HowardCounty
maryland
HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
3430 Court House Drive, Ellicott City, Maryland 21043 410-313-2350

Development Engineering Division
Developer Projects - Checklist

WATER AND SEWER FINAL CONSTRUCTION PLANS

To be completed by a Registered Professional Engineer with a Maryland Registration Number.

LEGEND ☑ Complied With ☒ Not complied with explanation attached N/A Not Applicable W Waiver Submitted

A. GENERAL

- [ ] 1. Standard sheet
- [ ] 2. Standard Title block on all sheets
- [ ] 3. Standard signature block on all sheets
- [ ] 4. Professional engineer's seal and signature on each drawing
- [ ] 5. Vicinity map shown on Cover Sheet
  - a. Provide Title "Vicinity Map"
  - b. Scale 1"=600'
  - c. Show north arrow
  - d. Site of proposed subdivision clearly outlined and identified *(do not shade in subdivision)*
  - e. Existing and proposed streets identified
  - f. Existing and proposed water and sewer shown with pipe sizes and contract numbers
  - g. Below vicinity map provide information block containing:
    - *Type of Building*
    - *No. of Water House Connections*
    - *No. of Sewer House Connections*
    - *Drainage Area*
    - *Treatment Plant*
- [ ] 6. Provide a table on the first street showing total material quantities, i.e. type of pipe, number of water and sewer connections, number of manholes, number of fire hydrants, number valves, etc.
- [ ] 7. Provide General notes adjacent to or below Vicinity Map *(see attached sheet for General Notes)*
- [ ] 8. On Title Block, identify the Contract as per identification used in record plat:
  - a. No. of Lots
  - b. Contract No.
  - c. Election District
- [ ] 9. Show 600 scale map number and block number
- [ ] 10. North arrow on each sheet
- [ ] 11. Plan Scale 1"=50'
- [ ] 12. Show on the plan view the complete survey details and the traverse and road center line stationed at least every 100 feet.

13. All horizontal controls are based on Maryland State Coordinates NAD 83/91
14. Place three coordinate ticks on each plan
15. All vertical controls are based on NAVD 88
16. Show at least two permanent bench marks with description, elevation and references *(use the same bench marks as shown on the road construction plans)*
17. Show property line, curb line, septic tank and well and spring locations
18. Show existing and proposed storm drains and stormwater management ponds
19. Show and label the contract number of existing water and sewer mains, house connections, manholes and other related structures and appurtenances
20. Show streams, lakes, trees, railway lines and related structures
21. Show all proposed and existing Gas, Electric, Telephone and other utilities
22. Show existing and proposed utility rights-of-ways
23. Show existing and proposed buildings on lots with basement elevation or lowest floor elevation
24. Label the parcels and lots and provide names of property owners for properties around the subdivision/ development
25. Label the lots or parcel numbers within the development
26. Front foot dimensions and arc radii along property lines *(optional or as requested)*
27. For roads, identify and show:
    a. Pavement width and type of pavement
    b. Right of way width
    c. Existing or proposed curb and sidewalks
    d. Type of road, (State, County or private)
28. Use jack/bore for crossing State and County roads, unless open cut excavations has been approved by the State or County on their respective roads. Show detail of method of crossing
29. For townhomes, apartment developments and single family subdivisions, show the complete layout of the piping system in the Plan View drawing
30. On the Plan View, locate the water and sewer mains and appurtenances by survey coordinates, or by station off-set from the survey traverse or station off-set from centerline road stationing. For clarity, a chart may be used to show coordinates instead of shown on the plan view.

B. SUPPLEMENTAL INFORMATION

1. Show sediment control for water and sewer mains outside the limits of grading. The sediment control measures shall be reviewed and approved by Howard Soils Conservation District (HSCD). Submit directly to HSCD
2. Provide water and sewer house connection location tables as shown below. Incorporate all of the lot numbers. The address and location dimensions (swing ties) will be added after construction

WATER HOUSE CONNECTION AS-BUILT LOCATION TABLE			
Lot Number	**Address**	**Location Dimension 1**	**Location Dimension 2**
Lot 1	*1234 Shady Lane*	*18' South West Corner Inlet 12*	*5' Water Valve Station 12+50*
Lot 2			
Lot 3			

SEWER HOUSE CONNECTION AS-BUILT LOCATION TABLE			
Lot Number	**Address**	**Location Dimension 1**	**Location Dimension 2**
Lot 1	*1234 Shady Lane*	*10' C/L Fire Hydrant Station 10+100*	*11' Water Valve Station 12+50*
Lot 2			
Lot 3			

C. WATER SYSTEM PLANS

- [ ] 1. Plan Scale 1" = 50'
- [ ] 2. Check the size of the water main per approved network computation
- [ ] 3. All water mains shall be DIP Class 54, unless otherwise specified and/or approved by the DPW
- [ ] 4. All piping and appurtenances, existing and proposed features shall be shown and noted by Standard symbols and abbreviations. See Volume IV, Details G-1.01, G-1.02 and G-1.03
- [ ] 5. Clearly identify all fittings and appurtenances by size and type (valves, tees, crosses, bends, plugs, tapping sleeves, reducers, division valves, air release valves and manholes, etc).
- [ ] 6. Pipe alignment and fittings location by coordinates, dimensioned from traverse or proposed road centerline for field stakeout
- [ ] 7. Check spacing of valves to insure compliance with Volume II of the Design Manual
- [ ] 8. Check the spacing of fire hydrants. Provide water main stationing on the fire hydrant tee. Label the Bury Line Elevation and Bury Length *(to 1/2 foot)* of each hydrant
- [ ] 9. House connections properly shown and identified - Note size if other than 1 1/2-inch diameter
- [ ] 10. Locate the house connection on high end of property.
- [ ] 11. Check minimum 10-ft clearance required between the water main and the sewer and minimum 5-ft clearance required between the water main and other utilities.
- [ ] 12. Check minimum 5-ft clearance required of water house connections from other utilities
- [ ] 13. Outside meter settings shown and noted on the plan or call for inside settings as applicable. Inside meter setting for 2-inch and smaller WHCs are only permitted with the approval of DPW
- [ ] 14. Sprinkler systems for single residential dwelling units shall have water house connections and water meters that are sized in accordance with the design of the sprinkler systems. Sprinkler systems for single residential dwellings shall have a minimum of 1 1/2 inch service connection with a 1" outside meter setting
- [ ] 15. Crimp radii and curve data for DIP shown for pipe curvatures, together with location and stationing of point of curvature (PC) and point of tangent (PT)
- [ ] 16. Check to ensure that all horizontal and vertical directional changes for PVC water mains are made by using proper fittings. *(PVC pressure pipe shall not be crimped or bent)*
- [ ] 17. Label the material and class of pipe of the existing water main
- [ ] 18. Show water main stationing
- [ ] 19. Provide special note for division valves and show water pressure zones
- [ ] 20. Check the water pressure zone and the available water pressure
- [ ] 21. Service connections with over 60 psi pressure are noted on drawings at the applicable parcel or lot requiring PRV for service connection
- [ ] 22. Use tapping sleeve and valve for connecting into the existing water main, unless otherwise approved

23. When shutdowns for tie-ins are permitted, provide connection sequence, noting the existing valves to be closed when the connection to the existing water system is made. Provide note on the plan outlining areas affected by the shutdown and a list *(names and addresses)* of all water customers affected by the outage
24. In residential developments where easements are required between two adjacent lots for the future extension of the water system, a water main shall be constructed within the easement between the adjacent lots. The water main shall be extended the full length of the easement between the lots
25. Concrete encasement of water mains shall not be used
26. Locations of all continuity test stations are shown and noted on the plan

D. WATER MAIN PROFILES

1. Profile scale 1"=5' vertical and 1"=50' horizontal
2. Profiles shall be shown on separate drawings and clearly identified and cross referenced to the Plan view drawings
3. On a combined water and sewer project the profiles of each system may be combined on a single profile
4. Show the water main in double line and label the size of the water main
5. Water main stations and inverts shall be shown at every 50-foot intervals *(See the Design Manual, Volume II, Section 3.3D)*
6. Cover over the water main to be no less than 3.5 feet *(finished grade)*
7. Show and label existing and proposed grades of the road or ground
8. Water main sizes, fittings (appurtenances) shall be labeled, stationed, and invert elevation shown
9. Check the combine horizontal and vertical radii of pipe required to traverse over, under, or around obstruction to ensure crimp radius of DIP does not exceed the maximum radius allowed
10. Check to ensure that all horizontal and vertical directional changes for PVC water mains are made by using proper fittings *(PVC pressure pipe shall not be crimped or bent)*
11. Pipe checked for minimum/maximum depth
12. Show air release manholes where required
13. For transmission water mains, show and label the hydraulic gradient line
14. Label the type of pipe material used for the existing water main. Show on the plan the contract number of the existing water main
15. Check for adequate clearance between crossing utilities
16. Where profiles branch to other profiles, check inverts for compatibility
17. Verify need for trench erosion checks and pipe anchors based on slope of ground
18. Locations of all continuity test stations are shown and noted on the profile

E. SEWER SYSTEM PLAN

1. Plan scale 1" = 50 '
2. Show existing sewer mains and contract number to which proposed sewer main will be connected
3. Show pipe size and direction of flow of sewer main shown between manholes
4. The minimum public sewer main size is 8-inch
5. Manholes numbered and identified by type *(drop, type A or B, water tight manholes, etc)*

6. Manholes shall be located by coordinates, distance from applicable traverse station or from road centerline or other physical points for field stakeouts
7. Channels not conforming to standard geometric schemes have been detailed *(including all manholes with inside diameters over 5 feet in diameter)*
8. Centerline manhole channel radii are not less than 2.5 times the pipe diameter
9. The type of manhole required *(drop, type A or B, water tight manhole)*
10. On the terminal manhole, ensure SHCs do not exceed the maximum 3 SHCs allowed
11. Ensure that the maximum number of sewer mains connecting onto any manhole is four or less
12. Check horizontal and vertical clearances for the existing utilities in the area
13. Show minimum cellar elevation of lots or buildings
14. Note on the plan all lots that have sewer service restrictions *(i.e. no gravity sewer service or gravity service first floor only)*
15. House connections are properly shown and located
16. All sewer service for residential units shall be 4 inch size with 2% slope *(standard acceptable slope)*
17. Provide invert elevation of SHC at property line, note the type of connection and design slope if greater than or less than 2% *(The minimum slope is 1% and 5% maximum)*
18. Check clearance between house connections and other utilities are not less than 5 feet
19. No twin sewer house connections are permitted unless separate justification is provided for unusual conditions
20. Show all easements required for sewer main extension and sewer house connections
21. Show all off site right-of-way or easements
22. Check the size of sewer main as per approved computation or as required by the Master Plan
23. In residential development projects, where easements are located between two adjacent lots for future extension of the sewer system, a sewer main shall be provided within the easement between the adjacent lots. The sewer shall be extended the full length of the easement
24. If sewer mains are designed to be within existing County right-of-way *(including roads)*, the sewer main shall be no closer than five (5) feet from the right-of-way line
25. When a sewer main design necessitates the acquisition of a sewer easement, the sewer main should be located in the middle easement
26. In new developments where sewers are laid in advance of road pavement, the sewer shall be placed on the lower side of the street, seven (7) feet from the street centerline
27. On the plans *(plan view)* clearly label public and private sewer mains

F. SEWER PROFILE

1. Sewer profile scale 1" = 50' Vertical and 1" = 50' Horizontal
2. Show existing and proposed grades for the road or ground. Identify and label grade as *"Grade Over Water Main" "Grade Over Sewer"* or *"Centerline Road Grade"*
3. Show sewer pipe size and grade of sewer main
4. Pipe slopes shall be checked to be within minimum, maximum allowable design limits as set forth in Design Manual, Volume II
5. Show all manholes and label the invert elevations of manholes

6. Distances between manholes shown and stationed. Identify manholes with numerical numbers
7. Note size and type of manhole and provide structural detail, if other than standard
8. Identify drop manholes, including invert elevations of drop connections and labeled by Type A or Type B
9. Label the rim elevation of the manhole
10. Provide intermediate landing for manholes 18-feet and greater depth. Label the elevation of intermediate landing. Note the manhole wall thickness as required
11. Intersecting sewer mains at manholes that are of different diameters have matching tops of pipe elevations
12. Check for concrete cradle or encasement. Check where necessary and label accordingly
13. For profiles that branch to other profiles, verify that invert elevations are consistent
14. Verify the need for trench erosion and concrete anchors based on slope of ground. Use water tight frame covers set 18 inches above the ground when the manholes are located within the flood plain *(See standard details G-5.52 and G-5.41)*
15. Check that manholes placed on fill shall have base extended to undisturbed earth
16. Use D.I.P. sewer pipe for river crossings, on slopes greater than 20% and when required for structural strenght *(extra depth of cover)*; unless otherwise directed by DPW
17. Show proposed centerline road stationing on the profiles
18. Note on the profile the hydraulic design data between manholes for all interceptors and steep or shallow grade collector sewer *(Q in mgd, velocity, and n factor)*
19. Label service elevations of lots, homes and structures to be serviced shown together with house connections at appropriate elevations

GENERAL NOTES

To be printed on Drawing No. 1 or 2 of the Water and/or Sewer Plans

PART I *(to be printed on both water & sewer plans)*

1. Approximate locations of existing mains are shown. The contractor shall take all necessary precautions to protect existing mains and services and maintains uninterrupted service. Any damage incurred shall be repaired immediately to the satisfaction of the Engineer at the contractor's expense
2. Topographic field surveys were performed on_____(Month, Year) by _____ (Engineering/Survey Firm)
3. Horizontal and Vertical Survey Controls:

   The coordinates shown on the drawings are based on Maryland State Reference System NAD '83/'91 as projected by Howard County Geodetic Control Stations No._____ No.____and No.____. All vertical controls are based on NAVD '88. Vertical controls provided on the drawings are ____(Engineering/Survey firm shall provide description of vertical control points, i.e., iron bars, cross cuts on concrete structures)
4. All pipe elevations shown are invert elevations unless otherwise noted on the plans
5. Clear all utilities by a minimum of 12 inches. Clear all poles by 5'-0" minimum or tunnel as required unless otherwise noted. The owner has contacted the utility companies and has made arrangements for bracing of poles as shown on the drawings. In the event the contractor's work requires the bracing of additional poles, any cost incurred by the owner for the bracing of additional poles or damages shall be deducted from monies owed the contractor. The contractor shall coordinate with the utility companies to schedule the bracing of the poles

6. For details not shown on the drawing, and for materials and construction methods, use Howard County Design Manual, Volume IV, Standard Specifications and Details for Construction (Latest Edition). The contractor shall have a copy of Volume IV on the job
7. Where test pits have been made on existing utilities, they are noted by the symbol ☐ at the locations of the test pits. A note or notes containing the results of the test pit or pits is included on the drawings. Existing utilities in the vicinity of the proposed work for which test pits have not been dug shall be located by the contractor two weeks in advance of construction operations at his own expense
8. The contractor shall notify the following utility companies or agencies at least five working days before starting work shown on these plans:

AT&T	800-252-1133
BGE (contractor services)	410-637-8713
BGE (emergency)	410-685-0123
Bureau of Utilities	410-313-4900
Colonial Pipeline Co	410-795-1390
Miss Utility	800-257-7777
State Highway Administration	410-531-5533
Verizon	800-743-0033

9. Trees and shrubs are to be protected from damage to the maximum extent. Trees and shrubs located within the construction strip are not to be removed or damaged by the contractor
10. The contractor shall remove trees, stumps and roots along the line of excavation. Payment for such removal shall be included in the unit price bid for construction of the main
11. The contractor shall notify the Bureau of Highways, Howard County, at (410) 313-7450 at least five working days before open cutting or boring/jacking of any County road for laying water/sewer mains or house connections. The approval of these drawings will constitute compliance with DPW requirements per Section 18.114(a) of the Howard County Code

PART II *(to be printed on water plans only)*

1. All water mains shall be D.I.P. Class 54 unless otherwise noted
2. Tops of all water mains shall have a minimum of 3'-6" of cover unless otherwise noted
3. Valves adjacent to tees shall be strapped to trees
4. All fittings shall be buttressed or anchored with concrete in accordance with Standard Details unless otherwise provided for on the drawings
5. Fire hydrants shall be set to the bury line elevations shown on the drawings. All fire hydrants shall be installed in accordance with Standard Details. the soil around the fire hydrant shall be compacted in accordance with Section 1000 and Section 1005 of the Standard Specifications
6. The contractor shall not operate any water main valves on the existing water system
7. Tracer wire and continuity test stations shall be installed on all DIP and PVC water mains in accordance with the Howard County Design Manual
8. For PVC water mains, all records for the Quality Control and Qualification Test Requirements noted in Section 5.1 of the AWWA Standard C900 for PVC pressure pipes shall be submitted with the pipe material certifications or shop drawings prior to approval of the material for use.

The test records shall be for the pipe to be installed under this contract. All PVC pipe shall contain markings to allow cross referencing of the pipe supplied to the test records received

9. Unless otherwise noted on the plans or in the specifications, sacrificial anodes shall be installed on all valves and metallic fittings used with PVC water mains in accordance with Volume IV Standard Specifications and Details for Construction. 17 pound Magnesium anodes shall be installed on all valves and ductile iron fittings including restraints and harnesses. 12 pound Zinc anodes shall be installed on all stainless steel fittings and saddles used with PVC mains. All "tees" used with PVC mains shall be ductile iron
10. Proper Assembly of Gasketed PVC Pipe Joints: The manufacturer's insertion line of gasketed PVC pipe joints indicates the maximum depth of insertion of the spigot into the bell. After assembly of the joint, the insertion line shall remain visible. Dual insertion lines on gasketed PVC pipe indicate the maximum and minimum depth of insertion of the spigot into the bell. The contractor shall not over insert or over home the spigot into the bell of the PVC pipe.
11. All changes in horizontal or vertical direction of PVC water pipe shall be made with standard bends, 5-degree sweeps or high deflection (HD) couplings. No bending of the pipe or deflecting of PVC pipe joints is permitted. Where high defection couplings or 5-degree sweeps are permitted, the contractor shall provide one full pipe length (20-foot long) on either side of the high deflection coupling or 5-degree sweep. The contractor shall use a vibratory plate compactor or other approved means to thoroughly compact the #57 stone on both sides of the high defection coupling or 5-degree sweep, taking care not to use compaction equipment directly over the fitting.

    PVC high deflection couplings shall be limited to a total defection of 3-degrees (1 1/2- degree on either end of the coupling), shall be rated for a minimum 200 psi meeting the requirements of AWWA C900, shall have a minimum lay length of 9-inches and shall have center stops. PVC High deflection couplings shall be CertainTeed PVC High Deflection (HD) Stop Couplings or equal.

    Five degree sweeps shall be bell by spigot, rated for a minimum 225 psi, DR 18 meeting the requirements of AWWA C900 and shall be Multi Fittings (Ipex) Blue Brute DR18 or equal.

12. When PVC high deflection couplings or PVC 5-degree sweeps are used to facilitate changes in horizontal or vertical alignments of AWWA C-900 PVC pipelines, the contractor shall install devices for the prevention of over-insertion of the PVC pipe spigots or plain ends into the push on bell joint on both sides of the high deflection couplings and 5-degree sweeps. Bell stops shall be placed at the proper insertion line for the fitting. The bell stop shall be manufactured of ductile iron and incorporates an expansion retention spring to allow for pipe expansion and contraction. The bell stops shall be Series 5000 Mega-Stop, as manufactured by EBAA Iron, Inc. or approved equal.

PART III *(to be printed on sewer plans only)*

1. All sewer mains shall be D.I.P. or P.V.C. unless otherwise noted
2. All manholes shall be 4'-0" inside diameter unless otherwise noted
3. Force mains shall be D.I.P. only
4. Manholes shown with 12" and 16" walls are for brick manholes only
5. Manholes designated W.T. in plan and profile shall have watertight frame and cover. Standard Detail G5.52 Where watertight manhole frames and covers are used, set top of frame 1'-6" above finished grade unless otherwise noted on the drawings
6. House(s) with the symbol "C.N.S." indicates that the cellar cannot be served

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