



**Electronic Data  
Submittal Standards  
for  
GIS and Engineering**

## Foreword

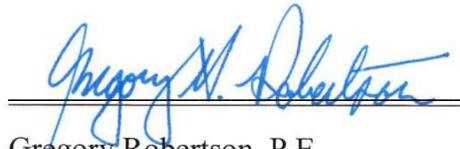
These Electronic Data Submittal Standards (Standards) for GIS and Engineering have been developed to serve as a framework for the City of Forest Grove (City). These Standards are to be incorporated into the written agreement (Contract) between the City of Forest Grove as Contracting Agency and the Contractor. Also, it is a prerequisite for submittal of final plats, site plans, improvement plans, and as-builts between the Developer of a plan development project and the City.

These Standards are living documents and will be periodically reviewed, updated, and made available to users as part of the Services' responsibility for providing technical criteria of electronic data for construction projects being done within the City's limits and areas of interest.

The City of Forest Grove is effective upon issuance and distributed only in electronic media from the following source:

[www.forestgrove-or.gov](http://www.forestgrove-or.gov)

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## 1.0 INTRODUCTION

### 1.1 Purpose

The City of Forest Grove (City) has leveraged the increase use of electronic documentation in the construction of public and private improvements for all future and existing facilities in order to provide more efficient services to the public. The purpose of this manual is to set standards to facilitate the collection, development, and accuracy of digital construction records. Hence, this will improve efficiency and eliminate redundancy efforts among the various departments, as well as:

- a. Enable the production of digital data from the same digital file without modification.
- b. Access to all available digital site development data or construction improvement.
- c. Provide standards for which the submission of plans to the City will be made in an electronic format.
- d. Be consistent with coordinate geometry (COGO).
- e. Use of Oregon Administrative Rule stated within the Oregon Department of Transportation, Highway Division Book – Chapter 734, Division 5; and the ruling of Oregon Legislative Council Committee, Chapter 93.312 – *Conveyancing and Recording* – for referencing Geographic Coordinate System (GCS) North America Datum 1983 (NAD 83). Specifically, the City of Forest Grove has adopted the regional standards of the **GIS Infrastructure Group** to use NAD 1983 HARN State Plane Oregon North FIPS 3601, International Feet and projection shall be Lambert Conformal Conic (Appendix E). Vertical control points should follow the Oregon Coordinate Reference System Handbook and Map Set 2017 Edition referencing the North America Vertical Datum of 1988 (NAVD 88) US Survey Feet. Therefore, when submitting **CAD files** the above mention datum is required. However, the City of Forest Grove Engineering Office still retains the use of vertical United States Coast (U.S.C) and Geodetic Survey (G.S) 1934 Sea Level Datum. Therefore, the conversion matrix in Appendix A. should be used when **submitting paper or PDF plans**. Measurements should also conform to the City of Forest Grove Control Network monuments.
- f. Acceptance and signature approval of the City of Forest Grove GIS Data Sharing Agreement from any non-agency entity or individual requesting a copy of GIS data for City related projects or personal use (Appendix F).

### 1.2 Revisions

The City may make the following changes to this manual as needed, when the changes do not alter existing City policy or have significant cost impacts. The following may apply:

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### *1.2.1 Implementation of new technology*

Implement new products and technical requirements that can improve the quality of data collection and/or design software.

### *1.2.2 Corrections*

Changes that will rectify concepts and clearly articulate meanings that result from the use of the current requirements in this manual.

### *1.2.3 Mandated Changes*

Additions, deletions, or revisions to City electronic standards may be made when required for City compliance with mandatory regulations.

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## 2.0 PRODUCT DELIVERABLES

Digital submission of product deliverables apply specifically to all plans submitted, inspected, and recorded by the City of Forest Grove. These will be verified in accordance with the Digital Submittal Check List (Appendix C) and metadata specifications (Appendix D). Individual survey descriptions are not specifically referenced in this requirement, but certainly will be encouraged and accepted. If the individual does not have the capability to submit digital product deliverables of the developed area of interest, the City of Forest Grove can scan the created paper graph as a Portable Document File (PDF) and recover the cost through plan check fees.

### 2.1 File Format Requirements

In addition to standard paper documents, digital files relating to any submission will accompany each document or plan delivered to the City of Forest Grove Department of Engineering. Digital files to be submitted include:

#### 2.1.1 “Smart Portable Document Format” (PDF)

PDF files of drawing/plans can include structural calculations; tech reports; easement letters; application narrative; and certifications. These files must be submitted as a multi-page document and be able to have searchable text; maintain layers; and retain calibration settings.

#### 2.1.2 Design Web Format (DWF)

DWF files must include all layers, graphic elements as describe in Appendix B. Conforming to construction record drawings shall include the following text on each sheet of the deliverable.

<p style="text-align: center;"><u>CONFORMED TO CONSTRUCTION RECORDS</u></p> <p style="text-align: center;"><u>THESE DRAWINGS HAVE BEEN PREPARED BASED ON INFORMATION PROVIDED BY OTHERS. THE ENGINEER AND OWNER HAVE NOT VERIFIED THE ACCURACY OF THIS INFORMATION AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT.</u></p>
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Conforming to record drawings shall identify whom originally sealed the drawing on each set of the deliverable or if applicable, electronically stamped with a signature per Oregon Statues and Oregon Administrative Rules. Architects and Engineers are responsible to meet these rules and regulations. The following is an example of text to be used to identify the Engineer or Architect of Record:

THE DRAWING WAS ORIGINALLY SEALED  
ON XX/YY/ZZ BY JOEY SMITH, A LICENSED  
ENGINEER IN THE STATE OF OREGON.

DWF files shall also meet the following specifications:

- a. All drawing elements and drawing units shall be submitting to reference Oregon State Plane Coordinates as stated in section 1.1.e of this document. Caution must be exercised in performing all conversions involving submitted data to ensure the correct use of the US International Survey feet. Errors in conversion **cannot exceed 0.4 linear feet**. It is not the intention of the City of Forest Grove to replicate legal surveys. Therefore, the method employed to gain geodetic control shall be submitted and identified in a text file labeled: **‘metadata.txt’ or ‘metadata.xml’**.
- b. Drawing features shall include layer names as indicated in Appendix B. They will also be included in the **‘seed file’** (.dwg) that can be downloaded from the City’s website. Features other than those thematically defined by the individual layer name shall not be included in that layer. Only feature elements are to be included on individual layers. Annotation for each layer shall be placed in annotation layers as specified in Appendix B. Additional layers not identified in Appendix B may utilize any layer name. As outlined above a list of these layers shall also be submitted (ASCII text file labeled: **‘xtrdata.txt’**). Closure is critical in converting CAD elements to GIS features. Therefore, all polygons features (i.e. parcel boundaries) shall be ‘snapped’ to close and polyline features shall be ‘snapped’ to connect to each other.
- c. Submitted .dwg files shall contain only complete parcel polygon features. All partial polygons (parcel boundaries) shown for reference in drawings are **not to be included** in the LOTS layer (Appendix B). Such features can be included in an unnamed layer in the submitted .dwg file.

### 2.2 *Transfer Media Accepted*

Standard transfer media to be accepted will be a CD-ROM and/or DVD+R, compressed zip file by email, USB mass-storage device or any other media device compatible with the City’s IT protocol at no additional cost to the City of Forest Grove. The submitted media shall be labeled with: **drawing number; project name or number; type of media; date of submittal; type of drawing (i.e. As-built); company name; contract information (name, affiliation); contact phone number; and email address.**

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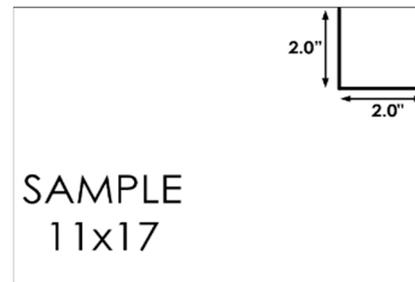
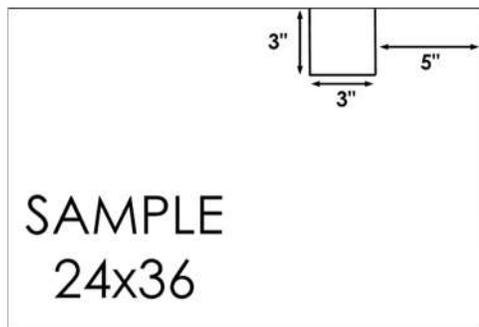
## 3.0 DESIGN PLANS FORMATING REQUIREMENTS

### 3.1 Border and Reserved Space Requirements

It is virtually impossible to predict each individual or company’s unique border sizes and title block areas. As a result, the following locations are offered as guides to ensure that when viewed, the Approval Stamp is visual and not truncated.

Sheet Size	Stamp Location	Reserve Space (Dimensions)
8.5” x 11”	Upper right corner	2.0” x 2.0”
11” x 17”	Upper right corner	2.0” x 2.0”
24” x 36”	5” from upper right edge of page inset to 8” top edge inset down to 3”	3.0” x 3.0”
36” x 48”	5” from upper right edge of page inset to 8” top edge inset down to 3”	3.0” x 3.0”

An area located in the top right corner of all drawings shall be reserved for the City of Forest Grove electronic stamp. Our stamp location will allow for a ½” border.



### 3.2 Scale

All drawings must be prepared in accordance with the current version of the Clean Water Services Design and Construction Standards<sup>1</sup>. Metric scales shall not be used. Each sheet must have a scaled identified with a scale or fractional bar or notation adjacent to the north arrow. When more than one scale is used on a sheet, an independent bar or fractional scale must accompany each applicable detail. No scale is required if the drawing is schematic, but the City may require it to be redrawn to scale if needed for clarity. Schematic drawing shall be labeled “Not to Scale”.

### 3.3 Text

All text shall be at least 0.075” high.

<sup>1</sup> <https://www.cleanwaterservices.org/permits-development/design-construction-standards/>

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### *3.4 Survey Data*

Permanent and temporary survey control points, existing survey monuments, vertical benchmarks, and related data shall be shown on the digital PDF plans. CAD drawings shall be geo-referenced and will be accompany by an ASCII comma delimited text file containing any elevation points, surveyed ground surfaces as specified in section 1.1.e

### *3.5 PDF Sheet Order and Specifications*

The model space of the submitted drawing should contain entire project (showing property lines, improvements, etc.) and it should be divided into sheets as Appendix B.

### *3.6 CAD Specifications*

Drawing features shall include layer names as indicated in Appendix B. Features other than those thematically defined by the individual layer name/description shall not be included in that layer. Only elements are to be included on individual layers. Annotation for each layer shall be placed in annotation layers as specified in Appendix B. Additional layers that are not identified in Appendix B. may utilize any layer name. As outline above a list of these layers shall also submitted and labeled: xtrdata.txt.

Coordinate system mentioned in section 1.1.e shall also be used to submit CAD electronic files.

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## 4.0 GIS INFORMATION SUBMISSION REQUIREMENTS STANDARDS

### 4.1 *GIS Data Deliverable Requirements*

All GIS data must adhere to the requirements and standards listed in this document.

#### 4.1.1 *Source Data*

Where possible, the contractor will utilize source GIS data provided by the City of Forest Grove (City).

- a. The contractor shall be provided a copy of any GIS data required within an ESRI Local Government template (File Geodatabase or access to data via GIS services) through the City's Engineering Office.
- b. The contractor shall consult with the City's GIS Coordinator **before** populating the attribute tables to ensure the population matches the needs of the City. Feature class metadata are required for all updated or newly created layer.

#### 4.1.2 *GIS Deliverables*

The GIS deliverables shall be delivered on disc (CD-ROM or DVD); external hard drive provided by the contractor at no additional cost to the City.

#### 4.1.3 *Reporting*

The contractor shall provide a document (Excel format) that lists all the layers developed or updated for the task.

#### 4.1.4 *Maps*

In addition to a hardcopy maps delivered, all source maps (ESRI ArcGIS .mxds or .aprx) for these maps shall be provided to the City.

#### 4.1.5 *Data Model*

A Data Model poster of the geodatabase schema (i.e. subtypes, domains, data types, etc.) in **PDF** format. Each element of the data model shall be identified with distinct color backgrounds and related connections (i.e. ESRI Street and Address Data Model.)

#### 4.1.6 *GIS data format deliverables*

Acceptable data formats for GIS deliverables are, in order of preference: file geodatabase, shapefile (latest version), or ArcGIS Pro package. GIS data shall adhere to the following requirements regarding the coordinate system, metadata, feature attribution and data integrity:

- a. Projected Coordinate System: All datasets need to be delivered as mention in section 1.1.e
- b. Metadata: The contract will deliver metadata for each feature class in accordance with the latest Federal Geographic Data Committee (FGDC)

Content Standard for Digital Geospatial Metadata (CSDGM) (i.e. ISO 19115-2, 19115-1, 19139) in an XML format. The following elements must be included as part of the deliverable:

*Contact Details*

*Contact information for the data steward Person*

*Organization*

*Position*

*Telephone*

*Email*

*Description – characterization of the data*

*Abstract*

*Purpose*

*Time Period – explains how current the dataset is*

*Currently Reference*

*Date*

*Keywords – word/phrase description of the data*

*Data Quality*

*Positional Accuracy – accuracy assessment of the data*

*Horizontal Accuracy Report*

*Vertical Accuracy Report (if applicable)*

*Source Information – list of sources and a short citation of each*

*Source Citation (Details)*

*Title Originator*

*Publication Date*

*Process Step – and explanation of how/when the data was created*

*Process Description*

*Process Date*

*Spatial Reference*

*Horizontal Coordinate System*

*Vertical Coordinate System (if applicable) – vertical datum information*

*Datum Name*

*Distance Units*

### 4.1.7 QA/QC standards

The contractor shall employ appropriate QA/QC standards to ensure that data is topologically correct, accurate, and complete (to include):

- No erroneous overshoots, undershoots, dangles or intersection in the line work.
- Point and line features will be snapped together where appropriate to support networks. For example, do not break linear features for labeling or other aesthetic purposes.

- Lines should be continuous and point features should be digitized as points. For example, point features, such as manholes, should not be drawn using only a circle (polygon) to represent its location. Preferably, use an attribute block symbol that has an intersection point in the center of the manhole.
- No sliver polygons.
- Digital representation of the common boundaries for all graphic features must be coincident, regardless of feature layer.
- Geometric network connectivity must be maintained for utility networks as current version of the ESRI Local Government Information Models for Utilities, Transportation, etc.
- A summary of the methods used to correct inconsistencies and any remaining errors by case should be included in the metadata under the ‘Logical Consistency Report’ and ‘Completeness Report’ sections.

### 4.2 *Field Collection Procedures*

- a. Where field data collection is stipulated in the contract, the contractor shall utilize conventional and other methods, such as a total station, or Global Positional System (GPS) in accordance with the applicable Geospatial Position Accuracy Standards published by the Federal Geographic Data Committee (FGDC)<sup>2</sup>.
- b. At a minimum, the contract shall provide, survey grade GPS collection at an accuracy level of  $\pm 1$  cm.
- c. Where appropriate (as stipulated in the contract or as otherwise determined by the City of GIS Coordinator), the contractor shall use survey grade GPS, at an accuracy level of  $\pm 20$ cm; with exception to **invert elevation of gravity infrastructure** where as it shall be a minimum of  $\pm 1$  cm. Global Positioning System (GPS) data collection activities will be based on a post-processed environment using an accurately sighted base station. Base station files for post processing acquired locally (off-site Continuous Operating Reference Station –CORS) will be verified for accuracy.
- d. GPS data on the location of utility lines and other features shall be captured at a minimum every 50ft and at each turn or bend in the line and processed as a line feature type. GPS data on the location of utility point and other features should be captured at the centroid of the feature unless signal obstruction or access prohibits; otherwise points will be captured in the metadata for the feature. Data on polygon features will be collected at every vertex of the feature and processed as a polygon.
- e. All survey-grade data collected shall be provided to the City in a digital format with an attached Survey Report identifying survey method, equipment list, calibration documentation, survey layout, description of control points, control diagrams, quality control report and field survey data.
- f. A digital Survey Control Database will be produced for all survey control points established under the contract, including the horizontal and vertical order and coordinate location of each point.

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<sup>2</sup> Federal Geographic Data Committee FGDC-STD-007.3-1998 (<https://www.fgdc.gov/standards/projects/accuracy/part3>)

- g. Where Digitizing/Conversion is stipulated in the contract, the contractor shall digitize/convert features from designated sources (including remotely sensed data, hardcopy scans and vector data) to support various GIS applications.

### 4.3 *Data Collection Procedures*

All data collection must include:

- a. **Feature Attributes:** The contractor shall identify the necessary attributes (specified by the City's GIS Coordinator) for all new/updated/edited features first by field verification and then by existing sources.
- b. **Feature Attributes:** should have Foreign Key and Unique ID clearly identified.
- c. **Table relationships:** should be clearly stated and defined as stated in section 4.1.5
- d. **Metadata:** must include accuracy statement at the 90% or 95% confidence interval. Accuracy statements should include the method of determination, preferably from a recognized standard such as National Standard for Spatial Data Accuracy (NSSDA).

### 4.4 *Review Process*

The City shall review the submitted data and documentation within two months to QA/QC the data. The City will then forward the contractor the information for completion. The contractor will have month to make any corrections and produce the final deliverable. Failure to adhere to any of the stated delivery specifications could result in rejection of deliverables and nonpayment. Contractors should, at the minimum, submit data and documentation samples at 25%, 50%, and 75% project completion to avoid the rejection of final deliverables.

## APPENDIX A.

### *City of Forest Grove Datum Conversion*

#### **How to convert City of Forest Grove datum to another datum**

Below are two tables for converting City of Forest Grove datum both to and from other datum.

To learn more about different types of datum and their historical backgrounds, the National Geodetic Survey maintains an informative list of Frequently Asked Questions<sup>3</sup>.

Known Datum to Wanted Datum			Known Datum to Wanted Datum		
City of Forest Grove	0.49	NGVD 29 (Approx.)	NGVD 29 (Approx.)	-0.49	City of Forest Grove
City of Forest Grove	0.489	USC & GIS 1947	USC & GIS 1947	-0.489	City of Forest Grove
City of Forest Grove	3.97	NAVD 88 (Approx.)	NAVD 88 (Approx.)	-3.97	City of Forest Grove

Date: 2/12/2014. Created by: DJR

#### **NGVD 1929**

The National Geodetic Vertical Datum of 1929 was established by the U.S. Coast and Geodetic Survey holding mean sea at various tide gages on both coasts fixed and adjusting the interconnecting level lines. NGVD29 is sometimes referred to as Sea Level Datum of 1929 or as MSL on some early issues of USGS topographic quads. NGVD29 was originally derived from observations at 26 long-term stations in the U/S. and Canada.

#### **1947 ADJUSTMENT**

The Pacific Northwest Supplementary Adjustment was made by C&GS in 1947, to incorporate better leveling and tidal data.

#### **NAVD 88**

NGS adjusted the national vertical network to an entirely new datum, called the North American Vertical Datum of 1988. It was done because NGVD 1929 held mean sea level fixed on both coasts, when in reality the two sea levels differ by about 4.5 feet. The new adjustment, which incorporated large amounts of new leveling and many refinements, is a true “equipotential surface”, and gives better results when used with GPS (satellite surveying) techniques.

The Forest Grove benchmark system was first extended extensively in the 1930’s. Elevations were based on the United States Coast and Geodetic Survey 1934 Sea Level Datum, and were established from local U.S.C. and G.S. benchmarks in Forest Grove. An official U.S.C. and G.S. Pacific Northwest Supplementary adjustment was made in 1947 on all the U.S.C. and G.S. benchmarks. However, the Forest Grove Datum remained at the U.S.C. and G.S. 1934 datum.

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<sup>3</sup> Datums and Reference Frames, National Geodetic Survey Website. <https://www.ngs.noaa.gov/datums/faq.shtml>

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Both horizontal and vertical control was established for a 1955 orthophotography mapping of Forest Grove. Vertical control was extended from the U.S.C. and G.S. 1934 datum. This mapping was updated in 1958, with the grids extended east to Cornelius.

In 1974, the City of Forest Grove again re-mapped the entire city, as well as areas to the southeast and northeast of Forest Grove not previously mapped, but in areas where there would be future expansion. Vertical control again was based on U.S.C. and G.S. 1934 datum, although at the time of the mapping it was thought to be established from the U.S.C. and G.S. 1947 adjustment.

In 1982, an “in-house” level net adjustment of Forest Grove’s entire benchmark network was done by the City’s Engineering Department. The primal benchmark used for control was benchmark no. Q-207, a U.S.C. and G.S. 1947 brass disc cemented in a drill hole at the northeast corner of the base of a petrified stump located approximately 250 feet west of the south entrance to Marsh Hall of the Pacific University campus. The 1934 Forest Grove datum elevation of B.M. Q-207 was 210.780 feet. This compared to the U.S.C. and G.S. 1947 adjustment elevation of 211.269 feet.

As a part of the 1982 “City” adjustment, a “tie” elevation check was made to a T.B.M used in 1974 for establishing the orthophotography maps. This check was made from Forest Grove B.M. no. 60 to T.B.M. B.S., a spike in power pole no. SU-30-54. This “tie” check was made solely for the purpose of making a datum check. Both the B.M. and the T.B.M. are located at the intersection of Beal Road and Sunset Drive (State Hwy. No. 47). This check positively establish that the datum of T.B.M. B.S., B.M. no. 60 and primal benchmark no. Q-207 are one and the same, i.e. U.S.C. and G.S. 1934 datum.

The equipment used in the 1982 adjustment done by the City of Forest Grove Engineering Department was a Hilger/Watts Autaset Level (Dietzgen) No. SL-60-2, Serial No. 231345. This instrument was peg-tested for accuracy prior to the running of each level loop.

Office adjustments of benchmark elevations were then calculated by adjusting all the benchmarks in Forest Grove as one level net adjustment. Some 28 loops were solved simultaneously by the least squares method<sup>4</sup> developed by the U.S.C. and G.S.

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<sup>4</sup> Kissam, Phillip. Surveying for Civil Engineers. McGraw-Hill Book Co., 1956.

## APPENDIX B.

*Table 1. Sheet Order*

1. Title Sheet	9. Utility Plan and Profiles
2. Existing Conditions and Demolition	10. Water Quality/Quantity
3. Tree Removal	11. Site Grading and Erosion Control
4. Preliminary Plat	12. Landscaping
5. Typical Sections	13. Retaining Walls
6. Details	14. Signing and Striping
7. Traffic Control	15. Illumination
8. Roadway Plan and Profiles	16. Traffic Signals

*Table 2. General: CAD Level/Layer Format*

Item No.	Layer Name	Layer Description
1-1	G-ANNO-LEGN	Legends and symbols keys
1-2	G-ANNO-MATC	Match lines
1-3	G-ANNO-NOTE	General notes and general remarks
1-4	G-ANNO-REFR	Reference files and raster attachments
1-5	G-ANNO-TEXT	Miscellaneous text
1-6	G-ANNO-TTLB	Border and title block line work
1-7	G-GRID-COOR	X-Y coordinate grid lines
1-8	G-GRID-COOR-IDEN	X-Y coordinate grid lines annotation
1-9	G-COOR-STAT	State plane coordinate grid ticks
1-10	G-COOR-STAT-IDEN	State plane coordinate text
1-11	G-SITE-OTLN	Site plan – key map
1-12	G-PLAN-OTLN	Floor outline/perimeter/building footprint

*Table 3. Survey/Mapping: CAD Level/Layer Format*

Item No.	Layer Name	Layer Description
2-13	V-CTRL-BMRK	Benchmarks
2-14	V-CTRL-HORZ	Horizontal control points
2-15	V-CTRL-HVPT	Horizontal/vertical control points
2-14	V-CTRL-IDEN	Control point annotation
2-15	V-FLHA-025Y	25 year mark
2-16	V-FLHA-050Y	50 year mark
2-17	V-FLHA-100Y	100 year mark
2-18	V-FLHA-200Y	200 year mark
2-19	V-FLHA-500Y	500 year mark
2-20	V-FLHA-IDEN	Flood hazard area annotation
2-21	V-FLOD-CNTR	Floodwall centerline
2-22	V-FLOD-IDEN	Floodwall annotation

*Table 4. Civil: CAD Level/Layer Format*

<b>Item No.</b>	<b>Layer Name</b>	<b>Layer Description</b>
3-1	C-ALGN-LINE	Alignments
3-2	C-ALGN-TEXT	Alignment text, annotation with associated leaders
3-3	C-APRN-CNTR	Apron centerlines
3-4	C-APRN-CNTR-IDEN	Apron centerline annotation
3-5	C-BLDG-FTPT	Building footprints
3-6	C-BLDG-IDEN	Building and other structure annotation
3-7	C-BRDG-CNTR	Bridge centerlines
3-8	C-BRDG-IDEN	Bridge annotation
3-9	C-COMM-JBOX	Communication junction boxes, pull boxes, hand holes, pedestals, and splices
3-10	C-COMM-UGND	Underground communications/telephone lines
3-11	C-COMM-UGND-IDEN	Identifier tags, symbol modifier and text
3-12	C-COMM-OVHD	Overhead communications/telephone lines
3-13	C-GPS-POINT	Utilities of interest (points)
3-14	C-PRKG-CNTR	Parking lot centerlines
3-15	C-PRKG-CNTR-IDEN	Parking lot centerline annotation
3-16	C-PRKG-IDEN	Parking lot annotation
3-17	C-DTCH-CNTR	Centerline of ditch or wash
3-18	C-DTCH-IDEN	Ditches and washes annotation
3-19	C-PROP-ESMT	Easements
3-20	C-PROP-IDEN	Property annotation
3-21	C-PROP-LINE	Property lines
3-22	C-PROP-RWAY	Right of ways
3-23	C-PROP-RWAY-ACQU	Right of way to be acquired in perpetuity
3-24	C-PROP-SBCK	Setback lines
3-25	C-PROP-SECT	Section lines
3-26	C-PROP-SECT-IDEN	Section lines annotation
3-27	C-PROP-TSHP	Township/range lines
3-28	C-PROP-TSHP-IDEN	Township/range lines annotation
3-29	C-RAIL-CNTR	Railroad track centerlines
3-30	C-RAIL-IDEN	Identifier tags, symbol modifiers, and text
3-31	C-RIVR-CNTR	Centerline of river
3-32	C-RIVR-IDEN	Identifier tags, symbol modifiers, and text
3-33	C-ROAD-CNTR	Road centerlines
3-34	C-ROAD-ASPH	Road outlines – asphalt surface
3-35	C-ROAD-CONC	Road outlines – concrete surface
3-36	C-ROAD-CNTR-IDEN	Road centerline annotation
3-37	C-ROAD-CURB	Curb and gutters
3-38	C-ROAD-GRAL	Guard rails
3-39	C-ROAD-SHLD	Roadway shoulder
3-40	C-ROAD-SIGN	Signs
3-41	C-ROAD-UPVD	Road outlines – unpaved surface

*Table 5. Utilities: CAD Level/Layer Format*

<b>Item No.</b>	<b>Layer Name</b>	<b>Layer Description</b>
4-1	C-SITE-BLIN	Site breakline
4-2	C-SITE-FENC	Fences and handrails
4-3	C-SITE-IDEN	Site feature annotation
4-4	C-SITE-STRC	Structures (bridges, sheds, foundation pad, footings, etc.)
4-5	C-SITE-STRS	Stairs and ramps
4-6	C-SITE-WALK	Walks, trails and bicycle paths
4-7	C-SSWR-CO	Sanitary sewer clean out
4-8	C-SSWR-CO-IDEN	Sanitary sewer clean out annotation
4-9	C-SSWR-GTRP	Sanitary sewer grease traps
4-10	C-SSWR-GRICH	Sanitary sewer grits chambers
4-11	C-SSWR-FLUM	Sanitary sewer flumes
4-12	C-SSWR-NEUT	Sanitary sewer neutralizers
4-13	C-SSWR-SPTR	Sanitary sewer oil/water separators
4-14	C-SSWR-EJEC	Sanitary sewer ejectors
4-15	C-SSWR-VAL	Sanitary sewer valves
4-16	C-SSWR-VAL-IDEN	Sanitary sewer valve annotations
4-17	C-SSWR-FLOW	Flow directions arrows
4-18	C-SSWR-LATERAL	Sanitary sewer lateral
4-19	C-SSWR-MHOL	Sanitary sewer manholes
4-20	C-SSWR-SERV-PIPE	Sanitary sewer service piping
4-21	C-SSWR-PLNT	Treatment plants
4-22	C-SSWR-TANK	Septic tanks
4-23	C-SSWR-TXT	Sanitary sewer text (size, slope, length)
4-24	C-SSWR-STNS-PUMP	Booster pump stations
4-25	C-SSWR-WYE	Sanitary sewer wye
4-26	C-STRM-AFFF	AFFF lagoon/detention pond
4-27	C-STRM-CULV	Culverts
4-28	C-STRM-FLOW	Flow direction arrows
4-29	C-STRM-LATERAL	Storm water lateral
4-30	C-STRM-INLT	Inlets (curb, surface, and catch basins)
4-31	C-STRM-MHOL	Storm water manholes
4-32	C-STRM-POND	Retention ponds, lagoons, watersheds, and basins
4-33	C-STRM-SERV-PIPE	Storm sewer service piping
4-34	C-STRM-STNS-PUMP	Pump stations
4-35	C-STRM-TXT	Storm water text (size, slope, length)
4-36	C-STRM-WYE	Storm water wye
4-37	C-STRM-CO	Storm water clean out
4-38	C-STRM-CO-IDEN	Storm water clean out annotation
4-39	C-WATR-SAMPLE	Water sampling points
4-40	C-WATR-SAMPLE-IDEN	Water sampling annotation
4-41	C-WATR-CASING	Water casing
4-42	C-WATR-CASING-IDEN	Water casing annotation
4-43	C-WATR-CONN	Water connectors

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4-44	C-WATR-FAU	Water faucets
4-45	C-WATR-REDUC	Water reducers
4-46	C-WATR-INPTS	Water intake points
4-47	C-WATR-TAPS	Water taps
4-48	C-WATR-BFPR	Water backflow preventers
4-49	C-WATR-VAL	Water valves
4-50	C-WATR-VAL-IDEN	Valve annotations
4-51	C-WATR-HYDT	Flushing hydrants
4-52	C-WATR-HYDT-IDEN	Flushing hydrants annotation
4-53	C-WATR-LATERAL	Water lateral
4-54	C-WATR-MAIN-PIPE	Main domestic water piping
4-55	C-WATR-MPIPE-IDEN	Main domestic water piping annotation
4-56	C-WATR-METR	Meters
4-57	C-WATR-NPW-PIPE	Non-potable water piping
4-58	C-WATR-STNS-PUMP	Booster pump stations
4-59	C-WATR-TANK	Water storage tanks
4-60	C-WATR-VALT	Valve/vent pits/vaults
4-61	C-WATR-WELL	Water well houses
4-62	C-WATR-STNS-REDC	Pressure reducing stations

## APPENDIX C.

### *Digital Data Submittal Checklist*

#### **Format of Data for Digital Submittal**

- (Autodesk) .DWG or .DXF format. Version: \_\_\_\_\_
- (Shapefile) .SHP, .XML, .SBX, .SBN, .SHX, .DBF, .PRJ format  
Version: \_\_\_\_\_
- (File Geodatabase) .GDB format. Version: \_\_\_\_\_

#### **Basis of Bearings and Coordinate Reference**

- Horizontal Control:*  
Geographic Coordinate System (GCS) North America Datum 1983 (NAD 83) Oregon State Plane North Federal Information Processing Standard (FIPS) zone 3601 US Survey Feet.
- Vertical Control:*  
North American Vertical Datum of 1988 (NAVD 88).

#### **Media Information Requirements**

- Drawing No.: \_\_\_\_\_
- Project Name/No.: \_\_\_\_\_
- Media Type: \_\_\_\_\_ Date \_\_\_/\_\_\_/\_\_\_
- Type of Drawing:       Draft     Preliminary     Final
- Company: \_\_\_\_\_
- Contact Name: \_\_\_\_\_
- Telephone No.: (\_\_\_\_) - \_\_\_\_\_ - \_\_\_\_\_
- Email Address: \_\_\_\_\_

#### **Girl Ancillary Data**

- Metadata (.XML)
- Poster of Data Model (.PDF or Microsoft Visio Format)

*Note: The Digital Submittal Checklist must be turned in along with the digital drawing to complete the submittal process.*

APPENDIX D.

*Metadata Text File ('metadata.txt') Specifications for CAD*

Subdivision Name: \_\_\_\_\_ Submittal Date: \_\_\_\_\_

Parish: \_\_\_\_\_ City: \_\_\_\_\_

Parent Parcel #: \_\_\_\_\_

Number of Lots: \_\_\_\_\_

Type of Geodetic Control:

Monument Reference: Y / N

Traverse to Monument: \_\_\_\_\_

Referenced Monument Name/Number: \_\_\_\_\_

Distance to Monument: \_\_\_\_\_

GPS

Unit Type: \_\_\_\_\_

PDOP of Control Points: \_\_\_\_\_

Differentially Corrected: Y / N

Elevation Reference: Y / N

Prepared by/Firm Name: \_\_\_\_\_

Engineer of Record: \_\_\_\_\_

Drawing/File Name: \_\_\_\_\_

Software/Version Used: \_\_\_\_\_

## APPENDIX E.

### *Horizontal Datum*

Name: NAD 1983 HARN State Plane Oregon North FIPS 3601, International Feet

Details:

Projection: Lambert Conformal Conic

False Easting: 8202099.737533

False Northing: 0.000000

Central Meridian: -120.500000

Standard Parallel\_1: 44.333333

Standard Parallel\_2: 46.000000

Latitude of Origin: 43.666667

Linear Unit: Foot (0.304800)

Geographic Coordinate System: GCS North America 1983 HARN

Angular Unit: Degree (0.017453292519943229)

Prime Meridian: Greenwich (0.000000000000000000)

Datum: D North American 1983 HARN

Spheroid: GRS\_1980

Semi-major Axis: 6378137.000000000000000000

Semi-minor Axis: 6356752.314140356100000000

Inverse Flattening: 298.257222101000020000

## APPENDIX F.

### *City of Forest Grove GIS Data Sharing Agreement*

The City of Forest Grove's GIS data was developed for internal use in support of City of Forest Grove functions. This data is derived and compiled from a variety of sources, including data obtained from outside jurisdictions and data developers. Information on data should be obtained by the source organization.

The data released is subject to the following terms and conditions:

1. This data is for informational purposes only, and it is both understood and agreed that said data was prepared exclusively for City purposes. Users of this data should always review or consult the primary data and information sources to ascertain the utility of the data for the particular purpose(s) to which it is being applied or used. Users of this data should field verify accuracy of the data.
2. The City of Forest Grove does not warrant that the data is free from errors, omissions, or accuracy in the digital data or the underlying related data. There are no warranties, expressed or implied, including the warranty of merchantability or fitness for a particular purpose accompanying this data. All data is provided on an "AS IS" basis and is to be used at the user's own sole risk.
3. Reproduction of the City logo, logos of any City contractors, or other trademarked, copyrighted or otherwise legally protected material is strictly forbidden. Reproduction of any professional stamps or seals is not allowed.
4. No distribution or third party use of the data is granted without the prior written consent of the City of Forest Grove.
5. Any use or distribution of these data, or subsequent data and/or map data created with these data, must include a statement that the City of Forest Grove, Oregon is the originating data source provider, and the source data is available from the City of Forest Grove at <https://www.forestgrove-or.gov/>
6. Any modification to the data does not constitute authorization or endorsement by the City of Forest Grove. Any distribution or third party use of modified City of Forest Grove data must include a statement that the modifications are not authorized or endorsed by the City of Forest Grove.
7. The data user assumes the entire risk, including the quality, performance and usefulness of any data requested and hereby releases the city, its elected officials, officers, employees, agents and insurers from and against any damages resulting from loss of data, loss of profits, loss of use of layers or any incidental or consequential damages. The limitation of the City's liability will apply regardless of the form of action or suit whether statutory, at common law in contract or tort at law or in equity.
8. The data user agrees to indemnify, defend and hold harmless the City, its elected officials, officers, employees and agents and insurers from and against any and all claims, actions, damages or injuries of any kind and nature whatsoever, by or to any and all persons or property, arising directly or indirectly from the use of the data or the terms of this agreement.

# Electronic Data Standards

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Name of Data Requestor/User: \_\_\_\_\_

Data requested: \_\_\_\_\_

Area of interest/ project name: \_\_\_\_\_

Use and purpose of data: \_\_\_\_\_

Additional notes regarding data: \_\_\_\_\_

Data Format: \_\_\_\_\_

The City of Forest Grove is providing the data listed above for the exclusive use of:

Company/Individual: \_\_\_\_\_ Phone: \_\_\_\_\_

Contact: \_\_\_\_\_ Email: \_\_\_\_\_

Title: \_\_\_\_\_ Phone: \_\_\_\_\_

I have read and by signing below (whether electronically or otherwise) I agree that I understand the terms and conditions of this agreement and accept the digital data consistent with the terms and conditions set out above.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_