

Water, Storm Water and Streets As-Built Drawing and GIS Data Requirements



1.0 As-built Drawing Requirements

- 1.1. After completion of construction of the project but before final acceptance of the project (the release of performance bonds), certified record drawings ('as-built' set of plans) prepared by a Professional Engineer or licensed Land Surveyor registered in the State of Indiana shall be submitted by the Contractor for review. Additionally, a digital copy of the certified record drawings ('as-built' plans), as well as finalized digital versions of all analyses, models, manuals, and reports that are consistent with the as-built conditions, are required in a format accepted by the City of Carmel and the Digital Submission policy.
- 1.2. As part of the final acceptance process, record drawings shall be submitted by the Contractor to the City of Carmel, through the Project Engineer. The Project Engineer shall check the submittal for content and submit the corrections to the appropriate Program Manager for formatting review. The Program Manager shall submit the corrected submittal to the City of Carmel
- 1.3. Data shall include the following:
 - 1.3.1. Roadway
 - 1.3.1.1. Right of way width
 - 1.3.1.2. Centerlines
 - 1.3.1.3. Roadway names
 - 1.3.2. Paths and Sidewalks (Type and Limits)
 - 1.3.3. Curbs (Type and Limits)
 - 1.3.4. Easements
 - 1.3.5. Signage
 - 1.3.6. Lamp Posts
 - 1.3.7. Traffic Signals
 - 1.3.8. Size, length, invert, class or pressure rating and top of casting elevations and material of:
 - 1.3.8.1. Storm Drains and Structures (Including subsurface underdrains)
 - 1.3.8.2. Sanitary Sewers (including structures, laterals and mains)

- 1.3.8.3. Water Mains (Including service lines, valves, fittings, hydrants and other appurtenances along with method of restraint)
- 1.3.8.4. Gas Lines
- 1.3.8.5. Power Lines
- 1.3.9. BMP types, dimensions, and boundaries/easements
 - 1.3.9.1. Ponds (wet and dry)
 - 1.3.9.2. Impervious Surfaces
 - 1.3.9.3. Pervious Surfaces
 - 1.3.9.4. Underground Detention Facilities
- 1.3.10. "As-planted" plans for BMPs, as applicable
- 1.3.11. Data and calculations showing detention basin storage volume
- 1.3.12. Data and calculations showing BMP treatment capacity
- 1.3.13. Flowline of rear and/or side yard ditches and swales at fifty (50) foot intervals or at lot lines
- 1.3.14. Horizontal alignment of storm drain pipes, culverts, streets, and storm drain structures, to a minimum accuracy of +/- two (2) feet
- 1.3.15. The horizontal locations and/or bank cross sections for all detention/retention facilities or other information sufficient to verify that the constructed detention/retention facility provides the required minimum runoff storage volume be in accordance with Hamilton County Record Drawing and Digital Submission Standards established under Hamilton County Ordinance 4-11-05-A and its amendments.
- 1.3.16. Any other pertinent data relevant to the completed storm drainage system and Stormwater management facilities.
- 1.3.17. Other data required by the Digital Submission Policy.

2.0 As-built GIS Submittal Requirements

- 2.1. Files shall be saved and submitted on a CD-ROM in a jewel case without using file compression. Files may also be submitted via flash (“thumb”) drive.
- 2.2. The CD label shall include the following:
 - 2.2.1. Engineering Company Name with “prepared by” statement
 - 2.2.2. Project Name
 - 2.2.3. Date that data is burnt onto CD
 - 2.2.4. Designate CD as As-Built, Construction Plan or Other
 - 2.2.5. Files shall be submitted in DWG format. Other acceptable formats include ESRI Shapefile or ESRI File Geodatabase.
- 2.3. Submittal data shall comply with directions provided in the Excel data templates found on the [Construction Trades](#) page located within the [carmel.in.gov](#) website. Directions can be found on the ‘directions’ tab of each spreadsheet.
- 2.4. File names should make sense to a viewer who may not be familiar with the consulting firms naming conventions and be indicative of the contents of the file.
- 2.5. All pertinent drawing elements will reside in the primary drawing file. There shall be no cells, nodes, blocks, or reference files (x-refs) attached to the drawing.
- 2.6. Separate layers for structures, signs, lighting/signals, pipes, annotation etc. with a logical description for each layer.

- 2.7. Projection shall be referenced to NAD83, Indiana State Plane Coordinate System, East Zone, using U.S. Survey Feet and per the Hamilton County datum. Elevations shall be in the NAVD 88 vertical datum. The coordinate location of the items listed below shall be obtained by a field survey and with vertical data that meets survey grade accuracy.
- 2.8. Tie into section corners in the Indiana State Plane Coordinate System to insure proper orientation. Section corner tie sheets can be obtained from the Hamilton County Surveyor's web page.
- 2.9. All easements shall be represented and drawn as closed polylines representing aggregate areas.
- 2.10. Graphical representation of all off-site platted easements, rights-of-way, lot lines, etc. encompassing infrastructure improvements are required.

3.0 As-Built – Storm Water Data Table

- 3.1. Populate the As-built Submittal Table (Excel spreadsheet) found on the [Construction Trades](#) page located within the carmel.in.gov website.
- 3.2. All Storm Water Structure BMP's (water quality units, etc.) shall be listed in the object data table or Excel template with their corresponding structures. Non-Structural BMP's (Ponds, etc.) shall be listed on the data table as well with their associated location.
- 3.3. The digital construction file shall be revised to show the exact As-Built location of the following items:
 - 3.3.1. Point features of all storm water structures (inlets, manholes, etc.)
 - 3.3.2. Underground detention structures shall be drawn as closed polylines with invert and crown elevations identified.
 - 3.3.3. Detention ponds with normal pool elevation & top of bank drawn as a closed polylines. If pond functions as BMP, indicate type of BMP in options provided on submittal spreadsheet.
 - 3.3.4. Sub-surface drains located on streets, laterals, in swales, dry detention ponds, in non-structural BMPs.
 - 3.3.5. Flow line of open conveyances.
 - 3.3.6. Point features of BMP Structures
 - 3.3.7. Point features of all protection signage associated with BMPs
- 3.4. All storm water structures will have top of castings and invert elevations. Values for all infrastructure shall be the As-Built values and any design values will be crossed out with the design data still legible. (Unless values remain the same)
- 3.5. Structures will be cells or blocks and have an appropriate Structure ID using the same attribute field name. i.e. STR_NU

- 3.6. All Infrastructure pipes will have a length, pipe size (in inches) and material listed.
- 3.7. Infrastructure line work shall be continuous polylines with a beginning and ending at a structure insertion point, connecting only two structures per line. Lines shall be drawn with the direction of flow.
- 3.8. Additionally, a digital copy of the record drawings (“as-built” plans) as well as finalized digital versions of all analyses, models, manuals, and reports that are consistent with the “as-built” conditions shall be submitted in accordance with section 103.01 of City of Carmel Stormwater Technical Standards Manual. It shall be legible, contain all As-Built data including the profile sheets, and be reproducible to scale. The files shall be a minimum of 300 dpi, rotated properly, and be stored in a separate folder on the CD.

4.0 As-Built – Sign, Lighting and Signals Data Table

- 4.1 Populate the as-built submittal table (Excel Spreadsheet) found on the Construction Trades page located carmel.in.gov website
- 4.2 The digital construction file shall be revised to show the exact location of the following items
 - 4.2.1 Point features of all municipal signage, electrical pullboxes, traffic signals, streetlighting, and electrical cabinets.
 - 4.2.2 Polygon feature of all pavement markings.
 - 4.2.3 Polyline features of all curbs, railing, and underground electrical conduit.
- 4.3 Horizontal alignment of all point features should be minimum accuracy of +/- (2) two feet
- 4.4 Sign points should be collected where post hole has been dug (at sign point base).
- 4.5 Pavement marking features should be continuous, closed polygon feature where paint markings have been as-built.
- 4.6 Curb features should be drawn as continuous polylines.
- 4.7 Railing features should be drawn as continuous polylines.

4.8 Pullboxes shall be created as point features and shot directly above physical pullbox.

4.9 As-built positions of traffic signal points will be created by the designer.

4.10 Streetlights shall be created as point where horizontal has been shot at pole base.

4.11 Conduit shall be drawn as continuous polyline feature that breaks and is snapped to pullbox points or electrical cabinets when present.

4.12 Electrical cabinet features shall be shot on base of electrical cabinet.

4.13 Street lighting product datasheet (technical spec sheet) shall be provided with as-built information.

5.0 As-Built – Water and Wastewater Component Data Table

For Water As-Built submittal requirements please contact:

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