

Delaware Department of Transportation  
Drainage Plan Submission Checklist for Division of Transportation Solutions Projects

### Directions for Completing the Checklist

- This checklist indicates what content should be included with each required submission to the Department.
- The Checkboxes  indicate that information is required and must be included in the submission.
- For each submission, indicate that the required information has been included in the plan submission by completing the appropriate checkbox.
- Items may need to be added for some projects and may not be required for others. Please discuss with the DelDOT Drainage Reviewers to determine if an item is not required. If the item is not required place a strikethrough line through the item that is not required.
- The DelDOT project manager shall review this checklist with the Designer/Consultant at each required submission to verify that all necessary information has been included in the report and shall sign below for each submission to attest to the completeness of the plan submission.
- The Preliminary Drainage Report Submission will occur with internal Preliminary Plan submission and will include all items in this checklist. Final Drainage Report Submission will occur with internal Semi-Final Plan Submission and include all items in this checklist.
- This checklist shall be completed, signed and submitted with each submission.

Project Information			
Contract #:		Primavera ID:	
Contract Name:			
Designer:		Project Manager:	

Verification of Submission Completeness		
Submission	Designer Approval	Project Manager Approval
Preliminary Plans		
Semi-Final Plans		

### Cover Sheet

	Prelim	Semi
Project title	<input type="checkbox"/>	<input type="checkbox"/>
Project contract number	<input type="checkbox"/>	<input type="checkbox"/>
P3E number	<input type="checkbox"/>	<input type="checkbox"/>
Date submitted for review	<input type="checkbox"/>	<input type="checkbox"/>
Name of designer(s) that the report was prepared by	<input type="checkbox"/>	<input type="checkbox"/>
Phone number of designer(s)	<input type="checkbox"/>	<input type="checkbox"/>
E-mail address of the designer(s)	<input type="checkbox"/>	<input type="checkbox"/>

### Table of Contents

	Prelim	Semi
Table of contents showing the order of the report. The report order shall follow the order presented in the checklist	<input type="checkbox"/>	<input type="checkbox"/>

### Narrative

	Prelim	Semi
Project summary included providing a brief history of the project	<input type="checkbox"/>	<input type="checkbox"/>
<b>Design methodology describing the following items:</b>		
• Inlet spacing	<input type="checkbox"/>	<input type="checkbox"/>
• Roadside ditches	<input type="checkbox"/>	<input type="checkbox"/>
• Storm drain system	<input type="checkbox"/>	<input type="checkbox"/>
• EGL and HGL Calculations	<input type="checkbox"/>	<input type="checkbox"/>

### Support Calculations/ Appendices

	Prelim	Semi
<b>Drainage area Maps in PDF or CADD format which include the following:</b>		
• North arrow	<input type="checkbox"/>	<input type="checkbox"/>
• Legend on each map describing information shown in map	<input type="checkbox"/>	<input type="checkbox"/>
• Proposed drainage area's boundaries	<input type="checkbox"/>	<input type="checkbox"/>
• Label each drainage area based on DI number on construction plans	<input type="checkbox"/>	<input type="checkbox"/>
• Roadway names labeled	<input type="checkbox"/>	<input type="checkbox"/>
• Aerial Photo in background	<input type="checkbox"/>	<input type="checkbox"/>
• Proposed contours in project limits	<input type="checkbox"/>	<input type="checkbox"/>
• Existing contours in project limits (shown in different color than proposed and on line a lighter line weight)	<input type="checkbox"/>	<input type="checkbox"/>
• Proposed Impervious limits	<input type="checkbox"/>	<input type="checkbox"/>
• The Tc path shown for each drainage area in a different color than the contours and drainage boundaries	<input type="checkbox"/>	<input type="checkbox"/>

## Support Calculations/ Appendices Cont.

	Prelim	Semi
<b>Provide Tables in PDF Format which Show Each Drainage Area Specifics Including:</b>		
• Each land type present listed with its associated area and "C" value	<input type="checkbox"/>	<input type="checkbox"/>
• Weighted "C" value listed for entire drainage area	<input type="checkbox"/>	<input type="checkbox"/>
• Total area of each drainage area in acres	<input type="checkbox"/>	<input type="checkbox"/>
• Calculated overland sheet flow time, shallow concentrated flow time and concentrated flow time summed into total Tc time. (Sample calculations can be submitted on larger projects)	<input type="checkbox"/>	<input type="checkbox"/>
• "I" values corresponding to chapter 6 of the Road Design Manual	<input type="checkbox"/>	<input type="checkbox"/>
• Total "Q" to the drainage area	<input type="checkbox"/>	<input type="checkbox"/>
<b>Inlet spacing Calculations Performed and Submitted in PDF Format Including:</b>		
• List design storm event	<input type="checkbox"/>	<input type="checkbox"/>
• Associated inlet number identified	<input type="checkbox"/>	<input type="checkbox"/>
• Longitudinal slope listed	<input type="checkbox"/>	<input type="checkbox"/>
• Cross slope of shoulder/ travel Lane listed	<input type="checkbox"/>	<input type="checkbox"/>
• Total gutter flow including previous bypass flow	<input type="checkbox"/>	<input type="checkbox"/>
• Gutter depth	<input type="checkbox"/>	<input type="checkbox"/>
• Actual Gutter spread	<input type="checkbox"/>	<input type="checkbox"/>
• Allowable spread	<input type="checkbox"/>	<input type="checkbox"/>
• Efficiency factor listed	<input type="checkbox"/>	<input type="checkbox"/>
• Bypass flow calculated	<input type="checkbox"/>	<input type="checkbox"/>
• Perform flanking inlet calculations for sags	<input type="checkbox"/>	<input type="checkbox"/>
<b>Ditch Sizing Calculations Performed and Submitted in PDF Format Including:</b>		
• List design storm event	<input type="checkbox"/>	<input type="checkbox"/>
• List the drainage areas (which were calculated in previous steps) contributing to the ditch flow	<input type="checkbox"/>	<input type="checkbox"/>
• Each land type present listed with its associated area and "C" value	<input type="checkbox"/>	<input type="checkbox"/>
• Weighted "C" value listed for combined drainage area to each ditch run	<input type="checkbox"/>	<input type="checkbox"/>
• Total area of each combined drainage area in acres	<input type="checkbox"/>	<input type="checkbox"/>
• Calculated overland sheet flow time, shallow concentrated flow time, and concentrated flow time summed into total Tc time. (Sample calculations can be submitted on larger projects)	<input type="checkbox"/>	<input type="checkbox"/>
• "I" Values corresponding to chapter 6 of the Road Design Manual	<input type="checkbox"/>	<input type="checkbox"/>
• Total Q to the ditch	<input type="checkbox"/>	<input type="checkbox"/>
• Ditch bottom width listed	<input type="checkbox"/>	<input type="checkbox"/>
• Composite longitudinal slope of the ditch section	<input type="checkbox"/>	<input type="checkbox"/>
• Ditch side slopes listed (for both sides)	<input type="checkbox"/>	<input type="checkbox"/>
• Calculated depth of water in the ditch	<input type="checkbox"/>	<input type="checkbox"/>
• Calculated water velocity in the ditch	<input type="checkbox"/>	<input type="checkbox"/>
• Calculated shear stress in the ditch	<input type="checkbox"/>	<input type="checkbox"/>
• Permissible shear stress for the ditch lining	<input type="checkbox"/>	<input type="checkbox"/>

## Support Calculations/ Appendices Cont.

	Prelim	Semi
<b>Pipe Sizing Calculations Submitted in Table Format:</b>		
• List design storm event		<input type="checkbox"/>
• Identify the pipe number associated with calculation		<input type="checkbox"/>
• Identify the length of the pipe		<input type="checkbox"/>
• Use previously created drainage area maps and inlet spacing calculations to identify the associated drainage area of both the individual pipe and total system		<input type="checkbox"/>
• Identify individual "C" value as well as aggregate total "C" value for each pipe		<input type="checkbox"/>
• Use previously created drainage area maps and inlet spacing calculations to identify the associated Tc of the of both the individual pipe and the total system		<input type="checkbox"/>
• Calculate associated "I" using Chapter 6 of the Road Design Manual		<input type="checkbox"/>
• Determine Runoff "Q" to the pipe being designed		<input type="checkbox"/>
• Identify the slope of each pipe		<input type="checkbox"/>
• Perform Manning's calculation to determine the design and full flow velocity		<input type="checkbox"/>
• Identify invert and discharge elevations for each pipe		<input type="checkbox"/>
• Calculate crown drop for each pipe		<input type="checkbox"/>
<b>HGL and EGL Calculations Submitted in Table Format:</b>		
• Provide summary of HGL and EGL calculation results		<input type="checkbox"/>
• Include sample HGL and EGL calculations for the project		<input type="checkbox"/>
<b>Culvert Analysis:</b>		
• Design flow		<input type="checkbox"/>
• Maximum flow		<input type="checkbox"/>
• Headwater elevation		<input type="checkbox"/>
• Tailwater elevation		<input type="checkbox"/>
• Outlet velocity		<input type="checkbox"/>
• Tailwater velocity		<input type="checkbox"/>
<b>Energy Dissipater Design:</b>		
• Perform appropriate energy dissipater calculations		<input type="checkbox"/>
• Determine outlet velocity with proposed energy dissipater		<input type="checkbox"/>