



## Preliminary Drainage Report (PDR) Checklist

### Instructions:

A Professional Engineer, licensed in the State of Colorado, must complete and sign this form as the Engineer of Record (EOR). By doing so, the EOR is certifying that the PDR submittal is complete and accurate per the items listed on this checklist, and in accordance with the latest version of Aurora's *Storm Drainage and Technical Criteria* (SDDTC).

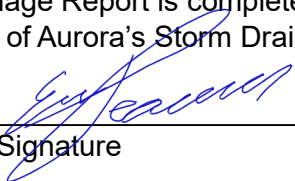
This checklist shall be uploaded as a separate file to the Planning Department portal, along with the preliminary drainage report and plan. This checklist shall be used as a guidance document only and shall not be considered comprehensive for submittal requirements. Site Plan will not be advanced for review until the PDR submittal is complete. Preliminary Drainage Report will be limited to three (3) reviews, additional review fees will apply to the fourth (4<sup>th</sup>) review.

This checklist is also to be used for Preliminary Drainage Amendments, Preliminary Drainage Letters and Preliminary Drainage Letters of Conformance. Select "N/A" where appropriate.

Applicant & Project Information			
Platted Subdivision or Site Plan Name:			
Engineering Company:		Phone:	
EOR Name:		E-mail:	
Owner Company:		Phone:	
Owner Contact Name:		E-mail:	
If part of a Master Planned Development provide EDN for MDR:		Site area in acres:	

I hereby certify that this Preliminary Drainage Report is complete per the items listed on this checklist, and in accordance with the latest version of Aurora's Storm Drainage and Technical Criteria (SDDTC).

\_\_\_\_\_  
Engineer of Record Printed Name

  
\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Engineer of Record Title



## Preliminary Drainage Report (PDR) Checklist

Reviewer Information (to be completed by Aurora Water staff)			
Name:		E-mail:	
Date:		Result:	
Submittal Type:			
Referrals Required:			
Notes:			

**X** below item number indicates deficiency. For AW staff use only.

Item	Description	Included	Not Applicable
01	A drainage kick-off meeting is required for all PDR submittals that contain regional infrastructure. The requirement to hold this meeting will be identified in the pre-application notes, or by direct communication with AW drainage staff. If a kick-off meeting is required, meeting minutes shall be prepared by the applicant, reviewed by all attendees, and included in the appendix of the PDR.		
02	Preliminary Drainage Plan in conformance with approved Master Drainage Plan.		
03	Drainage Plan must match the submitted Site Plan and Plat.		
04	The name of the PDR and plan set shall be the full platted subdivision name. If a replat is proposed with the site plan, the name shall be the proposed re-platted subdivision name. The platted subdivision name shall be noted on the cover page of the PDR and included in the title block on each sheet of the plan set.		
05	Drainage design for adjacent roadways included. Drainage design must match what is shown on the Site Plan, and what improvements		

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Item	Description	Included	Not Applicable
	were identified in the pre-application notes. Required even if roadway construction is deferred.		
06	Project Phasing Shown. If the project is to be phased, then phasing must be described in PDR report text and shown on plan. Hydrologic analysis of different phases may be required, and multiple plan sheets may be needed.		
<b>Report</b>			
07	COA approval block must appear on the report cover.		
08	Required report outline from Storm Drainage Design and Technical Criteria (SDDTC) Section 2.4.3 followed.		
09	Advisory note that PDR approval is required prior to Civil Plan Approval must appear in report.		
10	Discuss any changes made to the approved MDR and address any conditional approval comments on the approved MDR or MDR plan sheets.		
11	If variances are requested, see SDDTC Section 2.10 for guidance. If there are no variances requested, state "No variances requested."		
12	Identify any off-site basins and describe their impacts to the existing property.		
13	Watersheds with Special Requirements must be identified and their requirements considered in the design. These basins are: Aurora Reservoir, Cherry Creek Reservoir, High Line Canal, and Peterson Subdivision.		
14	Identify all outfalls from the property.		
15	Selected hydrologic calculation methods are consistent with SDDTC, MHFD criteria and sound engineering practice.		
16	Hydrologic calculations are fully documented in report appendix.		
17	Imperviousness values must be based on SDDTC Chapter 5.		
18	Confirm routed/accumulated flows are computed at critical locations (ponds, storm inlets, etc.) including design points.		
19	Selected hydraulic calculation methods are consistent with SDDTC, MHFD criteria and sound engineering practice.		
20	Hydraulic calculations are fully documented in report appendix.		
21	Calculations for sizing of detention and other SCMs are fully documented in report appendix. MHFD design spreadsheets included.		
22	Criteria and methodology for establishing drainageway corridor widths is appropriate and fully documented.		
23	FEMA or FHAD floodplains are identified, and anticipated Letters of Map Change are listed.		
24	Indicate whether proposed infrastructure is public (i.e., maintained by CoA) or private.		

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Item	Description	Included	Not Applicable
25	Coordination with adjacent property owners has occurred and is documented.		
26	Each basin or sub-basin is described in words.		
27	Provide a table summarizing the percent impervious, runoff coefficient values for minor and major storms, and corresponding discharges for each sub-basin. Provide design point table with accumulated and routed flows where appropriate.		
28	Bridge concepts are discussed.		
29	Emergency overflow paths for sump inlets, culverts, bridges and detention ponds are identified and analyzed.		
30	Swale, ditch and open channel concepts are discussed and accompanied with appropriate levels of analysis.		
31	Provide a table of street, drive, and alley flow capacities. Note the flow depth and street spread for the major and minor storms.		
32	References: List all criteria, existing drainage reports, MDR(s), City Master Plan(s), floodplain studies, MHFD MDPs, etc. used in the report. Provide citation information including author and date of each reference. Note the EDN for RSN for CoA-approved or currently in review stage documents.		
<b>Appendices</b>			
33	NRCS Soils Report with the site boundaries delineated and the hydrologic soil groups identified.		
34	One-hour point precipitation depths for all design events per NOAA Atlas 14.		
35	FEMA FIRM or FIRMette with the site boundaries delineated.		
36	Airport Detention Pond Buffer Zone with the site boundaries delineated.		
37	Excerpts from previously approved reports, plans, etc. Annotate/highlight relevant information. Note the EDN or RSN where applicable.		
38	Printouts or listings for all calculations, including CUHP and SWMM, must be provided in PDF format within the report appendix.		
39	Electronic copies of models used in above analysis. Provide all input and output files and ensure all submitted models are executable. If required files exceed the limitations of upload portal, send by e-mail or download link to <a href="mailto:AuroraWaterDrainage@auroragov.org">AuroraWaterDrainage@auroragov.org</a> .		
<b>Drainage Plan</b>			
40	Drainage Plan must be formatted as a full-size drawing (24" x 36" or 22" x 34") and uploaded as a separate file.		
41	COA approval block must appear only on the first sheet of the drainage plan.		
42	No copyright notes may appear on the plan.		
43	Include note from SDDTC Section 2.6 (General Conformance), as follows:		

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Item	Description	Included	Not Applicable
	City of Aurora plan review is only for general conformance with City of Aurora Design Criteria and the City Code. The City is not responsible for the accuracy and adequacy of the design, of dimensions and elevations which must be confirmed and correlated at the job site. The City of Aurora, through the approval of this document, assumes no responsibility for the completeness and/or accuracy of this document.		
44	Include note from SDDTC Section 2.6 (Adjacent Property), as follows: Approval of this document by City of Aurora does not imply approval for any off-site work on adjacent private property. It is the owner's responsibility to coordinate with adjacent property owners and obtain all necessary approvals and easements for such work.		
45	Provide a City of Aurora vertical benchmark on all sheets containing vertical information. Go to the City's <a href="#">website</a> to find benchmarks, and be sure to include the COA ID, description, and elevation in feet NAVD88.		
46	If the drainage concept relies upon an existing pond, include the following note from SDDTC Section 2.6 (Pond Recertification): Applicant understands recertification may be required. If a pond certificate, an executed I&M plan, or drainage easements do not exist, the applicant will be required to provide these prior to civil plan approval.		
47	Legend showing all symbols, linetypes, and fills/hatches used on the plan. Exclude any symbols, linetypes, and/or fills/hatches not used on the plan.		
48	Vicinity map.		
49	Indicate the design recurrence interval for storm pipe infrastructure.		
50	State whether storm infrastructure is public or private, and who will be responsible for maintenance. These requirements can be addressed with the following note from SDDTC Section 2.6: All storm infrastructure is [private/public] and designed for the [design recurrence interval] storm event.		
51	Plan sheets with minimum scales as follows: Single family detached: 1" = 50' Multifamily: 1" = 30' Commercial and Industrial: Building footprint less than 500,000 ft <sup>2</sup> : 1" = 30' Building footprint greater than 500,000 ft <sup>2</sup> : 1" = 50'  If the entire site doesn't fit on a single plan sheet at the required scale, a sheet index must also be provided.		
52	Existing topography at a 2-foot contour interval minimum. Proposed grading at 2-foot contour interval minimum. Contours must provide sufficient coverage to completely encompass all existing and proposed drainage basins (on-site and off-site). Contours must be		

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Item	Description	Included	Not Applicable
	extended a minimum of 50-feet beyond the property lines or further as necessary to clearly identify off-site drainage patterns and show the tie-in between the proposed grading and existing topography.		
53	Flow direction arrows with slope in percent for proposed on-site grading and off-site areas.		
54	Drainage basin boundaries and design points.		
55	Table with basin identifier, basin area (acres), major and minor runoff coefficients, percent imperviousness, and minor and major runoff for all basins and design points.		
56	Floodplain information, including the 1% annual chance floodplain and floodway limits and BFEs, if available, from FIRMs, FISs, FHADs, or other Best Available Information.		
57	If any work is planned within the floodplain, include note from SDDTC Section 2.6 (Floodplain Development Permit): <a href="#">Applicant understands that work in 100-year Floodplain requires a Floodplain Development Permit which must be obtained prior to grading or construction within the floodplain.</a>		
58	Stream Management Corridors. Label corridor widths and identify conceptual locations for grade control and bank revetment structures.		
59	Fluvial Hazard Zone mapping, where applicable.		
60	Location of all existing drainage facilities and public improvements. Include the size and EDN or RSN for each existing facility.		
61	Labeling of all proposed drainage facilities. The design storm frequency and maintenance responsibility for each proposed drainage facility must be indicated. If privately maintained, note party responsible for maintenance. A general note covering the above can be placed on all plans in lieu of labeling all facilities.		
62	Existing and proposed detention pond locations. <ul style="list-style-type: none"> <li>For each pond, label the WQCV, EURV, and 100-year storage volumes and WSELs.</li> <li>Note the allowable release rates, maximum depths, ponding limits, and any other water quality SCM data as needed for the proposed SCM.</li> </ul>		
63	For proposed ponds, provide sufficient detail in graphical or numerical format to verify that freeboard requirements of SDDTC Section 10.9.4 are satisfied.		
64	For proposed ponds, provide sufficient detail to verify that the maintenance requirements of SDDTC Section 10.7 are satisfied.		
65	Location and direction of all emergency overflows for sump inlets, culverts, bridges, and detention ponds. <ul style="list-style-type: none"> <li>Emergency overflow arrows must use a unique symbol.</li> <li>Label all inlets in sump.</li> </ul>		
66	For each emergency overflow location, include a cross section with the emergency overflow discharge, WSEL, dimensioned freeboard, and adjacent building lowest point of entry (LPE) if applicable.		

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Item	Description	Included	Not Applicable
67	<p>Preliminary plan and profiles for open channels.</p> <ul style="list-style-type: none"> <li>Note the longitudinal slope on both the plan and profiles.</li> <li>Include a typical cross section for each channel section which notes the major and minor design storm discharges, WSELs, dimensioned freeboard, and adjacent building lowest floor elevation (LFE).</li> <li>Define maintenance responsibilities if not included as general note.</li> <li>Note schematically the location of any erosion protection and bank stabilization measures.</li> <li>Show any existing utilities, culverts, etc., that cross the channel.</li> </ul>		
68	<p>Typical cross section(s) for each swale and/or ditch.</p> <ul style="list-style-type: none"> <li>Note the major and minor design storm discharges, WSELs or flow depth, dimensioned freeboard, and adjacent building LPE.</li> <li>Include a note identifying all swales and/or ditches as privately maintained.</li> </ul>		
69	Existing and proposed outfall location(s). Include reference label to applicable report/plan denoting projected received flows.		
70	Labeling of any interim infrastructure. Do not include Stormwater Master Plan (SWMP) SCMs.		
71	Project phasing as applicable. If necessary, include plan sheets for both interim and ultimate conditions, with relevant hydrologic and hydraulic information adjusted to match each condition.		
72	Proposed buildings and Lowest Floor Elevations (LFEs) for commercial and multi-family sites. Note the Lowest Point of Entry (LPE) for structures near emergency overflow paths and swales/ditches.		
73	Labeling of proposed retaining walls. Include preliminary cross section with maximum height, and ROW/property lines.		
74	Existing and proposed easements (drainage, utility, fire lane, etc.), property lines, and ROW. Dimension all easements and ROWs and label all roadways. Identify any necessary license agreements.		
75	Labeling of all adjacent properties, subdivisions, developments, etc. Include the platted subdivision names where applicable. Note the EDN or RSN where applicable. Provide CoA jurisdictional boundaries as applicable.		
76	SWMM model schematic diagram depicting all drainage basins, conveyance elements, storage elements, junctions etc., if applicable. May be included in report, as long as the schematic is clear.		



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Key Storm Drainage Criteria to Verify (Based on commonly seen errors)			
Hydrologic Analysis			
77	Basin boundaries correspond to existing topography or future site layout and grading has been incorporated.		
<u>Rational Method (Where applicable)</u>			
78	Rational method is appropriate for the application. See SDDTC 5.3.		
79	Point Rainfall Depth per NOAA Atlas 14.		
80	Imperviousness values based on SDDTC Table 5-6.		
81	Runoff coefficients computed per SDDTC 5.3.2, based on Hydrologic Soil Groups.		
82	Time of concentration calculations comply with SDDTC and MHFD criteria.		
83	Accumulated and routed flows are calculated at appropriate design points.		
<u>CUHP (Where applicable)</u>			
84	Depression loss values correspond to MHFD and COA criteria.		
85	Infiltration method parameters correspond to SDDTC 5.3.3.		
86	Imperviousness values based on SDDTC Table 5-6.		
87	Directly Connected Impervious Area (DCIA) Level is accurate. <i>Use 0 unless distributed LID measures utilized throughout watershed.</i>		
88	100% imperviousness used for WQCV portion of detention ponds.		
<u>SWMM (Where applicable)</u>			
89	Pond storage curves in SWMM match curves on plans and calculations.		
90	Pond discharge curves in SWMM match curves on plans and calculations.		
91	CUHP output hydrographs are applied to the correct SWMM nodes.		
92	Link connectivity in SWMM model is correct.		
93	Continuity error is insignificant.		
94	Kinematic wave method is used.		
Hydraulic Analysis			
<u>New or modified ponds</u>			
95	Applicable detention, EURV and water quality requirements are met.		
96	Volumes computed by appropriate methods. See SDDTC Table 10-2.		



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97	Pond footprint shown based on preliminary grading.		
98	Proposed pond should not classify as a jurisdictional dam.		
99	Proposed ponds located near airports identify and apply requirements in SDDTC 10.14.		
100	Detention and water quality provided per requirements in SDDTC 10.3		
101	Preliminary grading complies with requirements of SDDTC 10.9.1. <ul style="list-style-type: none"> <li>• Embankment and side slopes not steeper than 4:1</li> <li>• Pond bottom slopes 2% or greater</li> <li>• Earthen embankments cover with minimum 6" of topsoil and revegetated.</li> <li>• Top width of embankment minimum 10' wide if used for access. Otherwise, minimum 5'.</li> <li>• Groundwater considered.</li> <li>• Located outside floodplain.</li> </ul>		
102	Preliminary grading includes maintenance features specified in SDDTC 10.7. <ul style="list-style-type: none"> <li>• Drainage easement(s) provided for all pond components.</li> <li>• Maintenance access provided to all pond components.</li> <li>• All-weather, stable surface provided for maintenance access.</li> <li>• Geometric requirements met for maintenance access.</li> <li>• Avoid crossing low-flow channel.</li> <li>• Storage and staging areas provided for maintenance.</li> <li>• Regional facilities meet SDDTC and MHFD requirements.</li> <li>• Multi-use access meets other departments' requirements/</li> <li>• I&amp;M plan provided.</li> </ul>		
<u>Use of existing ponds</u>			
103	If an existing pond is being expanded or changed due to tributary area change, percent impervious increase or some other aspect of the pond is being changed, that pond must be brought up to current design standards.		
<u>Streets/Alleys</u>			
104	Only Type R inlets are allowed within right-of-way. Other inlet types may be used on private property.		
105	Inlets are located per the requirements in SDDTC 6.3.3.		
<u>Storm Sewer System</u>			
106	When connecting to an existing storm sewer pipe, call out the offsite flow rate projected for the receiving storm sewer system at the point of connection and reference the name and date of the study. If no previous study exists, analysis showing adequate capacity must be performed by Applicant and provided with MDR.		

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<u>Culverts</u>			
107	All culverts must be designed to pass the 100-year peak flow, subject to the allowable headwater depth criteria in SDDTC 9.4.4.		
108	No road overtopping is allowed up to and including the 100-year event.		
109	When box culverts reach or exceed a width of 8 feet, the minimum height must be 6 feet.		
110	An emergency overflow path must be provided above the opening of each culvert. See SDDTC 9.4.8 for details.		
<u>Open Channels</u>			
111	Criteria relative to the classification of stream (major, minor, swale/ditch) are met. See SDDTC 7.2.		
112	Discharges from hydrologic study are applied to the proper cross-sections in hydraulic analysis.		
<u>Floodplains</u>			
113	Correct and most up-to-date floodplain information is shown on the plans.		
114	Source documents, such as a FIRMette, are including in the report appendix.		
115	Applicable floodplain requirements, particularly requirements for minimum LFE and/or LPE are identified and implemented to residential lots and/or commercial buildings in report and plan.		
116	Setback requirements are identified in report and plan. See SDDTC 4.5.2.		
<u>Overall</u>			
117	Descriptions, elevations, dimensions, specifications, etc. must be consistent in all parts of the submittal, including report narrative, calculations, and plan sheets.		