

Design Requirements for Public Improvements

Updated: 12/24/19

Town of Middleton

7555 W. Old Sauk Road

Verona, WI 53593-9700

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This checklist shall be used as a guide when submitting plans, specifications, and reports for public infrastructure improvements OR private infrastructure on public easements. This list has been developed to aid in the review process, but does not cover every situation comprehensively. Applicants are advised to review Town Code Chapters 8, 15, 16, and 17 for all requirements.

PROJECT INFORMATION

Applicant Name:
Owner Name (if different from Applicant):
Location (Address, CSM name or #, Plat name and/or Lot #):
Submittal Type: <input type="checkbox"/> CSM <input type="checkbox"/> Preliminary Plat <input type="checkbox"/> Final Plat <input type="checkbox"/> Site Plan <input type="checkbox"/> Other
Submittal Date:

Instructions: Please check the check box (✓) if the item has been addressed in the submitted materials. Check the “Notes or N/A” box if the item does not apply to your submittal, or if you are providing additional comments at the end of the section (and include the related item number in the comments). Separate columns are provided to aid you in completing only the sections that pertain to your application (e.g. “Preliminary” or “Final” design depending on the submittal type).

Notice about submittals, variance requests, and design revisions:

- Full-size plans/exhibit sheets as well as detail drawings should be provided as necessary, if letter or 11x17 size plots are not able to show required information clearly.
- If any specific design situation varies from these design requirements, supply a written description of the proposed design (with any necessary calculations) that explains the reason for the variance and supports the design.
- A variance is easier to work into the design review process if the design engineer contacts the Town Engineer as soon as possible after the issue arises. A solution can usually be reached via phone conversation or face-to-face meeting, expediting the design review process.
- If revisions require additional submittals, provide a letter that lists each review comment and describes how each comment was addressed. References to the report/plans should be included as necessary. If any comments are not fully addressed as requested, please explain.

Instructions: Check the boxes in the relevant column (at right) to certify that the plans submitted comply with each requirement and/or contain the information listed below.	Preliminary Plat (✓)	Final Plat / CSM/ Site Plan (✓)	Notes or N/A (✓)
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DESIGN CHECKLIST

CONSTRUCTION PLANS & TECHNICAL SPECIFICATION REQUIREMENTS

<i>Roadways</i>			
1. Roads are placed and designed to have as little impact on existing trees as possible.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Large cuts and fills are avoided (they tend to create problems for lots and driveways).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Curve data is provided for all vertical and horizontal curves on plan & profile sheets. Vertical curves 'K' values are consistent with design speed 5 mph over proposed posted speed. The minimum K factor shall be 20 for crest vertical curves and 37 for sag curves, for posted speed limit of 25 mph.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Pavement radius at typical intersections is 40' (minimum 50' for radius entering a cul-de-sac bulb.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Permanent cul-de-sacs have a pavement radius of 45' and are centered within right-of-way (ROW). Temporary cul-de-sacs have a pavement radius of 36' (minimum 42' pavement radius if more than one driveway will be located on the bulb). If a required ditch cannot fit within the ROW around the cul-de-sac, a stormwater easement is created.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Streets ending at plat boundary that can be extended in the future end as close to plat line as possible.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Profiles extend to the ROW on cul-de-sacs, and extend 300' beyond phase lines and/or plat boundaries to show that roads can be easily extended in the future.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Preliminary profiles for all of the streets in a multiphase plat are submitted with Phase 1 plans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Cross-sections are provided (maximum interval of 50') that depict existing ground surface, proposed ground surface and road subgrade, ditch section and match points between the proposed and existing surfaces. Plans provide slope and dimension for all sections not following a 'typical' road section.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Stationing on grading plan match stationing shown on the plan & profiles and cross-sections.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Intersection grades and centerline station equations are placed on the plan and profile sheets.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Where streets intersect, the cross-section of the through-street is clearly shown in the profile.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Any intersection with a Collector or Arterial (as classified in Ch. 15 Ordinance) are designed in accordance with WisDOT criteria for Rural Intersections (FDM 11-25).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Intersection Sight Distance (ISD) are provided at all intersections. A clear sight window, as defined by the State of Wisconsin Facilities Development Manual, is shown on the plans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. There are no islands proposed within cul-de-sacs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Steel curb & gutter reinforcement is shown at all utility and storm culverts/sewer crossings.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Shoulders for typical local roads are sloped at 4% for a minimum of 3'. The top surface of the shoulder consists of ¾" crushed aggregate and is the same thickness as the pavement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Plans include a typical section that depicts the finished road section. Proposed roads have a minimum base thickness of 12" compacted in-place crushed aggregate base course for the full width of the proposed asphalt pavement and shoulders, and road subgrade extends beyond shoulders to allow for proper drainage of crushed aggregate base course. (The base consists of 1¼" gradation in the top 4", and 3" or 1¼" gradations in the lower 8".)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Pavement for all streets have a lower layer (binder course) lift 2 ¼" thick consisting of 4 LT 58-28 S HMA pavement and upper layer (surface course) lift 1 ¾" thick consisting of 5 LT 58-28 S HMA pavement. Pavements for Collector and Arterial Roads shall be a MT mix.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Roads have a 2% crown where road design slope is 5% or less. Steeper roads (or sections of roads longer than 200') with greater than a 5% design slope have a 3% crown to reduce shoulder erosion.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Roadside ditch grades and Major/Minor Drainageway grades are 1.0% or greater. A minimum grade of 0.70% will be considered for roadside ditch grades for short distances, and additional drainage devices may be needed. If road grade is less than 1.0%, ditch profiles are included on profile sheets. Ditch profiles are also shown where the ditch transitions to culvert ends.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Where the bottom of a proposed ditch will not match the typical design section, plans show line work depicting the ditch location.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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23. Ditch depths have been increased in roadside ditches where the driveway culvert pipe diameter is over 18". The ditch profile is included on the plan and profiles at all of these locations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Pavement spot elevations are placed around cul-de-sacs and at intersections are consistent with the Town standard detail.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Plans show proposed locations of proposed subdivision entrance signs and associated lighting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Plans indicate clearing of all vegetation within dedicated ROW and beyond the ROW when necessary to achieve maximum ditch back slopes and to achieve the proper clear zone width.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Plans show End-of-Roadway signage consistent with current WisDOT standard details, permanently mounted at the end of all dead-ends that do not end in a cul-de-sac, and in temporary cul-de-sacs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Preliminary plans show proposed locations of Cluster Mailbox Units (CBUs).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Final construction plans show proposed locations, and detailed designs, for CBUs. (See Town's Standard Details for smaller CBUs requiring an apron, and for larger CBUs with a pull-off drive aisle, 5' street pavement offset, and paved sidewalk pad.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grading Plans			
30. A full-size (22x34" or 24x36") grading plan of the entire development is provided with the submittal at a scale of 1 inch = 20 feet. Spot elevations detailing specific critical elevations are included on the plan. (Smaller plan sheets will be accepted, if they scale to this specification.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Spot elevations are included as necessary to clarify design. Recommended locations include high points, low points, grade breaks, important features in detention basins (normal water level and high water level) and detention basin release structures, channels, culverts, lot lines/corners, and pavement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Detailed stormwater management facility cross-sections are provided. Details of proposed detention basins and detention basin release structures are also included.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. All easements are shown and labeled on grading plans (in addition to being shown on Final Plat).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Plans include swale and drainway grading information (including swales that direct stormwater runoff between lots). All interior lot line drainage is designed with a minimum 2% grade.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Storm sewer and culvert information (inverts, lengths, slopes and materials) is shown.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Riprap information (length, width, thickness, fabric, and rock diameter information) is shown on the grading plans and is consistent with the design calculations provided.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Restoration of detention basins and other stormwater facilities located in a public stormwater easement or outlot includes 6" minimum topsoil placement. Infiltration and bio-retention areas have their own specific restoration requirements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Grading plan shows all stormwater features (swale grading, storm sewers, culverts, etc.) in relation to easements and outlots. This information will be compared to the sizing calculations included in the stormwater report, to verify adequate location and size of stormwater easements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Erosion control notes are included on the plans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. One-foot contours are used for all grading plans. Labels are provided for existing and proposed contours, legible and frequent enough to clearly show existing and proposed conditions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Minimum opening elevations (MOEs) are required for most lots adjacent to detention basins or Major Drainageways. MOEs are a minimum 2' above water elevation for the 100-year, 24-hour event.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Culverts/Storm Sewer			
42. Finish grade spot elevations are provided at the edge of pavement above all culverts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Cross-culverts: Culvert information is on the plan & profiles and matches the information on the grading plan. Culverts have a minimum cover of 18" from top of pipe to finished pavement grade. Culvert lengths allow for a maximum slope at 4:1 from the shoulder edge to the culvert end.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. Culvert ends parallel to the road have a minimum match slope of 4:1 for roads with a speed limit of less than 45 mph. For all other roads, the culverts ends are at a slope of 6:1.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. Field inlets and manholes are not proposed; only open ended culverts are proposed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. All endwalls have gates if the storm pipe/culvert is longer than 100', has a bend, or is longer than 50' with manholes/catch basins.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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47. Plans do not contain tee connections or bends in storm sewer without manholes.		<input type="checkbox"/>	<input type="checkbox"/>														
48. Lengths listed for storm culverts/pipes clearly state whether or not length includes endwalls. (Note: Culvert lengths shall be field verified during construction to ensure they are long enough to conform to the typical cross section.)		<input type="checkbox"/>	<input type="checkbox"/>														
Driveways																	
49. Driveways extended when cul-de-sacs are removed are to be replaced with in-kind materials.	<input type="checkbox"/>		<input type="checkbox"/>														
50. Any existing driveways that currently end on a temporary cul-de-sac or a tee-turnaround shall be restored to meet the Town driveway ordinance after the cul-de-sac or tee-turnaround is removed. Plans show the existing driveway conditions (dimensions, materials, spot grades) to ensure driveway reconstruction is completed by the Developer. The material of the existing driveway shall be installed to the ROW limits or to within 33' of the proposed street centerline.		<input type="checkbox"/>	<input type="checkbox"/>														
51. A preliminary review of the site grading has been completed to confirm that driveways can be built to meet Town Ordinances. Driveways must slope down and away from street pavement edge in order to prevent shoulder erosion. (This allows ditch runoff to overtop driveways if a culvert flows above capacity or gets blocked, and prevents stormwater from running onto the street and eroding the stone shoulders.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
52. Driveway culverts are at least 15" in diameter (or equivalent elliptical or arch section). Maximum culvert length is 50'.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
Specifications <i>The requirements listed below shall be stated in the specifications or on the construction plans.</i>																	
53. The Town requires roll tests of sub-grade with a loaded tri-axle dump truck carrying a minimum load of 18 tons with the tag wheels up. Soft areas shall be undercut below subgrade and replaced with 3" breaker run rock, as directed by the design engineer. Recommendations made by the Town or its Engineer shall not relieve the Contractor from their warranty obligations against failures. At Town's discretion, a roll test of the finished gravel may also be required. Blue tops and red tops (within the allowable tolerance of +/- 0.05 feet) shall be in place every 50' prior to both sub-grade and base-course roll tests. A load ticket to verify weight of truck is required before each roll test.		<input type="checkbox"/>	<input type="checkbox"/>														
54. Pavement for all streets have a lower layer (binder course) lift 2 1/4" thick consisting of 4 LT 58-28 S HMA pavement and upper layer (surface course) lift 1 3/4" thick consisting of 5 LT 58-28 S HMA pavement. Pavements for Collector and Arterial Roads shall be a MT mix.		<input type="checkbox"/>	<input type="checkbox"/>														
Recreational Trails																	
55. All proposed trails meet the basic design requirements in Sec. 15.49 of Town Ordinances.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
56. All trails are designed with maximum 1:48 (2%) cross slope	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
57. Maximum grade of trails is 5% (Town preference). Where the running slope of a segment of a trail is steeper than 1:20 (5%), the following criteria are met:																	
<table border="1"> <thead> <tr> <th colspan="2">Running Slope of Trail Segment</th> <th rowspan="2">Maximum Length of Segment</th> </tr> <tr> <th>Steeper than</th> <th>But not Steeper than</th> </tr> </thead> <tbody> <tr> <td>1:20 (5%)</td> <td>1:12 (8.33%)</td> <td>200 feet</td> </tr> <tr> <td>1:12 (8.33%)</td> <td>1:10 (10%)</td> <td>30 feet</td> </tr> <tr> <td>1:10 (10%)</td> <td>1:8 (12%)</td> <td>10 feet</td> </tr> </tbody> </table>	Running Slope of Trail Segment		Maximum Length of Segment	Steeper than	But not Steeper than	1:20 (5%)	1:12 (8.33%)	200 feet	1:12 (8.33%)	1:10 (10%)	30 feet	1:10 (10%)	1:8 (12%)	10 feet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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1:12 (8.33%)	1:10 (10%)	30 feet															
1:10 (10%)	1:8 (12%)	10 feet															
58. No more than 30% of the total length of a trail has a running slope steeper than 1:12 (8.3%).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
59. Trails have maximum 4% slope within 25' of any street crossing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
60. Segments over 8% grade are paved on crushed stone base (not crushed stone only).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
61. Drainage across trails is avoided, and does not cross trails with slope of 5% or more.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
62. Trails intersect with roads at 90-degree angles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
63. All paths/trails have minimum radii of 5' at intersections, including street intersections.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
64. Trails have minimum horizontal curve radii of: 60' (Primary crushed stone trails), 30' (Secondary crushed stone trails), or 15' (grass trails).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														

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65. Vertical curves have minimum length based on stopping site distance of 110' (Primary trails) or 80' (Secondary trails).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
66. An asphalt apron (5' long x full trail width) is provided wherever a grass or crushed stone trail meets street pavement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landscape Plan			
67. Landscape buffer requirements apply to certain roads per Sec. 15.13 of Town Ordinances. If applicable, a landscape plan and easements are provided in the plat/CSM and plans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
68. The clear sight windows for intersection sight distance is shown at all intersections on the plans. (Any area of a clear sight window that conflicts with the landscape easement does not have to be included in the total area considered when determining required number of plantings per Ordinance.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
69. Each plant is clearly identified with either its genus/species name or its common name as shown in the Town's "Preferred Planting List". The number of each plant unit used is clearly listed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
70. Plantings will not impede or interfere with the flow of water.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
71. Plantings are located outside of the clear zone and clear sight window.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Miscellaneous			
72. All lot numbers, street names, easements, minimum opening elevations, ROWs, clear zones and vision triangles are shown on (and match) the plat, construction plans, and landscape plans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
73. An Opinion of Probable Construction Cost is included with the final design plans for review.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
74. Two (2) permanent benchmarks are indicated on the plans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
75. A tree protection plan is provided, to recognize the public and private benefits of preserving and protecting existing trees. (The plan may be a graph and/or text detailing steps that will be taken to protect existing trees. A site visit with Town Public Works Staff, Town Engineer, and the Developer shall be conducted to confirm that protection areas and levels are appropriate.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
76. Plans contain detailed street signage and lighting plans, and a note stating that all street and regulatory signs and lights will be installed by the Town. (Street and regulatory signs must be installed prior to building permit issuance. Developer must contact Town Public Works Staff to request that the Town order the signs and posts, to ensure that you request correct materials, and to coordinate installation. Applicant to reimburse costs for materials and labor incurred by Town.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
77. Retaining walls within the ROW are generally discouraged. When allowed by the Town, the Retaining walls meet the following requirements: <ul style="list-style-type: none"> • Maximum height of 4' • Parallel to the roadway • Tapered/sloped at each end • Requirements listed in the "Procedure for Evaluating Clear Zones" • Drainage from lands up-slope of the wall is properly conveyed to the area downslope of the wall. 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

STORMWATER MANAGEMENT

Any development and/or land disturbing activity after August 22, 2001 that results in the cumulative additional of 20,000 square feet of impervious surface to the site must meet Town stormwater management requirements.

Stormwater Report (SWMP)			
78. The report includes narrative describing the project, unique design considerations and any other backup to stormwater facility design that is not covered by the calculations and exhibits.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stormwater Runoff Calculations			
Note: Applicant is encouraged to verify runoff calculation methods as well as curve number and time of concentration assumptions with the Town Engineer during preliminary design.			
79. All runoff calculations use the methodology described in the NRCS Technical Release 55 (TR-55), or other methodology approved by the Town Engineer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
80. Maximum curve numbers are per Chapter 14 of Dane County Ordinances.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
81. Submittal provides pre-developed and post-developed curve number calculations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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82. Submittal provides time of concentration calculations for pre and post-development.	<input type="checkbox"/>		<input type="checkbox"/>
83. The design maintains pre-development peak runoff rates for the 1-year, 2-year, 5-year, 10-year, 25-year and 100-year, 24-hour storm events using the NRCS MSE4 storm distribution and NOAA Atlas 14 24-hour rainfall depths. (Except redevelopment projects which are subject to Dane County standards for redevelopment projects.)	<input type="checkbox"/>		<input type="checkbox"/>
84. Exhibits are provided showing pre- and post-development drainage areas (watersheds) with area and curve number information for each drainage area, as well as time of concentration paths. Tributary off-site areas are included if necessary.	<input type="checkbox"/>		<input type="checkbox"/>
85. Final SWMP includes revisions to pre- and post-development watershed areas, curve numbers, times of concentration and tributary off-site areas, as necessary.		<input type="checkbox"/>	<input type="checkbox"/>
<i>Stormwater Easements</i>			
86. Any stormwater management facility required to meet proposed site goals is contained in a public stormwater or drainage easement (containing the 100-year water surface elevation). Detailed grading may be required to show how water will be directed to these devices and how they will be accessed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
87. Generally, easements for conveyance swales are provided where needed to collect runoff from 3 or more lots. Design flow rates within a proposed development must be considered in enough detail during preliminary design to plan for the location and size of stormwater easements.	<input type="checkbox"/>		<input type="checkbox"/>
88. Stormwater management easements are not overlapping with other easements unless allowed by the Town. (Easement crossings are generally acceptable.)	<input type="checkbox"/>		<input type="checkbox"/>
89. Easement widths for Drainageways. The easement width for any Minor Drainageway (5 acres of tributary area) is large enough to contain the runoff from a 25-year, 24 hour rainfall event. The easement width for any Major Drainageway (10 acres of tributary area) contains runoff from a 100-year, 24 hour rainfall event. In addition, easements are adjacent to ROW or to another easement providing access by the Town for maintenance purposes.	<input type="checkbox"/>		<input type="checkbox"/>
90. Easement sizes are verified by the stormwater calculations required for final design, and are presented in an exhibit.		<input type="checkbox"/>	<input type="checkbox"/>
<i>Detention Basin & Stormwater Facility Design Calculations</i>			
91. The plan depicts the locations where runoff leaves the existing (pre-developed) site and includes the peak runoff rate for the 1, 2, 5, 10, 25 and 100-year rain events at each location.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
92. The post-development peak runoff rate for the 1, 2, 5, 10, 25 and 100-year rain events does not increase beyond the existing at any location where stormwater is discharged.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
93. Detention basin grading and 1' contour labels provide enough detail to illustrate approximate size and feasibility of the proposed stormwater facilities. There is enough detail to confirm that the 100-year storm is contained in the easement or outlet.	<input type="checkbox"/>		<input type="checkbox"/>
94. The presence of a Major Drainageway or an existing flooding condition on or near the site can affect how stormwater facilities function and can also affect minimum opening elevations for affected lots. Analysis of these conditions is provided during preliminary and final design. Note that additional topographic information may be required (on-site and/or off-site).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
95. Drainage areas (1 square mile or larger) require a base flood elevation study (100-year). For areas that meet this standard, A hydraulic study has been submitted for approval by the Town Engineer or WDNR. A FEMA base flood elevation should be used if available. Adjacent structures and opening elevations should meet requirements in the Dane County Floodplain Ordinance.	<input type="checkbox"/>		<input type="checkbox"/>
96. Infiltration basins with bottom slopes < 1.0% includes an underdrain leading to the outlet structure. Alternatives include restoration with native vegetation that can handle wet conditions.		<input type="checkbox"/>	<input type="checkbox"/>
97. Minimum opening elevations are provided on the final plat and construction plans.		<input type="checkbox"/>	<input type="checkbox"/>
98. If a stormwater management feature is placed near the public ROW the 100-year elevation must be kept 10 feet away from the ROW.		<input type="checkbox"/>	<input type="checkbox"/>
99. As required by NR 151, test pits have been provided to establish the design infiltration rates.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Swale and Drainway Design Calculations</i>			
100. Capacity and velocity calculations are provided for critical sections of each swale, showing typical sections and design variables such as area, wetted perimeter, Manning's η value, channel slopes (side and		<input type="checkbox"/>	<input type="checkbox"/>

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longitudinal), flow depth and velocity. Capacity of shallow and flat areas, as well as velocity/erosive properties of steep areas, must be considered. If a section of swale has significantly differing slopes, both the flattest and steepest slopes should be considered.			
101. Calculations include an exhibit that shows drainage areas for critical swale/channel locations. (Provide full-size exhibit if letter or 11x17 plots cannot show required information clearly.)		<input type="checkbox"/>	<input type="checkbox"/>
102. Major/Minor Drainageways must be defined during final design since capacity and freeboard requirements may differ. Major Drainageways are designed for the 100-year event with 0.5' minimum freeboard. (Note: Some Major Drainways may require more detailed analysis if there are flooding concerns with adjacent properties.)		<input type="checkbox"/>	<input type="checkbox"/>
103. Roadway swales are designed for the 25-year event at a minimum. Modeling for the 100-year event does not inundate pavement or building envelopes, or potentially cause flood damage to property. A wider, deeper ditch has been provided as needed to meet these criteria.		<input type="checkbox"/>	<input type="checkbox"/>
104. All swales have a flat bottom that is a minimum of 2' wide.		<input type="checkbox"/>	<input type="checkbox"/>
105. Permanent erosion protection for open channels is based on the velocity of the design storm and labeled on grading plans.		<input type="checkbox"/>	<input type="checkbox"/>
<i>Culvert Design Calculations</i>			
106. The FHWA culvert method (Culvert Master computer program by Haestad methods, HY8, etc.) are used for all culvert calculations, to consider headwater, tailwater, entrance losses, friction losses, etc. In some cases, Manning's Equation is sufficient.		<input type="checkbox"/>	<input type="checkbox"/>
107. Driveway culverts are designed for the 10-year event minimum. Driveway culverts within a Major Drainageway are designed for the 100-year event. For driveways that cannot slope down away from the street, larger culverts may be required by the Town Engineer (this is determined after problematic driveways are identified).		<input type="checkbox"/>	<input type="checkbox"/>
108. Roadway culverts under streets are designed for the 25-year event at a minimum. Modeling for the 100-year event does not inundate pavement or building envelopes, or potentially cause flood damage to property. Any street culvert within a Major Drainageway is designed for the 100-year event.		<input type="checkbox"/>	<input type="checkbox"/>
109. Calculations include an exhibit showing drainage areas for each culvert. Full-size plans/ exhibits should be provided, unless letter or 11x17 size can show required information clearly.		<input type="checkbox"/>	<input type="checkbox"/>
<i>Stable Outlet/Riprap Design Calculations</i>			
110. Riprap design for rock size, length, width and configuration follows the guidelines in the Dane County Erosion Control and Stormwater Management Manual. Calculations are included with plan submittal. (Other methods may be accepted if adequate calculations are provided.)		<input type="checkbox"/>	<input type="checkbox"/>
111. Discharges from new construction sites must have a stable outlet capable of carrying design flow rates at a non-erosive velocity. Generally, velocities less than 4.0 feet per second are considered non-erosive. In some cases, velocities between 4.0 and 5.0 feet per second may be permitted, depending on soil and other conditions.		<input type="checkbox"/>	<input type="checkbox"/>

NOTES			
1. Other stormwater and erosion control design details required by Dane County, DNR, etc. include such considerations as infiltration and sediment control and involves separate reviews by those agencies. However, infiltration and sediment control design can affect the size of other stormwater facilities and the area needed for outlots and easements, and as such will be considered during review by the Town Engineer.			
2. A preconstruction meeting with Contractor, Owner's Engineer, Town Public Works Staff, Town Engineer and affected utilities shall be held prior to construction.			
3. All necessary permit approvals shall be submitted to the Town before scheduling the preconstruction conference. This includes the plan approval letter from Dane County, and a copy of the County-approved plans.			

Instructions: Check the boxes in the relevant column (at right) to certify that the plans submitted comply with each requirement and/or contain the information listed below.

Preliminary Plat (<input checked="" type="checkbox"/>)
Final Plat / CSM/ Site Plan (<input checked="" type="checkbox"/>)
Notes or N/A (<input checked="" type="checkbox"/>)

4. Additional approvals and permits may be necessary if the project is in close proximity to a navigable waterway. The applicant is responsible for any such permits. Copies of all such permits shall be provided to the Town prior to scheduling a pre-construction meeting for the project.
5. To ensure a proper grade transition from the end of existing roads to new pavement (road extension), the Town Engineer must receive as-built shots of the new subgrade and existing pavement every 25' for 100' prior to rock placement.
6. Culvert markers meeting Town standards are required for all street culverts and shall be installed with the street and drainage improvements. These shall be ordered and installed by Town staff. The cost for materials and labor will be reimbursed by the Applicant.

Notes/Comments: *(use additional sheets if needed)*