



City of Bowie, Maryland
Department of Public Works
Department of Planning and Economic Development
 15901 Excalibur Road; Bowie, MD 20716
 (Phone: 301-262-6200; Fax 301-809-2309)

Storm Drains Plan Review Checklist

SITE DESCRIPTION

Project/Subdivision Name: _____
 Plan Alias: _____

Tax Map No	Parcel No.	Acreage	ADC Map/Grid
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APPLICANT/CONSULTANT INFORMATION

OWNER

CONTRACT PURCHASER

Name

Address

City, State, Zip Code

Telephone

Email Address

Name

Address

City, State, Zip Code

Telephone

Email Address

SURVEY/ENGINEER

Name

Address

City, State, Zip Code

Telephone

Email Address

Contact Person

LEGEND

____ Acceptable	<u> X </u> Not Acceptable	<u> NA </u> Not Applicable
<u> R </u> Required Not Submitted	<u> INC </u> Incomplete	<u> NR </u> Not Reviewed

PLAN REQUIREMENTS

1. Drains - all shown in standard symbols (size, length, and type noted).

2. Drains - curve data shown for pipes laid on curves to conform with Design Standards.

3. Drains - in State roads and rail-road tracks, method of crossing specified and detailed.

4. Drains - clearance from other utilities shown on plan.

5. Drain structures – dimensioned for location-dimensioned by station and offset from road centerline (preferred), or property lines or other well defined procedures.
6. Drain structures – adequate access to structures.
7. Drain structures- numbered S-1, S-2, M-1, I-1, etc., starting from downstream end of the system.
8. Drain structures- special details provided if not according to city standards.
9. Inlet connections – size indicated (show detail).
10. Check drainage easements with those shown on plat. Storm drain easements throughout on condominiums and townhouses. Drainage easement shall be twice the pipe invert depth plus pipe diameter and minimum 20 feet.
11. Dedicated right-of-way provided for pipes larger than 33” in residential properties (check on plat also).
12. Sumps for yard inlets on private property are discouraged, but if necessary should be located as far as possible from dwelling units, minimum of 50 feet away.
13. If outlet discharges into swale/ditch/stream, provide computations showing velocity not greater than 4 fps unless stabilization measures are provided.
14. A soil investigation report showing sufficient borings at each outfall and the technical recommendations specifying but not limited to, infiltration rates, groundwater levels, USDA soil classifications, scaled boring location map, boring profile and slope stability information, shall be submitted duly sealed and signed by a Maryland registered geotechnical engineer.
15. Sufficient topography showing existing and proposed contours at all yard inlets and at outlet structures.
16. All the storm drain and inlet design computations must be posted on the mylars before final approval.
17. Check safe passage of 100 –year storm, overland, using manning’s equation on site grading plan.
18. Water quality control device (infiltration trench) at each outfall.
19. Oil & Grit Separators in Commercial Properties for water quality (if infiltration is infeasible).
 - a) Storage volume in first two chambers.
 - b) Size of chamber 1, 2, & 3.
 - c) Reinforcement design & detail.
 - d) Hydraulic gradient line design & shown on detail not to exceed crown of inflow pipe.
 - e) Trash rack and elbow design and detail.
 - f) Elbow should be either DIP or Zinc coated where aluminum comes into contact with concrete.

PROFILE

1. Existing and finished ground line and/or pavement shown, extended 200’ at tie-ins or breaks.
2. Roads and streets – name of road or street and intersecting streets – labeled.
3. Utilities, existing – crossing and parallel lines shown and labeled (invert shown and size).
4. Utilities, existing – drainage structures and manholes shown, invert elevations shown and checked against record drawing.
5. Utilities, proposed – crossings and parallel lines shown and labeled (show diameter).
6. Scales – shown in proper location, horizontal: 1 inch = 50 feet; vertical: 1 inch = 5 feet.
7. Drains – size, type, class, length, and slope shown.
8. Drains – quantity of flow for 10 year storm, velocity of flow (full & partial), and friction slope (sf) and actual slopes shown.
9. Structures numbered and stationed from downstream end of each reach.

10. Structure inverts labeled (upstream and downstream).
11. Drains - arithmetic of invert equations and grades checked.
12. Drains -hydraulic gradient shown and labeled.
13. Drains - pipe classification checked for allowable maximum and minimum cover.
14. Drains - the use of pipe anchors, concrete cradle, or encasement, where necessary, otherwise trench detail with pipe bedding shown on details sheet.
15. Check for rubber gasket (ASTM C-361), if required due to fill or high HGL or reservoir upstream.
16. Outfall structures - Plan and section with table showing length, width and thickness and d50 size of riprap, apron and filter cloth details shown. Design as per Maryland standards and specifications for soil erosion and sediment control (attach curves).
17. Proper compaction (re: AASHTO) shown for pipes in fill.
18. Minimum slope in storm drains shall be 0.50%
19. Minimum velocity in storm drains greater than 2 fps and maximum partial (actual) velocity less than 20 fps.
20. For pipes with less than 12" clearance in between, concrete encasement under written permission of city engineer.

DRAINAGE AREA MAP

1. Scale 1 inch = 200 feet (preferably 1"=100'). Drainage area map can be enlarged for smaller watersheds, but can not be reduced without prior consent. City can ask for enlarged drainage area map for any job irrespective of its size.
2. Entire watershed area draining through site shown, with contours extending at least up to ridge line upstream or 200' beyond property line, whichever is farther. All drainage divide lines shown conspicuously bold.
3. Entire existing, approved (to be constructed) and proposed drainage systems indicated systematically, complete with manholes, inlets and structures. Numbered starting from downstream only.
4. Runoff data - Each tributary area shall have information on tributary area in acres, percentage impervious area, rational method coefficient or runoff curve number, zoning, SCS hydrologic soil type and average slope of this terrain.
5. All of the pertinent off-site properties shown with the owner's name, existing use and zoning.
6. Limits of 100 year flood plain and wetlands clearly shown.

COMPUTATIONS AND MISCELLANEOUS ITEMS

1. Storm Drain Computation Table - areas, weighted runoff factors, times of concentration shown, Intensity shown, CA factor adjusted for 20-year intensity in sumps, and adjusted factor used in summation CA column.
2. Structure schedule-structure number, type, width, size, location (station and offset), Bowie standard detail number (R-_____), top elevation, invert elevations (in and out) indicated. If special structure, sheet number indicated where detail appears (under type). For yard inlets, specify number of openings.
3. Inlets - inlet flow checked against inlet capacity curves; bypass carried to next inlet. Inlets in sumps sized for 20-year intensity. Inlet capacity and spread computations for all inlets irrespective of sump conditions should be checked. Maximum spread not to exceed 10 feet in any situation.

- 4. Inlets – locations checked to verify conformance with standards for maximum gutter flow, maximum flow across intersections, maximum flow around fillets, and maximum flow through yards not greater than 5cfs. Maximum flow in any inlet not to exceed 10cfs.
- 5. Water jet impingement curve checked where drop through a structure cannot be served by channelization.
- 6. Storm Drain Structures – checked against Bowie standard details for proper dimensions (minimum depth to crown of pipe, proper inlet width for inflow pipe to clear throat of structure, etc.).
- 7. Storm Drain Structures – shown in accordance with Standard Details as much as feasible.
- 8. Special details – shown in accordance with Standard Details as much as feasible.
- 9. Special details – check use of proper scales.
- 10. Special details – reinforcement clearly detailed.
- 11. Protective fill indicated for all drains with less than two feet of cover (for construction phase only).
- 12. Minimum 12” cover labelled for applicable pipe reaches.

COMMENTS
