roads Applicable notes Cross drains with structure numbers and pipe sizes Storm drain pipes including sizes Final geometrics including dimensions, radii, offsets, station pluses and taper/transition lengths

DRAINAGE STRUCTURES

Vertical and horizontal scale Roadway template with profile grade elevation Underground utilities Special sections at conflict points R/W lines (at critical locations) Storm drain construction notes Flow arrows Applicable notes Structure numbers and location station along right side of sheet Drainage structures with numbers in numerical order, type, size, location and flowline elevations

OUTFALL / LATERAL DITCH SYSTEM - PLAN VIEW

North arrow and scale Roadway centerline Existing and/or survey ditch centerline Proposed ditch centerline with stationing Begin and end ditch stations Equations Ditch centerline intersection stations R/W lines Bearings of ditch and mainline centerlines Proposed storm drain pipes Ditch PI stations with deflection angle left or right Proposed drainage structures with structure numbers

Existing topography, drainage structures, utilities Limits of wetlands

OUTFALL / LATERAL DITCH SYSTEM - PROFILE VIEW

Bench mark information Scale Existing ground line Proposed ditch profile with grades Begin and end ditch stations High water elevations Proposed storm drain pipes with size Existing Utilities Overland flow or overtopping elevations Proposed drainage structures with structure numbers Typical section can be placed in either plan or profile

LATERAL DITCH CROSS SECTIONS

Horizontal and vertical scale Existing ground line Station numbers Survey centerline and elevation R/W Begin and end ditch stations Begin and end excavation stations Earthwork quantities Existing utilities Total earthwork quantity in cubic yards (CY) Proposed template with ditch bottom elevation

RETENTION/DETENTION POND DETAILS

North arrow and scale Roadway centerline ties Proposed pond centerline with stationing Begin and end pond stations Side slopes, dimensions, and elevations R/W lines Berm, fence and gate locations Soil boring information Proposed pond drainage structures with structure numbers Existing topography, drainage structures, utilities Pond sections (2 perpendicular to each other) Pond Typical Section Limits of wetlands

RETENTION/DETENTION POND CROSS SECTIONS

Horizontal and vertical scale Existing ground line Station numbers Begin and end pond stationing Pond centerline and elevations R/W Soil borings Water table Extent of unsuitable material Earthwork quantities Existing utilities Proposed template with bottom elevation

CROSS SECTION PATTERN

North arrow and scale Interchange layout Access and frontage roads Mainline and ramp stationing Begin and end bridge stations Cross section location lines Ramp baselines with nomenclature and stationing

ROADWAY SOIL SURVEY

Soil data Project specific

CROSS SECTIONS

R/W Special ditch bottom elevations Equivalent stations for ramps and mainline Mainline equation stations Soil borings Water table Extent of unsuitable material Proposed template with profile grade elevation Earthwork Columns Begin and end stationing for project, construction and earthwork, bridge and bridge culvert Existing utilities affected by the template and where unsuitable materials are present

STORMWATER POLLUTION PREVENTION PLANS (SWPPP)

Narrative Description (with supplemental topographic maps, when used)

TRAFFIC CONTROL PLANS

Preliminary traffic control plan Detour plan Phasing plan R/W - existing and additional if required Existing Utilities

UTILITY ADJUSTMENT

All existing utilities highlighted

SELECTIVE CLEARING AND GRUBBING

Limits of construction by station and type of selective clearing and grubbing

MITIGATION PLANS

Project Specific

MISCELLANEOUS STRUCTURES PLANS

Retaining walls (Cast in place, proprietary, temporary) if required

SIGNING AND PAVEMENT MARKING PLANS -

KEY SHEET Financial Project ID (Federal Funds) notation, if applicable State Road Number County Name FDOT Project Manager's Name Begin/end stations & exceptions Station Equations (if location map is shown) Engineer of Record Consultants name & address, if applicable

SIGNING AND PAVEMENT MARKING PLANS -

TABULATION OF QUANTITIES Project Specific

SIGNING AND PAVEMENT MARKING PLANS -

PLAN SHEETS North arrow and scale Basic Roadway Geometrics Begin/End Stations and Exceptions Station equations Conflicting utilities, lighting or drainage Pavement markings Sign locations Applicable pay items

SIGNING AND PAVEMENT MARKING PLANS -

SIGN DETAIL SHEETS GUIDE SIGN WORK SHEETS Project Specific

SIGNALIZATION PLANS - KEY SHEET

Financial Project ID (Federal Funds) notation, if applicable State Road Number County Name FDOT Project Manager's Name Begin/end stations & exceptions Station Equations (if location map is shown) Engineer of Record Consultants name & address, if applicable

SIGNALIZATION PLANS - TABULATION OF

QUANTITIES Project Specific

SIGNALIZATION PLANS - PLAN SHEET

North arrow and scale Basic Roadway Geometrics Begin/End Stations and Exceptions Station Equations Conflicting utilities, lighting or drainage Signal Pole Location Type and location of loops Type and location of signal heads Pedestrian Signal Location of Stop Bars Location of Pedestrian Crosswalks Sheet Title Applicable pay items

SIGNALIZATION PLANS - POLE SCHEDULE

Pole location, number, type Pole dimensions Pay item number and quantity Joint use pole details, if applicable Foundation design

SIGNALIZATION PLANS - INTERCONNECT/

COMMUNICATION CABLE PLAN Placement of interconnect/communication cable Conflicting utilities, lighting or drainage Other project specific details

ITS PLANS - KEY SHEET

Financial Project ID (Federal Funds) notation, if applicable State Road Number County Name FDOT Project Manager's Name Begin/end stations & exceptions Station Equations (if location map is shown) Engineer of Record Consultants name & address, if applicable

ITS PLANS - TABULATION OF QUANTITIES Project Specific

ITS PLANS - PLAN SHEETS

Project Specific, but must include: North arrow and scale Basic Roadway Geometrics Begin/End Stations and Exceptions Station equations Conflicting utilities, lighting or drainage Applicable pay items

ITS PLANS - DETAIL SHEETS Project Specific

LIGHTING PLANS - KEY SHEET

Financial Project ID (Federal Funds) notation, if applicable State Road Number County Name FDOT Project Manager's Name Begin/end stations & exceptions Station Equations (if location map is shown) Engineer of Record Consultants name & address, if applicable

LIGHTING PLANS - TABULATION OF QUANTITIES Project Specific

LIGHTING PLANS - POLE DATA AND LEGEND SHEET

Each pole by number with location, arm length, mounting height and luminaire wattage noted. Design value for light intensities and uniformity ratios shown. Legend and sheet title

LIGHTING PLANS - PLAN SHEETS

North arrow and scale Basic Roadway Geometrics Begin/End Stations and Equations Station Equations Conflicting utilities, drainage, signal poles, etc. Sheet title Applicable pay items Pole symbols shown at correct station location and approximate offset

LIGHTING PLANS - HIGH MAST

Foundation detail sheets (project specific) Boring data sheets (project specific) Conflicting utilities, drainage, lighting

LANDSCAPE PLANS - KEY SHEET

Financial Project ID (Federal Funds) notation, if applicable Fiscal year and sheet number State Road Number County Name FDOT Project Manager's Name Begin/end stations & exceptions Station Equations (if location map is shown) Landscape Architect of Record name and registration number Consultants name, address, and contract number, if applicable Index of landscape plans

LANDSCAPE PLANS - TABULATION OF QUANTITIES AND PLANT SCHEDULE Project Specific

LANDSCAPE PLANS - TABULATION OF QUANTITIES AND SCHEDULE FOR IRRIGATION AND SITE AMENITIES Project Specific

SHEETS

Project centerline

Edge of pavement (edge of traffic lanes)

Curbs or curb and gutter

Drainage systems

Guardrails

Right of way and/or limited access fence line Sidewalks or other planned or existing structures Lighting, signs, and signal poles

Intersections and driveways which are noted in the plans

Existina and proposed overhead and underground utility locations

Clear Zone/Horizontal clearance (should be plotted or safety setback distances noted frequently on each plan sheet)

View zones for permitted outdoor advertising signs

Canopy limits

Existing vegetation (to remain or be removed) Existing off site features and conditions that

affect or are affected by the project

Fence and gate locations

Setbacks from structural elements or drainage system

Limits of clear sight

Transit facilities

Proposed Planting Plan (Plant symbols and Plant quantities)

LANDSCAPE PLANS - PLANTING PLAN LANDSCAPE PLANS - IRRIGATION PLAN

SHEETS (if applicable) Type of system

Location and size of mainlines and lateral lines Type and location of spray heads and rotors Type and location of valves, sleeves, controllers, water sources/point of connection, backflow preventers, and isolation valves

LANDSCAPE PLANS - DETAILS SHEET

Applicable landscape details Irrigation symbology with associative descriptions (if applicable)

2.3.2.3 Phase III Plans Submittal

Ordinarily, the only other remaining work to be done will be to comply with comments received as a result of the review. The Work Zone Traffic Control items paid for on a 'per day' basis shall be estimated and included in the Phase III submittal.

The FDOT construction department will make a biddability review and will establish construction duration as a part of the Phase III review after receiving the computation book. This information should be included in the Phase III review comments transmitted back to the EOR. The estimated pay items for Work Zone Traffic Control shall be revised as necessary based on the established construction duration.

All plan sheets and computation books are complete and the Financial Management (FM) system has been updated. Final drainage tabulations shall also be furnished for review.

Utility Joint Participation Agreement (JPA) Plans, consisting of a key sheet, and mainline plan-profile showing proposed utility horizontal and vertical locations, are also to be included in the Phase III submittal.

A "marked up" set of the plans and review comments shall be returned to the EOR for incorporation of the comments into the plans. When the review comments have been resolved and documented by the designer, the plans are ready to proceed to completion.

2.3.2.4 Phase IV Plans Submittal

After all corrections noted in the Phase III submittal are complete and the cost estimate is complete, the plans are considered final.

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