

CHAPTER 11

Plan Standards

A. Introduction

The City requires uniform public improvement plans for ease of record keeping and understanding. The following standards govern most plan submittals to the City. Any specialized submittal requirements may be discussed with the City development engineer. Copies of sample drawings are available for review.

B. General Plan Standards

1. General Drawings

- a. All final engineering plans submitted shall be on mylar as well as a 3 1/2" computer diskette (or other pre-approved medium) in the City's current MicroStation DGN or a standard DXF file format.
- b. Final specifications shall be submitted on a 3 1/2" computer diskette (or other pre-approved medium) in a compatible format to the City's current version of Microsoft Word.
- c. All public improvement plans shall be prepared on reproducible double matte, 4 mil mylar, having a standard size of 24" x 36".
- d. All plans must be clear, legible, and prepared in a professional manner.
- e. All documents shall be drawn to scale, which will permit all necessary information to be plainly shown, legible, and easily understood.
- f. All Plan and Profile construction sheets shall be drawn at a scale of 1" = 20' unless pre-approved by the City Engineer in writing.
- g. All benchmarks shall be noted on the plans.
- h. All proposed public improvement construction materials shall be indicated on the drawings.
- i. All required drawings (sanitary, water main, storm, paving, grading, street lighting, and landscape) shall be bound and submitted in one set. The City will not review partial sets. The reviewing engineer must have all sets in order to evaluate the interrelationships of the facilities.

- j. All elevations are to be based on U.S.G.S. datum and referenced to the City's benchmark system.
- k. All elevations shall be described to the nearest 1/100 of a foot unless otherwise noted.
- l. All distances shall be described to the nearest 1/100 of a foot unless otherwise noted.
- m. All survey data shall be referenced to the Manitowoc County Coordinate System (local datum).
- n. Slopes shall be indicated in percentages to the nearest 0.01%.
- o. Stationing along the roadway centerline shall be shown at 100' intervals with tick marks at 1/2 stations, including cul-de-sacs.
- p. Stationing shall be referenced to a survey monument.
- q. A symbol legend shall be shown.
- r. Any revision made after the City Engineer has signed the plan set shall be clouded and the revision number indicated.
- s. Revisions shall be numbered and described in the title block revision section.
- t. The plan and profile sections shall be aligned vertically.
- u. Plan sheet size shall be 24" x 36", except for grading plans for review purposes only.
- v. A proposed established street grade with the appropriate five-line profile will have to be created if one does not exist.
- w. The design engineer's name, address, phone number, fax number, email, signature, and graphical company logo if any shall be placed just above the title block.
- x. All text shall be read from the bottom or right side.
- y. The computer file name and time of plot shall be printed up the left side of all plan sheets.
- z. All obstructions/appurtenances located within the project limits shall be shown, including but not limited to trees, signs, utilities, fences, and light poles.

2. Title Block
 - a. A seal and signature of a Wisconsin Registered Professional Engineer or Surveyor as appropriate.
 - b. Scale that the work is drawn in.
 - c. Placed in lower right corner and conform to City's standards.
 - d. Drawing date and any revisions in the lower portion of the engineer's seal block.
 - e. A sample is available on computer format, upon request.

3. Plan View
 - a. All easement locations, type and size.
 - b. Subdivision boundary lines.
 - c. ROW lines and width.
 - d. All lot lines.
 - e. All underground utilities, proposed or existing, (sanitary, storm, water, gas, electric, telephone, and television cable.)
 - f. The design engineer shall certify in the title block (left side) that all utilities have been investigated and show them on the drawing.
 - g. Identify the following for all properties (as appropriate):
 - 1) Owner's name
 - 2) Address
 - 3) Tax Key Number
 - 4) Subdivision, block, and lot numbers
 - 5) CSM number
 - 6) Frontage distance
 - h. All curb flange and back or edge of pavement lines.
 - i. All adjoining and inclusive roadways and their names.

- j. A north arrow.
 - k. An estimate of quantities.
4. Profile View
- a. Show proposed established street grade.
 - b. Show existing and proposed ground elevations over proposed facility.
 - c. Existing and proposed centerline grade shall be drawn and labeled.
 - d. All existing or proposed utility crossings such as sanitary, gas, and telephone shall be drawn with the name, diameter, elevation, and station indicated, including other than City public utilities.

C. Grading Plan/Site Plan

- 1. The erosion and sediment control plan shall be submitted on a separate sheet from the grading plan.
- 2. The grading plan shall show existing and proposed property topographic conditions based on the City datum.
- 3. A drawing scale of 1" = 40' shall be used.
- 4. Existing and proposed contour lines at 1' intervals, extending 100' into adjacent properties, except when adjacent topography is critical to the development, then contour extends 200' into adjacent properties.
 - a. 2' contours may be used in certain cases with prior authorization of the City Engineer.
 - b. Existing contour lines shall be shaded and/or dashed.
 - c. Proposed contour lines shall be bold and solid.
- 5. All yard elevations shall be shown to 1/10 of a foot.
- 6. Proposed spot elevations at all proposed property corners, and breaks in alignment or grade, including high points, low points, and side and rear yard swales.
- 7. Typical sections and details shall be shown for all swales or ditches (side yard, rear yard, and drainage channel.)

8. Show all existing and proposed high points, low points, and other critical drain elevations.
9. Typical building pad locations for each lot that incorporate setbacks and offsets and show finished yard grade elevations to the nearest tenth of a foot.
10. Proposed yard grade at building shall be indicated at the building setback line.
11. Finished street centerline elevations shall be indicated at 100' stations, all intersections, cul-de-sac, and any change in slope.
12. All lots requiring walkouts, lookouts, or split level homes shall be indicated on the plans and recorded in the deed restrictions.
13. All obstructions within the project limits shall be shown including but not limited to trees, landscaping, fences, structures, light poles, and manholes.
14. All existing trees, having a diameter of 6" or larger, shall be shown on the preliminary and final grading plans.
15. The plan must also delineate heavily wooded areas.
16. Proposed topsoil stockpile location.
17. Show storm water management facilities including location, size, required volume, provided volume, berm elevations, overflow location and elevation, and wet or dry bottom on a separate plan sheet.
18. All existing culvert locations, invert elevations, sizes, and materials within 200' of the development.
19. All existing and proposed culvert locations, inverts, sizes, and materials within the proposed development.
20. Proposed and existing ditch elevations at grade breaks, property lines extended, or at spacings of 100' maximum.
21. Shoreland wetland conservancy district boundaries.
22. Major and secondary (minor) flood routings through the site.
23. All existing and proposed storm sewer inlets and catch basins within the proposed development shall show rim and invert elevations and pipe sizes.
24. Site plans should show dumpster locations, driveway locations and widths, paved area locations, flow directional arrows, private pedestrian walk and proposed public walk.

D. Paving Plan

1. Plan View
 - a. All surface structures related to underground utilities shall be shown.
 - b. Storm inlet locations and elevations shall be shown.
 - c. Curb flowline and centerline elevations at any non-standard cross sections and warped pavements at 25' intervals.
 - d. Centerline of proposed ditches, if used, with proposed elevations at every even station.
 - e. Lot line, numbers, and frontage distances.
 - f. Name of each roadway and any adjoining roadways.
 - g. All culvert locations, their sizes, and invert elevations.
 - h. Radii of all intersections to edge of pavement or face of curb.
 - i. **All curb and gutter shall be dimensioned to the face of curb.**
 - j. Tabular curve data shall be shown for all roads proposed and existing.
 - k. Typical roadway section and cul-de-sac section.
 - l. Specific details of all existing roadways.
 - 1) Pavement type, thickness, and width.
 - 2) Shoulder type and width.
 - 3) Ditch depth and location.
 - 4) Curb type, size, and alignment with face and flange of curb.
 - 5) Horizontal and vertical alignment, including cross slope.
 - m. All roadside ditch locations, slope, and flowline elevations as specified in the grading section.

- n. The beginning and end of all radius points shall be labeled with a station, offset, and elevation.
 - o. The limits of any areas, which need special soil stabilization techniques, if known.
 - p. Slope intercepts shall be shown as a long dashed line.
2. Profile View
- a. Existing and proposed roadway profiles along the centerline of the roadway and cul-de-sac.
 - b. Stationing and proposed centerline grades at all stations, 1/4 stations, and at 25' intervals for all vertical and horizontal curves, plus horizontal and vertical P.C.'s, P.T.'s and P.I.'s.
 - c. All culverts with their size and inverts labeled.
 - d. Slope of the centerline between grade breaks.
3. Detail Sheet
- a. The detail sheet shall show all details, the standard cross section to be used, and any non-standard cross sections used on the project.
 - b. Curb section shall be shown with specific dimensions, if not integral.
 - c. Details of any specialized items used on the project.
 - d. The detail sheet may include any other details required for the rest of the plan set.

E. Sanitary Plan

1. Plan View
- a. Proposed and existing water main, storm sewer main, and lateral locations.
 - b. Proposed and existing sanitary sewer mains and manhole locations, including rim and invert elevations.
 - c. Dimensions showing offset from ROW or centerline to the sewer line, and separation between the sanitary sewer and other utilities.

- d. Distance between manhole centers and between each sanitary sewer lateral. (Maximum distance between manholes to be 400'.)
 - e. Length of each sanitary sewer lateral and length of any lateral risers.
 - f. Size of proposed sanitary sewer.
 - g. A note, warning that underground utilities should be staked out by Diggers Hotline.
 - h. All culvert locations (proposed and existing.)
 - i. Numbered manholes (numbering scheme to be provided by the City Engineer).
 - j. Proposed or existing storm sewer, water main, and appurtenances.
 - k. All required standard notes, or other additional statements.
 - l. All improvements are stationed.
 - m. All obstructions/appurtenances located within the project limits including but not limited to trees, signs, utilities, fences, light poles, and structures.
 - n. Existing sanitary sewer material, size, and location.
 - o. Length, size, material, and slope of any sanitary sewer lines not shown in the profiles.
2. Profile View
- a. Sanitary sewer pipe to be drawn with two solid lines indicating arch and flow line of pipe.
 - b. Existing and proposed surface profiles over the sanitary sewer.
 - c. The proposed sanitary sewer and manholes.
 - d. Manhole numbers, rim, and invert elevations.
 - e. Material, class, slope, and size of sanitary sewer between each manhole.
 - f. The proposed water main or storm sewer and its size.
 - g. Culverts and their inverts and sizes (proposed and existing.)
 - h. Limits of gravel, spoil, and/or slurry backfill.

- i. Distance between manhole centerlines.
- j. Material and size of any existing sewer to be tied into.
- k. Material choices of new sanitary sewer, if appropriate.
- l. Stationing.

F. Storm Sewer Plan (if separate from Paving Plan)

1. Plan View

- a. Proposed and existing water and sanitary main, and lateral locations.
- b. Proposed storm sewer, inlet, and manhole locations and elevations.
- c. Rim and invert elevations of inlets and manholes.
- d. Numbered manholes (numbering scheme to be provided by City Engineer).
- e. Dimensions from centerline or ROW.
- f. Dimensions from proposed or existing sanitary and water mains.
- g. Length, size, material, and slope of any storm sewer lines not shown in the profiles.
- h. Existing storm sewer material, size, and location.
- i. Rip-rap, or other end treatment or cover, limits, and thickness.
- j. Location of sump pump laterals.

2. Profile View

- a. Storm sewer pipe to be drawn with two solid lines indicating arch and flow line of pipe.
- b. Length of each pipe from manhole center to center.
- c. Material, class, size, and slope of all storm sewer pipes. (Maximum spacing between inlets = 300'.)
- d. Rim and flow line elevations at manholes.

- e. Backfill types shall be shown on the top of the profile section.
- f. Existing and surface profiles over the storm sewer.

G. Water Main Plan

- 1. Contact Manitowoc Public Utilities for information.

Water Department
Manitowoc Public Utilities
1303 South 8th Street
Manitowoc, WI 54220
920-683-4600

H. Street Lighting Plan

- 1. Plan View
 - a. Location of:
 - 1) street light poles and transclosers
 - 2) cable burial
 - 3) pull boxes
 - b. Details showing streetlights and luminaries, types, sizes, and specifications.

I. Storm Water Management Plan (see Appendix B for a complete copy of the Ordinance)

- 1. All submittals shall be in conformance with State and Federal Law, local ordinance and any additional requirements of the City Engineer.
- 2. The stormwater management plan required under 28.07 shall contain any information the Director of Public Works may need to evaluate the environmental characteristics of:
 - a. An area affected by land development activity;
 - b. The potential impacts of the proposed development upon the quality and quantity of stormwater discharges;

- c. The potential impacts upon the areas water resources and drainage utilities;
 - d. The effectiveness and acceptability of proposed stormwater management measures in meeting the performance standards set forth in the Stormwater Management Ordinance.
3. Stormwater management plans shall contain the following:
- a. Name, address, and telephone number for the following or their designees: landowner; developer; project engineer for design and certification of structural measures and non-structural measures; person(s) temporarily and permanently responsible for maintenance of structural measures and non-structural measures.
 - b. A legal description of the property where the land development activity will take place referenced to the U.S. Public Land Survey system or to block and lot numbers within a recorded land subdivision plat.
 - c. Existing site conditions, including:
 - i. One or more site maps at a scale of not less than 1 inch equals one hundred (100) feet. The site maps shall show the following: site location and legal property description; predominant soil types and hydrologic soil groups; existing cover type and condition; topographic contours of the site at a scale not to exceed two (2) feet; topography and drainage network including enough of the contiguous properties to show runoff patterns onto, through, and from the site; water courses that may affect or be affected by runoff from the site; flow path and direction for all stormwater conveyance sections, including time of travel and time of concentration applicable to each; water shed boundaries used in determinations of peak flow rates and discharge volumes from the site; lakes, streams, wetlands, channels, ditches, and other watercourses on and within five hundred (500) feet of the site boundary; limits of the one hundred (100) year floodplain; location of all public and private wells which are within one thousand two hundred (1,200) feet of the site; and the distance from any Well Head Protection Overlay Zoning District.
 - ii. Computations of peak flow rates and discharge volumes for the two (2) year/24 hour, ten (10) year/24 hour, and one hundred (100) year/24 hour storm events. All major assumptions used in developing input parameters for these computations shall be clearly stated. The computations shall be made for each stormwater discharge point on the site development, and the geographic areas used in making the computations shall be clearly cross-referenced to the required map(s).
 - d. Proposed post-development conditions, including:

- i. Explanation of the provisions which will be implemented to preserve and use natural topography and land cover features to minimize changes in the peak flow rates and discharge volumes to surface waters and wetlands.
- ii. Explanation of any restrictions on structural measures and non-structural measures on the site imposed by a well head protection plan or Well Head Protection Overlay Zoning District.
- iii. One (1) or more site maps at a scale of not less than one (1) inch equals one hundred (100) feet showing: changes in land use including vegetative cover type and condition; proposed impervious surfaces including all buildings, structures, and pavement; changes to the topographic contours of the site at a scale not to exceed two (2) feet; changes to the drainage network including enough of the contiguous properties to show runoff patterns onto, through, and from the site; locations and dimensions of drainage easements; locations of maintenance easements specified in the maintenance agreement; flow path and direction for all stormwater conveyance sections, including time of travel and time of concentration applicable to each; location and type of all stormwater management conveyance and treatment practices including the on-site and off-site tributary drainage area; location and type of conveyance system that will carry runoff from the drainage and treatment practices to the nearest adequate outlet such as a curbed street, storm drain, or natural drainage way; watershed boundaries used in determinations of peak flow rates and discharge volumes; any changes to lakes, streams, wetlands, channels, ditches, and other watercourses on and immediately adjacent to the site.
- iv. Computation of the runoff volume resulting from the 1.5-inch rainfall over a four (4) hour period and computations of peak flow rates and discharge volumes for the two (2) year/24 hour, ten (10) year/24 hour, and one hundred (100) year/24 hour storm events. All major assumptions used in developing input parameters shall be clearly stated. The computations shall be made for each discharge point in the development, and the geographic areas used in making the calculations shall be clearly cross-referenced to the required map(s).
- v. Results of investigations of soils and groundwater required for the placement and design of structural measures.
- vi. Results of impact assessments on wetland functional values.
- vii. Design computations and all applicable assumptions for the stormwater conveyance (open channel, closed pipe) system.

- viii. Design computations and all applicable assumptions for stormwater quality practices (sedimentation type, filtration-type, infiltration-type) as needed to show that practices are appropriately sized.
 - ix. Detailed drawings including cross-sections and profiles of all permanent stormwater conveyance and treatment measures.
 - e. A schedule for completing all structural measures and non-structural measures.
 - f. A maintenance program which covers the life of each structural measure and non-structural measure including the required maintenance activities and maintenance activity schedule.
 - g. Cost estimates for the construction, operation, and maintenance of each structural measure and non-structural measure.
 - h. Other information as required by the Director of Public Works to determine whether implementation of the proposed stormwater management plan will further the purpose of the Stormwater Management Ordinance.
 - i. All site investigations, plans, designs, computations, and drawings, shall be certified by a professional engineer, registered with the State of Wisconsin, that they have been prepared in accordance with accepted engineering practices and in accordance with Wisconsin Stormwater Manual, Technical Design Guidelines for Stormwater Management Practices.
 - j. Any other information as specified by the Director of Public Works.
4. Exceptions. The Director of Public Works may prescribe alternative submittal requirements for applicants seeking an exemption to on-site stormwater management performance standards under 28.06(3) of the Stormwater Management Ordinance.

J. Erosion Control Plan (See Appendix B for a complete copy of the Ordinance)

- 1. All submittals shall be in conformance with State and Federal Law, local ordinances and any additional requirements of the City Engineer.
- 2. Existing Site Map
 - a. Site boundaries and adjacent lands which accurately identify site location;
 - b. Lakes, streams, wetlands, channels, drainage ways, ditches and other water courses on the site and adjacent lands;

- c. Location of the one hundred (100) year floodplain including flood fringe, floodway and flood storage (if applicable);
 - d. Location and general identification of the vegetative cover
 - e. Location and dimension of on and off-site stormwater drainage systems and natural drainage patterns on and immediately adjacent to the site and the size, slope and land cover of the up-slope drainage areas;
 - f. Location and dimensions of utilities, structures, roadways, highways and paving;
 - g. Site topography at a contour interval not to exceed two (2) feet except that for slopes greater than twenty (20) percent, a five (5) foot contour is acceptable. A copy of an approved subdivision drainage plan for a lot in question is an acceptable site topography survey for one (1) or two (2) family homes;
 - h. Location and delineation of the predominant soil types.
3. Site construction plan. A scaled site construction plan that includes, at a minimum the following:
- i. Location of all proposed land disturbing activities or land developing activities;
 - j. Locations and dimensions of all site erosion control measures necessary to meet the requirements of the construction site erosion control ordinance;
 - k. A written statement on the face of the plan identifying the land owner or land use owner as the party responsible to maintain site erosion control measures during construction.
 - l. Location of on-site soil stockpiles.
4. Plan of final site conditions. A plan of final site conditions at the same scale as the existing site map showing the site changes.

K. Preliminary Plat

1. A copy of the approved preliminary plat shall be submitted with each of the required engineering plans.

L. Final Plat

1. Final plat shall be submitted to the City only after the City Engineer has certified all improvements that are required by the development agreement are complete.
2. The final plat shall be submitted on 4 mil, double matte mylar.
3. Final plat shall be submitted in the City's current MicroStation version, or DXF file format on a 3 1/2" diskette or other pre-approved medium.

M. As-Built Record Drawings

1. General
 - a. The City shall be provided with digital files of all as-builts. These files shall be compatible with the City's current MicroStation DGN or standard DXF file format.
 - b. All as-builts shall be submitted on double-matte mylar.
2. Water Main Record Drawings
 - a. Shall be drafted at the same scale as sewer as-builts.
 - b. Shall indicate ties to all aboveground improvements, including valves, hydrants, and stop boxes.
 - c. Main type and size.
 - d. Lateral type and size.
 - e. Hydrant type and size.
 - f. Fitting type and size.
 - g. Lateral lengths and location.
 - h. Name of contractor and date construction was complete.
 - i. Subdivision lot numbers, consistent with final plat.
 - j. Street names.
 - k. Edge of pavement and ROW.

- m. Existing sanitary sewer.
- m. Existing storm sewer.
- n. Inspector's name and firm.
- o. Adjoining file numbers.
- p. Location of mainline off of ROW, centerline, or another utility.
- q. Show all easements and widths.

3. Storm Sewer Record Drawings

- a. Main type, size, and length including inlet leads.
- b. Manholes, inlets and type of construction.
- c. Rim elevations and invert elevations of all manholes/storm inlets.
- d. Subdivision lot numbers consistent with final plat.
- e. Edge of pavement and ROW.
- f. Street name.
- g. Name of contractor and date construction was complete.
- h. Name of inspector and firm.
- i. Easements and widths.
- j. All dimensions to laterals, type, size, and depth.
- k. Location of main line.
- l. Location of existing storm sewer, sanitary sewer and water main.

4. Grading and Drainage Record Drawings

After finish grading is complete, a grading record drawing shall be accomplished to verify conformance with the approved grading plan. The drawings shall consist of the following:

- a. Use approved grading plan as the base sheet. Denote "record drawing" in bold letters at the top and specify the firm conducting the certification. Cross out the

name of the design firm on the plan if different from the firm doing record drawing.

- b. Spot elevations in the center of all lot pads to the nearest 0.1 of a foot.
- c. Spot elevations at all property corners to nearest 0.1 of a foot.
- d. Spot elevations at all property line midpoints to the nearest 0.1 of a foot.
- e. Culvert invert elevations to the nearest 0.1 of a foot.
- f. Centerline ditch grades at every even station or if in an easement, at 100' intervals to the nearest 0.1 of a foot.
- g. Elevations at top of bank and toe of slope at grade breaks, to the nearest 0.1 of a foot.
- h. Spot elevations at all high and low points to the nearest 0.1 of a foot.
- i. Verify topographic lines as directed by the City Engineer.
- j. Elevations at all detention basins, including outfall structures, emergency outfalls, pond bottom, and top of pond slope.

N. Building Permit Plat of Survey/Site Plans

1. A Wisconsin-registered land surveyor shall prepare all building permit plats.
2. Twelve original building permit plans must be submitted, each with an original surveyor's seal and signature.
3. The building permit plat shall show the following:
 - a. Address and phone number of the surveyor
 - b. Date of the survey
 - c. Approved yard grade from the master grading plan, CSM grading plan, site grading plan, or proposed established street grade drawing
 - d. Indicate which of the above (Item C.) were used
 - e. Property address
 - f. Lot lines with dimensions

- g. Building set back, ROW, curb or edge of pavement lines
- h. Building foot print with dimensions
- i. Legal description of the land survey
- j. Name of abutting streets
- k. Drawing scale and north arrow
- l. Proposed and existing 1' contours extending 20' onto adjacent property
- m. The proposed contours should be a heavy weight line
- n. Proposed spot elevations, using U.S.G.S. datum, at the following locations:
 - 1) Lot corners
 - 2) Swale high points
 - 3) Swale low points
 - 4) Garage floor at the middle of the front
 - 5) At the back of walk, if existing or proposed
 - 6) At back of curb or center of the ditch at the property lines extended
 - 7) Ditch elevations each end of the driveway culvert
 - 8) Any controlling elevations from the master grading plan
 - 9) Adjacent yard grades per the master grading plan
- o. Existing spot elevations, using U.S.G.S datum, at the following locations:
 - 1) Lot corners
 - 2) Existing swale high points
 - 3) Existing swale low points
 - 4) At the back of curb or existing edge of pavement (indicate if the final surface has or has not been placed)
 - 5) Existing yard grades of adjacent homes if they exist

- p. The proposed elevation should be boxed to distinguish them from existing elevations.
- q. Additional elevations needed to define specialized grading features
- r. Proposed or existing
 - 1) Sidewalk
 - 2) Street lights
 - 3) Street trees
 - 4) Hydrants
 - 5) Manholes
 - 6) Valve boxes
 - 7) Drainage or water courses
 - 8) Other buildings
 - 9) Driveway location and slope
 - 10) Easement locations, size and type
 - 11) Erosion control devices location and type
 - 12) Floodplain and/or floodway boundaries
- s. Indication if the lot will use any specialized grading features such as walkout, lookout, split-level, drop garage floor, exposed foundation, berms, or retaining wall systems

O. Occupancy Grading Certification Plat of Survey

- 1. A Wisconsin-registered land surveyor shall prepare all occupancy grading certification plats.
- 2. Two original plats must be submitted, each with an original surveyor's seal and signature.
- 3. The plat shall show the following:
 - a. Address and phone number of the surveyor

- b. Date of the survey
- c. Property address
- d. Lot lines with dimensions
- e. Building set back, ROW, curb or edge of pavement lines
- f. Building foot print with dimensions
- g. Legal description of the land survey
- h. Name of abutting streets
- i. Drawing scale and north arrow
- j. Original and as-built spot elevations, using U.S.G.S. datum, at the following locations:
 - 1) Lot corners
 - 2) Swale high points
 - 3) Swale low points
 - 4) Garage floor at the center of the door
 - 5) Back of walk, if existing or proposed
 - 6) Back of curb or center of the ditch at the property lines extended
 - 7) Ditch elevations each end of the driveway culvert and at edge of property
 - 8) Any controlling elevations from the master grading plan
 - 9) Yard grade at lot foundation
- k. The as-built elevation should be circled to distinguish them from the original elevations
- l. Additional elevations needed to define specialized grading features
- m. As-built
 - 1) Drainage or water courses

- 2) Driveway location and slope
- 3) Easement locations, size and type
- n. Confirmation of any specialized grading features such as walkout, lookout, split-level, drop garage floor, exposed foundation, or retaining wall systems
- o. Statement of certification, signed by the surveyor, that all of the elevations of the master grading plan have been met.