FIRM NAME _____

FPID #:_____ **DESIGNER:**_____
DESCRIPTION:_____ **CHECKER:**_____
COUNTY:_____ **DATE:**_____

DRAINAGE DESIGN CHECKLIST (900 Series)	Provided		Designer's Initials	Checker's Initials
	YES	NO		
I. Drainage Report (see report outlines on FTE design website)				
A. Executive Summary - Brief Overview of Project Drainage Design				
B. Project Description				
1. Existing Conditions				
2. Proposed Project Conditions				
3. Project Justification Narrative - Basin Schematic and Description				
4. Location Maps, Floodplain Maps, USGS Maps, SCS Maps, Drainage Map, etc.				
5. Survey Datum Conversion				
6. Assessment of permanent and temporary environmental impacts				
C. Design Criteria and permits required				
1. List minimum criteria and determine which is controlling the drainage design				
2. List all permits required and determine which is controlling				
3. Document all contacts with agencies				
D. Drainage Maps (pre and post)				
1. Drainage Divides with topography (onsite and offsite)				
2. Drainage Basin Areas Delineated				
3. Overland Flowpaths Shown (Flow Arrows)				
4. Proposed Drainage Structures Plotted and Labeled with Structure Numbers				
5. Outfall and Cross Drain Structures Shown				
6. Required Information on Existing Structures included and Field Verified				
7. Section, Township, Range, City and County Lines, WMD and local WMD's boundaries where applicable				
8. Existing Ground Line and Proposed Grade Plotted in Profile, if profiles included				
9. Elevation Datum (Topography). Contours				
10. If profiles included, Storm Sewer Main plotted in Profile (including cross drains)				
11. High Water and Design High Water Information				
12. Adjacent and Receiving Water Bodies Labeled				
E. Drainage Calculations				
1. Open Channel Flow				
a. Supporting Documentation - Tc, CN or C calculations, drainage map with flow paths shown				
b. Hydrologic Analysis - Storm frequencies and duration				
c. Hydraulic Analysis - Hydraulic Worksheet for Roadside Ditches - Include channel lining requirements				
d. Outfall ditches sized for 25YR storm				
e. Check if any point source flows entering a ditch have been properly accounted for				
f. Confirm noise wall drainage has been properly designed (slot locations, no increase to water elevations offsite, etc.)				
g. Verify freeboard criteria is met				
2. Stormdrain Systems				
a. FDOT Stormdrain Tabulations				
1. Correct zone and frequency used?				
b. Supporting Documentation - Tc, CN or C calculations, drainage map with flow paths				
1. Starting tailwater documented?				
c. Areas of special inlet placement, SE transitions, intersections, side streets, lane tapers against grade, sags, flanking inlets				
d. Inlet Spacing/Spread Calculations/Bypass Flow/Debris Tolerance				
e. Check 50 year storm event for sag inlets with no other outlet (median drainage)				
f. Stormdrains which act as crossdrains should be checked using crossdrain criteria				
g. Minimum pipe slopes are sufficient to provide self-cleansing velocities (2.5 fps)				
h. Minimum required HGL clearance provided?				
i. Check if any systems have base flow entering them and confirm accounted for properly				
j. Check velocities leaving systems, do any require energy dissipators/other erosion control measures?				

NOTE: This checklist is provided for the Designer's use only.

Revised: April 2023

FIRM NAME _____

FPID #:_____ DESIGNER:_____

DESCRIPTION:_____ CHECKER:_____

COUNTY:_____ DATE:_____

DRAINAGE DESIGN CHECKLIST (900 Series)	Provided		Designer's Initials	Checker's Initials
	YES	NO		
3. Optional Pipe Analysis				
a. Include geotechnical results of soil chemistry				
b. Latest version of culvert service life estimator run				
c. CSLE results checked for availability, minimum and maximum cover				
d. CSLE pitting analysis run for jack and bore pipes				
4. Cross Drains				
a. Description of Drainage Area				
1. Natural Features				
2. Existing Facilities				
3. Existing Flooding				
4. Existing Drainage Problems				
5. Bridge/Bridge Culvert category				
b. Previous Studies				
1. Drainage Studies				
2. Water Management Permits/DERM				
3. FEMA - Define floodplain/floodway impacts				
c. Peak Design Flows				
1. All Design Storm Peaks				
2. FDOT Methodology				
d. Existing Conditions				
1. Flood Stages - Source				
2. Tailwater Elevation - Source				
3. Headwater Elevation - Source				
4. Scour - Source				
e. Culvert Design (Pre/Post)				
1. Supporting Documentation - Tc, CN or C calculations, drainage map with flow paths				
Tailwater Methodology and calculations				
2. FDOT Culvert Design Methodology (HDS-5)				
3. Headwater/Tailwater Comparison to Existing Conditions for Design Storms				
4. Design HW does not exceed Allowable HW				
5. 100 year HW not increased (if increased, provide evidence of no adverse impact to offsite)				
6. Erosion/Scour calculations and protection requirements				
7. Clear Zone Standards				
8. Flood Data Box Information				
f. Box Culvert Design (Pre/Post)				
1. Supporting Documentation - Tc, CN or C calculations, drainage map with flow paths				
Tailwater Methodology and calculations				
2. FDOT Culvert Design Methodology (HDS-5)				
3. Headwater/Tailwater Comparison to Existing Conditions for Design Storms				
4. Design HW does not exceed Allowable HW				
5. 100 year HW not increased (if increased, provide evidence of no adverse impact to offsite)				
6. Include low flows and HEC-3 runs or backwater curves for design flows				
7. Structural Design using FDOT "Reinforces Concrete Box Culvert and Wingwall Design"				

FIRM NAME _____

FPID #:_____ DESIGNER:_____

DESCRIPTION:_____ CHECKER:_____

COUNTY:_____ DATE:_____

DRAINAGE DESIGN CHECKLIST (900 Series)	Provided		Designer's Initials	Checker's Initials
	YES	NO		
5. Underdrain, Vertical Column Recovery Structures or other drawdown systems				
a. Pollution abatement volume				
b. Design method				
c. Estimated length of underdrain for filtering pollution abatement volume				
d. Typical section with elevations				
e. Gravity flow in underdrain pipe(s)				
f. Estimated drawdown time to evacuate the pollution abatement volume				
g. Design addresses the drawdown of seasonal highwater table as applicable				
h. Design certified by geotechnical engineer				
i. Does system affect base clearance?				
6. Stormwater Management				
a. Pond Siting report - Wet, Dry, Detention, Retention, On-line, Off-line, Demonstrate all matrix factors fully evaluated.				
b. Stage storage calculations for proposed pond excluding compensation storage				
c. Supporting Documentation - Areas, Tc, CN or C calculations, drainage map w/flow paths				
d. Computed tailwater elevation of receiving facility for appropriate design frequency event				
e. Hydrologic Analysis				
1. Pre and Post Development Hydrographs				
f. Hydraulic Analysis				
1. Pond Routing Calculations				
2. Critical duration if required				
3. Pond Volume Calculations				
4. Skimmer Head Loss Calculations, including skimmer/box clearance				
5. Water Quality Volume Calculations Included. Correct criteria used				
6. Water Quality and Water Quantity Drawdown Times				
7. Littoral Area Calculations (wet pond), if applicable				
8. Permanent Pool Volume (wet pond). Use 21 days to avoid littoral zone requirements				
g. Computer Modeling Information				
1. Model Input Data				
2. Model Output Data				
7. Summary of Results in Table Form				
a. Pre vs. Post peak flows to receiving water				
b. Design high water in pond(s). Compare to min. required distance below roadway base				
c. 1 foot of freeboard above peak stage in pond(s) to the inside maintenance berm				
d. Floodplain compensation addressed				
e. NWL in ponds				
f. Control elevation, size, and provided recovery time versus required				
g. Required versus Provided water quality volumes				
h. Pre versus Post stages any where offsite HGL affected by project				
8. General				
a. Corrosiveness analysis has been performed on CMP installations and on RCP				
b. Description of offsite easements and/or flood rights, if required				
c. Check that existing drainage system will function under proposed conditions				
d. Verify that improvements do not result in adverse affects on adjacent property				
e. Temporary drainage addressed				
F. Correspondence and Supporting Documentation				
II. Engineering Plans				

FIRM NAME _____

FPID #:_____ **DESIGNER:**_____
DESCRIPTION:_____ **CHECKER:**_____
COUNTY:_____ **DATE:**_____

DRAINAGE DESIGN CHECKLIST (900 Series)	Provided		Designer's Initials	Checker's Initials
	YES	NO		
A. Drainage Maps				
1. All offsite area draining to project delineated and acreages labeled				
2. All offsite connections to project right of way shown				
3. Arrows showing flow direction both onsite and offsite				
4. Stormwater Management Facilities shown with outfall locations and easements				
5. Other items as identified in FDM Chapter 918				
6. Flood Data Table for cross drains included with notes				
B. Estimated Quantities Report includes all drainage items, including verification of the following:				
1. Identify adjusted and modified structures properly				
2. Check sizes, lengths, inlet types, etc.				
3. Erosion Control Items, cross drains, side drains, and ditch pavement, pond control structures, and any other miscellaneous drainage features				
4. Temporary drainage quantities				
C. Typical Sections				
1. Typical ditch sections shown with minimum bottom width and minimum berm elevation if needed				
2. Minimum depth of ditch shown				
3. Shoulder gutter shown where needed, such as pavement draining through guardrail				
4. Check number of lanes sloped in one direction vs.FDM Figure 211.2.1 to determine need for hydroplaning calcs				
D. Drainage Structures Sheets: Plan View				
1. Check Drainage Structures, Underdrain/Cleanout Locations, and French Drain callouts				
2. Check Lengths of pipes, flow line information, and flow arrow directions				
3. Check underground utility locations and Soil Boring locations				
4. Ponds and treatment swales labeled, if applicable. For treatment swales, provide additional labeling as requested in FDM 915.3.4				
5. Check consistency of stationing with all sheets				
6. Check structure numbers for consistency				
7. Confirm construction is contained within the Right of Way				
8. Show and label jurisdictional wetland lines and contamination limits, if present.				
9. Are inlets required at super elevation transition, median lanes, sags, tapers, or intersections?				
10. If connecting to existing pipe, consider adding the following general note: If a concrete collar/jacket is required in the plans to join a new pipe to an existing pipe, the existing pipe must be removed to the nearest joint to begin the placement of the new pipe; unless it would require encroachment into the adjacent lane. The concrete must be cured and inspected to confirm the integrity of the collar prior to placement of fill material. If this method is implemented, was an additional 8' of pipe length added to the quantities for each tie in site where a concrete collar would have been used? Was a mechanical type collar considered (over a concrete collar/jacket)?				
11. Riprap/energy dissipators shown if required				
E. Drainage Structures Sheets: Profile View, Structure/Pipe Information Tables, and End Treatment Data Tables				
1. Check plotting of drainage structures (offset as indicated in Standard Plans, verify all reference point elevations are correct)				
2. Existing structures requiring work are noted and given a proposed structure number				
3. Verify structure numbers, station/offset, structure type, structure bottom information, pipe sizes/lengths, invert elevations, and direction of flow				
4. Verify sump elevations				
5. Verify notes include all necessary information for the contractor (slots, aprons, riprap, energy dissipators, etc.)				
6. Underground utilities are shown and conflicts are identified (gas mains running through conflict boxes not allowed)				
7. Existing Ground Line and Proposed Grade Plotted				
8. Design fill heights for box culverts are verified (account for top slab thickness)				
9. Check for adequate cover over pipe for all optional materials allowed				
10. Minimum depth of pipe flowlines adhere to FDOT Drainage Design Guide				
11. Label Wall Zone Pipes				

NOTE: This checklist is provided for the Designer's use only.

Revised: April 2023

FIRM NAME _____

FPID #:_____ **DESIGNER:**_____
DESCRIPTION:_____ **CHECKER:**_____
COUNTY:_____ **DATE:**_____

DRAINAGE DESIGN CHECKLIST (900 Series)	Provided		Designer's Initials	Checker's Initials
	YES	NO		
F. Drainage Structures Sheets: Optional Materials Tabulation				
1. Check Drainage Manual/CSLE for availability, suitability, and max/min fill height for all materials				
2. Do not use materials that require a design review or approval by the State Engineer				
3. Gage for metal pipe noted				
4. RCP Class noted				
5. Verify pipe group numbers are properly identified				
6. Verify jack and bore minimum pipe thicknesses are identified				
7. Verify allowable pipe materials follow Table 6-1 of the FDOT Drainage Manual				
G. Roadway Plan/Profile:				
1. Show and label ponds and treatment swales.				
2. Stations for locations of pond access are included				
3. Show and label begin and end of special ditches (including median)				
4. Show and label all drainage structures, including existing structures				
H. Stormwater Facilities Sheets (Pond Details and Control Structure Information)				
1. Check that Pond radii points and access driveway have a station offset				
2. Minimum maintenance berm and littoral shelf provided				
3. Pond parameters given and verified (I.e. control, DHW, SHW, Weir elevation, pond bottom, berm, slopes)				
4. Check to see if a fence, gate, or sediment sump is required				
5. Geotech borings for pond shown on plans				
6. Actual Pond cross sections provided with soil borings shown				
7. Skimmer details required if not using Standard Plan 425-070				
8. Drainage easement or flood rights required?				
9. Confirmed control structures shown in tables/details are constructible in the locations proposed				
10. Show and label pond tie up/down contours tying to existing ground contours				
11. Show and label jurisdictional wetland lines and contamination limits, if present.				
I. Model Verification:				
1. Check tie ins are appropriate at the beginning and ending of all ditches/swales				
2. Verify that special ditch grading is included in the model				
3. SHWT has been verified with the Roadway Soil Survey				
4. Underground utilities (4 inch or greater) shown				
5. Check low points in ditches with locations of DBI's				
6. Check that proposed limits of construction stay within Right of Way				
7. Check that project does not cause offsite ponding				
8. Does project eliminate any existing conveyance ditches?				
9. Shoulder gutter requirements met				
10. Check number of lanes sloped in one direction vs. FDM Figure 211.2.1 to determine need for hydroplaning calcs				
11. Verify structure locations and types match roadway model (surface elevations/alignment/features/etc.)				
12. Verify that inlets have been placed prior to the level section in superelevation transitions				
13. Verify flow patterns based on roadway model surface information				
14. Verify when storm drains connect to an existing system, the existing system and connection are shown and labeled				
15. Verify minimum ditch bottom width and minimum berm elevations are provided.				
16. Verify minimum ditch slope is provided				
17. Verify the minimum longitudinal slope (0.5%) is provided where cross slope is 0%				
18. Verify that all ditch pavement and other riprap/lining needs are shown in the model				
19. Verify clear zone criteria is met for all drainage items				
III. Geotechnical Report				
A. Boring Location and Logs				
B. Estimated Seasonal High Groundwater Elevations for Ponds and Roadway				
C. Certification of Underdrain Designs				
D. Geotech certification for embankment stability				

NOTE: This checklist is provided for the Designer's use only.

Revised: April 2023

FIRM NAME _____

FPID #:_____ DESIGNER:_____

DESCRIPTION:_____ CHECKER:_____

COUNTY:_____ DATE:_____

DRAINAGE DESIGN CHECKLIST (900 Series)	Provided		Designer's Initials	Checker's Initials
	YES	NO		
IV. Other Miscellaneous Drainage Items				
A. Status of Design Variances or Exceptions				
B. Liability Concerns				
1. Documentation that proposed drainage design will not affect historic stormwater discharge				
location, rate and quantity (as applicable), and stages				
C. Right of Way				
1. Easement or Right of Way acquisitions are required for any construction activity proposed				
beyond the right of way lines shown on the plans				
2. Are flood rights required?				
D. Clearances/Conflicts				
1. Evidence of stormsewer and utility clearance check				
2. Seasonal highwater clearance checked against: bottom of base; pond bottom of storage				
elevation; and ditch bottom elevation				
3. Freeboard, A.H.W. and D.H.W. meet local (where applicable), state, and FDOT requirements				
E. Temporary Traffic Control Plans have been checked for temporary drainage items				
F. TSPs for drainage items completed by Ph III				