JOINT BASE LEWIS-McCHORD (JBLM), DIRECTORATE OF PUBLIC WORKS (DPW)
FY25 GEOSPATIAL REQUIREMENTS

FOR

BULDING INFORMATION MODELING (BIM), CIVIL INFORMATION MODELING (CIM), GEOGRAPHIC INFORMATION SYSTEMS (GIS), AND COMPUTER-AIDED DESIGN (CAD)

October 1, 2024

1. GENERAL GEOSPATIAL REQUIREMENTS 1
   1.1 General 1
   1.2 Submittals 1
2. BIM/CIM REQUIREMENTS 3
   2.1 General 3
3. CAD REQUIREMENTS 4
   3.1 General 4
   3.2 Referencing (XREF) 4
   3.3 Symbology 4
   3.4 AS-BUILT & Redline Submittal Requirements 5
4. GIS REQUIREMENTS 5
   4.1 GIS Documentation 5
   4.2 Coordinate System and Datum 6

1. GENERAL GEOSPATIAL REQUIREMENTS

1.1 GENERAL

1.1.1 Geospatial Requirements pertain to all submittals which contain geometric electronic data with associated non-geometric data including but not limited to Building Information Modeling (BIM), Civil Information Modeling (CIM), Geographic Information Systems (GIS), and Computer Aided Design (CAD).

1.1.2 Requirements. ‘ECB No. 2016-3’ has expired. Projects shall adhere to ECB 2018-7 “Advanced Modeling Requirements on USACE Projects” and to UFGS 01 33 16.00 10 "DESIGN DATA (DESIGN AFTER AWARD)."

1.2 SUBMITTALS

1.2.1 Directory Structure. The submittal directory structure to be used for all Geospatial Submittals is:

- Root Folder: [YYYYMMDD] [Submittal Transmittal Number]
- 00 Submittal Summary
- 01 Project Execution Plan and M3
- 02 DWG File List

- 03 Static Model
- 01 DWF
- 02 Navisworks
- 04 Drawing PDFs
- 05 BIM-CIM
- 06 CAD
- 07 GIS
- 08 QC Reports
- 01 Standards Checks
- 02 Model Integrity Checks
- 03 Visual Checks
- 04 Interference Management Checks
- 09 IFC
- 10 COBie
- 11 Other Contractor Electives

1.2.2 00 Submittal Summary. Contractor shall provide a summary list of changes included from prior submittals in addition to a summary of how prior RMS or Dr. Checks comments were addressed.

1.2.3 01 Project Execution Plan and M3. Electronic copies of the Project Execution Plan in PDF format and associated M3 submittals in both native Excel format and PDF format.

1.2.4 02 DWG File List. List of all CAD sheets including a list of the Sheet Titles, Sheet Numbers and filenames. Identify which sheets have NOT been produced from the Model(s) and Data. Identify sheets containing schedules which were not derived from the model, such as from imported spreadsheets, CAD linework, or drafted elements in the model.

1.2.5 03-01 DWF. Provide one DWF file with the entire model (all Revit and Civil3D content, all disciplines) and a separate DWF with all sheets. If model and sheet content can be combined and are less than 20MB in size, combining both into one DWF is preferred.

1.2.6 03-02 Navisworks. Autodesk Navisworks review files

1.2.7 04 Drawing PDFs. PDF files of the CAD Sheets reflecting submitted CAD/BIM/CIM content. Provide one PDF file per Discipline and an additional PDF file combining all disciplines, following the AEC CAD Standard discipline and drawing order.

1.2.8 05 BIM-CIM. To include Revit and Civil3D native authoring files. Two eTransmit transmittals shall be utilized, one for Revit and the other for Civil3D. Associated transmittal reports shall be included in folder 08-02, and illustrate no missing files. For Civil3D, AEC CAD Standard discipline directory structure will be retained and retain external references (do not bind).

1.2.9 06 CAD. To include exported DWG sheets from Revit, and Civil3D DWG sheets without proxy objects. For clarification files in folder "06 CAD" are for users which have not yet converted fully to a BIM/CIM workflow and need to be standalone, fully editable AutoCAD files with no proxy elements. Contractor shall utilize eTransmit and associated transmittal report shall be included in folder 08-02, and illustrate no missing files. AEC CAD Standard, discipline directory structure will be retained and retain external references (do not bind).

1.2.10 07 GIS. GIS electronic deliverables in Environmental Systems Research Institute's (ESRI) ArcGIS File Geodatabase, version 10.4

1.2.11 08-01 Standards Checks. To include Revit Model Checker Report, AutoCAD Reference Manager Report, and AutoCAD Batch Standards Checker Report for all delivered files.

1.2.12 08-02 Model Integrity Checks. To include Revit Warnings Report, report confirming No Unassigned Systems (for MEP, Fire Protection, Telecom), and list of schedules NOT derived from the Model(s).

1.2.13 09 IFC. Issue For Construction project drawings in PDF format
10-COBie. Construction Open Building Infromation Exchange (COBie) files

2. BIM/CIM REQUIREMENTS

2.1 GENERAL

2.1.1 Versions. Autodesk Revit 2020, Civil3D 2023, and Navisworks 2023 are preferred.

2.1.2 PxP and M3. Provide electronic copies of the Project Execution Plan in PDF format and associated M3 submittals in both native Excel format and PDF format.

2.1.3 Navisworks. In reference to 01 33 16.00 10, 2.2.3.1., the preferred interactive review format is Autodesk Navisworks.

2.1.4 Structural Interior Design (SID)/Furniture, Fixtures & Equipment (FF&E). Contractor shall utilize 01 33 16.00 10 requirements for SID and FF&E products.

2.1.5 Revit Model Composition. Revit models shall be organized by the following requirements.

2.1.5.1 The highest level container is the Site Model (SITE) which contains all of the Building Models linked and oriented in the correct location in world coordinates by the Civil/Survey disciplines.

2.1.5.2 Building Models (BLDG) contain all of the Discipline Models linked utilizing Origin to Origin.

2.1.5.3 Separate Discipline Models are required for separate buildings.

2.1.5.4 Discipline Models will link all other Discipline Models Origin to Origin.

2.1.6 Revit File Naming Standard

[PN]_[BLDGCODE]_[MODEL TYPE]_[DISC]_[CENTRAL].rvt PN:

USACE Project Number prefixed with “PN”
BLDGCODE: Building Acronym
MODEL TYPE: Required if Site Model (SITE) or Building Model (BLDG).
DISC: Discipline as one of Architecture, Electrical, Fire Protection, Interiors, MEP, Mechanical, Plumbing, Structural, or Telecom. Other AEC CAD Standard defined Disciplines are acceptable. Following discipline Acronyms are also acceptable: ARCH, ARCH-STR, ELEC, FP, INT, MECH, MEP, PLMB, STR, TEL.

Examples:
1. PN12345_COF_SITE.rvt
2. PN12345_COF_BLDG.rvt
3. PN12345_COF_Architecture_CENTRAL.rvt
4. PN12345_COF_ARCH_CENTRAL.rvt

2.1.7 Red Zone Meeting Submittal. In addition to submittal requirements established in Section 01 78 02.0010, Paragraph 1.10 “RED ZONE MEETING,” Contractor shall also submit BIM/CIM AsBuilts for review.

3. CAD REQUIREMENTS

3.1 GENERAL

3.1.1 Version. Autodesk 2023, and Civil3D 2023 are preferred.

3.1.2 Accuracy. Geometry shall be dimensionally correct and Civil, Geotechnical, Landscape, and MEP site content shall be located in the proper geospatial coordinates.

3.1.3 Resources. Contractor shall include all files, both graphic and non-graphic, required for the project, including but not limited to color tables, pen tables, font libraries, raster files, blocks, macros, and plotter configuration files.

3.1.4 Record File Number. Contractor shall obtain a Record File Number from:
- USACE District Project Manager in conjunction with USACE District Engineering Records -
DPW Project Manager in conjunctionn with DPW Individual Job Order (IJO) Number(s).

3.1.5 Extraneous Content. By the initial As-Built submittal, Contractor shall remove all graphics outside the design and border areas and remove all other information (geometry and layers) not relevant to the project. All unused resources such as Blocks, Dimstyles, Layers, Linetypes, Shapes and Styles shall be purged and compressed from all files.

3.1.6 Drawing Composition. Contractor shall utilize Layout and Model Views. All drawings shall be drawn full size (1 to 1) in Model View. Title sheet and border sheets shall be drawn in Layout View. AutoCAD View Ports shall be used to frame applicable Model Views. The AutoCAD drawing Layout View and printed hard copies shall be identical.

3.2 REFERENCING (XREF)

3.2.1 Unused References. All references shall be displayed and “work in progress” reference files removed.

3.2.2 Pathing. All reference files shall use “Relative Paths”, and “Full Path” or “No Path” options are not permitted.

3.2.3 Self Contained Referencing. All files must be within the project directory and all references limited to files within the project directory. References may not reference external files.

3.2.4 Sheet and Model Standards. Sheet files may not reference other sheets, and the contents of Sheets and Models should adhere to the AEC CAD Standard, ITL-TR-19-7r6.1 and AEC Graphic Standard, ITL-TR-19-6r2.1.

3.2.5 Retain References. Upon delivery references should remain intact, ie. Model content should not be merged or bound to the Sheets.

3.3 SYMBOLOGY

3.3.1 ByLayer. All geometry symbology must be assigned “ByLayer.”

3.3.2 Line Weight. All geometry shall utilize line weight symbology settings defined by the layer (see ByLayer above) instead of utilizing line weights by color.

3.3.3 Half-Toning. All geometry half-toning must utilize colors defined in the AEC CAD Standard, ITLTR-19-7r6.1 and AEC Graphic Standard, ITL-TR-19-6r2.1. for this purpose.

3.4 AS-BUILT & REDLINE SUBMITTAL REQUIREMENTS

3.4.1 Cover Sheet and Revision Block. Wording “RECORD DRAWINGS / AS-BUILT CONDITIONS” shall be annotated with the project’s as-built Date on the Cover Sheet drawing. When final revisions have been completed, show the wording "RECORD DRAWINGS / AS-BUILT CONDITIONS" followed by the name of the Contractor in letters at least 3/16 inch high on the cover sheet drawing. Label all other drawings either "Record" drawing denoting no revisions on the sheet or "Revised Record" denoting one or more revisions. Retain the original titleblock drawing date and add date of drawing revisions in the revision block.

3.4.2 Scanned Submittal Items. Contractor shall submit electronic versions of As-Built Field Data (Redlines) and Shop Drawings for review by the JBLM DPW Geospatial Services Office and USACE (USACE Projects) or DPW (DPW Projects) at Beneficial Occupancy. If native electronic files are not available, Contractor shall provide full sized color scanned versions in PDF format.

4. GIS REQUIREMENTS

4.1 GIS DOCUMENTATION

4.1.1 See Section 01 78 02.00 10, Paragraph 1.2.9.2 ‘GIS Documentation.’ Add submittal register item ‘SD-02 As-Built GIS – G'.

4.1.2 GIS Database Deliverable. The electronic deliverables for GIS shall be in Environmental Systems Research Institute’s (ESRI) ArcGIS File Geodatabase, version 10.3.

4.1.3 Standard GIS Database Template. USACE PM will coordinate with JBLM DPW Geospatial Services Office in providing the most current Standard GIS Database Template to the Contractor. Documentation of required attributes and schema definitions will be provided along with the Standard GIS Database Template as available.

4.1.4 Protection of GIS Data. GIS source data and product data remain the property of the US Government. The contractor may be required to explain and demonstrate the company's process for protecting all geospatial data, including but not limited to geometry, attributes, metadata, topologies, and relational database schemas and operations used in association with this contract. The contractor may be required to sign a non-disclosure agreement attesting to the same before source data are released. Further information about security and nondisclosure requirements should be obtained from the JBLM DPW. Some installation map data, source and/or product, may be considered by the government to be “Controlled Unclassified Information” (CUI) also known as “Sensitive but Unclassified” (SBU). The intent of this clause is to prevent intentional or unintentional dissemination of CUI/SBU information to include unauthorized access to the source and product data by any entity wishing to do harm to the United States Government while the data resides on the contractor's computer network. The contractor is not authorized to release this information to any third party without the explicit consent by JBLM DPW. All source information must be returned to the government POC or destroyed upon completion of this contract. Special requirements for handling classified map data, if applicable, will be addressed.

4.1.5 Geo-referenced Data of Subsurface Existing Utilities. Contractor shall collect GIS geo-referenced data pertaining to location and attribute data of subsurface utilities obtained at the time of project site excavation. All data collection for underground utilities shall include the collection of elevation (Z) values.

4.1.6 As-Built GIS. In addition to submittal requirements established in Section 01 78 02.0010, Paragraph 1.10 “RED ZONE MEETING,” Contractor shall also submit GIS As-Builts for review.

Provide final geo-referenced GIS database of the new building footprint, and site surface and subsurface features that exist 5’ outside the building footprint(s) out to the project extents.

4.2 COORDINATE SYSTEM AND DATUM

4.2.1 Joint Base Lewis-McChord (JBLM) GIS Coordinate System and Datum. All geospatial deliverables (CAD or GIS format), whether obtained via survey or any other data collection process, shall be measured in feet or meters. The vertical datum and horizontal datum shall comply with the requirements specified in the Army IGI&S Standard Geospatial Data Layer Quality Assurance Plans. Specification for State Plane Coordinate System shall be provided to the contractor by the Installation. When data is collected using global position systems (GPS) technology, the data shall comply with “Part 3: National Standard for Spatial Data Accuracy” of the FGDC Geospatial Positioning Accuracy Standards. Quality assurance shall comply with the precision and accuracy requirements specified in the applicable QAP.

Coordinate System: UTM Coordinate System
Zone: 10 North
Units: Meters
Horizontal Datum: WGS1984
Vertical Datum: North American Vertical Datum 1988 (NAVD 88)

4.2.2 Other. For coordinate system and datum information not included herein, coordinate with USACE Project Manager and NWS Geospatial Section.