

City of Casper
IT/GIS Department
200 N David Street
Casper, WY 82601



To: The Public

From: City of Casper Engineering, Community Development and IT/GIS Departments

Date: 2017.4.6

Subject: City of Casper Digital Asbuilt Submission: CAD Deliverable Standards (Final)

Technical Memorandum

History:

[Title 16](#) of the City of Casper Municipal Code outlines the technical requirements and procedures needed to submit digital asbuilt data and documents to Engineering staff. In conjunction with this portion of the municipal code, the City of Casper has previously published a standard CAD template through its website. This template was intended to adhere to the U.S. National CAD Standard (**NCS**) Version 5.0 in both layering conventions and their accompanying drafting elements (*e.g. blocks, colors, linetypes, annotation styles, plot styles, etc.*). The function of this standard CAD template was to provide the design community with a tool to more easily transmit asbuilt data to Engineering staff so that review, QA/QC and input processes could be streamlined. Since its initial publication, the standard CAD template has been used intermittently and the process improvements it was intended to support have not been fully realized. In September of 2015, an Engineering, Community Development and GIS working group was established to develop a new standard CAD template for the City of Casper. The result of this collaboration is the development of the **Natrona Regional Geospatial Cooperative (NRGC)** standard template. The NRGC standard template is a complete Civil Engineering and Land Surveying design template that takes advantage of the automated and intelligent design tools (*dynamic labels, point styles, label styles, annotative blocks, survey processing functions, parceling, alignments, profiles, surfaces, etc.*) in the AutoDesk Civil 3D platform. This technical memorandum was developed to accompany the release of this template and is intended to provide design professionals with an authoritative reference when developing asbuilt submittals.

Overview:

The **Natrona Regional Geospatial Cooperative (NRGC)** standard template adheres to the U.S. National CAD Standard (**NCS**) Version 5.0 structure. This enables the NRGC working group to identify and develop, discipline specific, layering to account for the various conditions that occur during the platting and design processes. This also allows the working group to identify the digital data workflows needed to extract plat submittals for entry into the NRGC GIS system. As a result, the NRGC standard template can be broken into two main groups **Civil** and **Survey**. Layers within the template with the prefix **C** are Civil Engineering layers. Layers within the template with the prefix **V** are Land Surveying layers. Layers within the template with the prefix **G** are general annotation and line layers (*e.g. title blocks, misc. details, north arrow, bar scale, etc.*). Plot styles within the NRGC standard template are style based, and utilize

an NRG standard template .stb file. Style based plotting explicitly states the plot parameters as opposed to using a color (.ctb) identifier to achieve a specific line weight, type, color and opacity/screening. Text elements within the NRG standard template (*notes, labels, annotation, dimensions, etc.*) are annotative in nature and based on True Type fonts. True Type fonts do not behave the same as traditional CAD fonts that are based on shapes (*e.g. simplex.shx, roman.shx, complex.shx*). To address the behavioral differences, several annotative text styles have been provided to give designers aesthetic options when composing elements in the NRG standard template. Points in the NRG standard template utilize a comprehensive Description Key Library that defines numerous label and point display styles.

Usage/Contents:

The **Natrona Regional Geospatial Cooperative (NRGC)** standard template is available to the public through the City of Casper Engineering site:

<http://www.cityofcasperwy.com/cms/one.aspx?pagelId=87224>

Within the zipped download file are a series of subfolders containing files related to the use of the NRG standard template. The following is a breakdown of the zip file contents:

1. **01_dwt**: contains the **NRGC_NCS_v1-x.dwt** template file
2. **02_plot**: contains the **NRGC_NCS_v1-x.stb** plot file
3. **03_survey**: contains the needed base files for survey processing
4. **04_docs**: contains the NRG standard template technical memorandum and change log

The following table highlights the layers associated with digital asbuilt submissions. Layers highlighted in green are the minimum required layers. These layers must contain drawing elements if infrastructure related to them were constructed as a part of the project. Failure to include these drawing elements will result in the digital asbuilt submittal being returned to the applicant for corrections.

Civil Engineering Layers

Layer Name	Layer Description	Layer Contents
C-ALGN	Civil: Alignment	Proposed alignment centerline
C-ALGN-LABL	Civil: Alignment: Label	Proposed alignment labels (station/geometry/bearing/distance/equation/offset)
C-ALGN-LINE-EXTN	Civil: Alignment: Line: Extension	Proposed alignment line/arc geometry extensions
C-ALGN-MARK	Civil: Alignment: Mark (non-plot)	Proposed alignment markers (end/midpoint/line/curve)
C-ALGN-STAN-MAJR	Civil: Alignment: Major stationing labels	Proposed alignment major station ticks
C-ALGN-STAN-MINR	Civil: Alignment: Minor stationing labels	Proposed alignment minor station ticks
C-BLDG-ANNO	Civil: Building: Annotation	Proposed building annotation/dimensions/labels
C-BLDG-NODE	Civil: Building: Node	Proposed building cogo points/blocks

C-BLDG-OTLN	Civil: Building: Outline	Proposed building footprint line/arc geometry
C-BORE	Civil: Borings	Proposed bore geometry
C-BORE-ANNO	Civil: Borings: Annotation	Proposed bore annotation/dimensions/labels
C-BORE-NODE	Civil: Borings: Node	Proposed bore cogo points/blocks
C-CATV-ANNO	Civil: Cable television system: Annotation	Proposed catv annotation/dimensions/labels
C-CATV-NODE	Civil: Cable television system: Node	Proposed catv cogo points/blocks
C-CATV-OVHD	Civil: Cable television system: Overhead	Proposed catv overhead line/arc geometry
C-CATV-UGND	Civil: Cable television system: Underground	Proposed catv underground line/arc geometry
C-COMM-FIBR	Civil: Communications: Fiber optics cable	Proposed fiber optic line/arc geometry
C-COMM-FIBR-ANNO	Civil: Communications: Fiber optics cable: Annotation	Proposed fiber optic annotation/dimensions/labels
C-COMM-FIBR-CNDT	Civil: Communications: Fiber optics cable: Conduit	Proposed fiber optic line/arc/polygon conduit geometry
C-COMM-FIBR-NODE	Civil: Communications: Fiber optics cable: Node	Proposed fiber optic cogo points/blocks
C-DTCH	Civil: Ditch	Proposed ditch line/arc geometry
C-DTCH-ANNO	Civil: Ditch: Annotation	Proposed ditch annotation/dimensions/labels
C-DTCH-NODE	Civil: Ditch: Node	Proposed ditch cogo points/blocks
C-FUEL-ANNO	Civil: Fuel Systems: Annotation	Proposed fuel system annotation/dimensions/labels
C-FUEL-MAIN	Civil: Fuel Systems: Main	Proposed fuel system mains line/arc geometry
C-FUEL-NODE	Civil: Fuel Systems: Node	Proposed fuel system cogo points/blocks
C-FUEL-SERV	Civil: Fuel Systems: Service	Proposed fuel system services line/arc geometry
C-FUEL-TANK	Civil: Fuel Systems: Tank	Proposed fuel system storage tank line/arc geometry
C-IRRG-ANNO	Civil: Irrigation: Annotation	Proposed irrigation annotation/dimensions/labels
C-IRRG-LATL	Civil: Irrigation: Lateral	Proposed irrigation services line/arc geometry
C-IRRG-MAIN	Civil: Irrigation: Main	Proposed irrigation mains line/arc geometry
C-IRRG-NODE	Civil: Irrigation: Node	Proposed irrigation cogo points/blocks
C-MISC	Civil: Miscellaneous (non-plot)	(Non-Production) generic civil elements
C-NGAS-ANNO	Civil: Natural gas systems: Annotation	Proposed natural gas annotation/dimensions/labels
C-NGAS-MAIN	Civil: Natural gas systems: Main	Proposed natural gas mains line/arc geometry
C-NGAS-NODE	Civil: Natural gas systems: Node	Proposed natural gas cogo points/blocks
C-NGAS-SERV	Civil: Natural gas systems: Service	Proposed natural gas services line/arc geometry

C-NGAS-TRAN	Civil: Natural gas systems: Transmission	Proposed natural gas transmission line/arc geometry
C-NODE	Civil: Node	Proposed cogo points/blocks
C-NODE-ANNO	Civil: Node: Annotation	Proposed cogo point label annotation (set in point styles)
C-PHON-ANNO	Civil: Telephone line: Annotation	Proposed telephone annotation/dimensions/labels
C-PHON-NODE	Civil: Telephone line: Node	Proposed telephone cogo points/blocks
C-PHON-OVHD	Civil: Telephone line: Overhead	Proposed telephone overhead line/arc geometry
C-PHON-UGND	Civil: Telephone line: Underground	Proposed telephone underground line/arc geometry
C-POWR-ANNO	Civil: Power: Annotation	Proposed power annotation/dimensions/labels
C-POWR-NODE	Civil: Power: Node	Proposed power cogo points/blocks
C-POWR-OVHD	Civil: Power: Overhead	Proposed power overhead line/arc geometry
C-POWR-UGND	Civil: Power: Underground	Proposed power underground line/arc geometry
C-PROF-GRID-MAJR	Civil: Profile: Grid: Major	Profile view major grid line geometry
C-PROF-GRID-MINR	Civil: Profile: Grid: Minor	Profile view minor grid line geometry
C-PROF-LABL	Civil: Profile: Label	Profile geometry labels
C-PROF-LINE	Civil: Profile: Line	Profile line/arc geometry
C-PROF-LINE-EXTN	Civil: Profile: Line: Extension	Profile line/arc extension geometry
C-PROF-TEXT	Civil: Profile: Text	Profile view axis annotation
C-PROF-TITL	Civil: Profile: Title	Profile view axis title annotation
C-PROF-TTBL	Civil: Profile: Titleblock	Profile view titleblock annotation
C-ROAD-ANNO	Civil: Roadways: Annotation	Proposed road annotation/dimensions/labels
C-ROAD-ASSM	Civil: Roadways: Assembly	Proposed assembly
C-ROAD-ASSM-BLIN	Civil: Roadways: Assembly: Baseline	Proposed assembly baseline marker
C-ROAD-ASSM-LINK	Civil: Roadways: Assembly: Link	code set style location for assembly link
C-ROAD-ASSM-MARK	Civil: Roadways: Assembly: Mark	code set style location for assembly mark
C-ROAD-ASSM-OFFS	Civil: Roadways: Assembly: Offset	code set style location for assembly offset
C-ROAD-ASSM-SHPE	Civil: Roadways: Assembly: Shape	code set style location for assembly shape
C-ROAD-CNTR-N	Civil: Roadways: Centerline: New	Proposed road centerline line/arc geometry
C-ROAD-CORR	Civil: Roadways: Corridor	Proposed corridor geometry
C-ROAD-CORR-BNDY	Civil: Roadways: Corridor: Boundary	Proposed corridor boundary
C-ROAD-CORR-FEAT	Civil: Roadways: Corridor: Feature line	Proposed corridor feature line geometry
C-ROAD-CORR-LINK	Civil: Roadways: Corridor: Link	Proposed corridor link geometry
C-ROAD-CORR-MARK	Civil: Roadways: Corridor: Marker (non-plot)	Proposed corridor marker geometry
C-ROAD-CORR-MARK-ANNO	Civil: Roadways: Corridor: Marker: Annotation (non-plot)	Proposed corridor marker annotation
C-ROAD-CORR-PATT	Civil: Roadways: Corridor: Pattern	Proposed corridor hatch pattern geometry
C-ROAD-CORR-SHPE	Civil: Roadways: Corridor: Shape	Proposed corridor shape geometry

C-ROAD-CURB	Civil: Roadways: Top back of curb	Proposed top-back-of-curb line/arc geometry
C-ROAD-EDGE	Civil: Roadways: Edge	Proposed edge-of-travelway line/arc geometry
C-ROAD-NODE	Civil: Roadways: Node	Proposed road cogo points/blocks
C-ROAD-SWLK	Civil: Roadways: Back of walk	Proposed back-of-sidewalk line/arc geometry
C-SITE-ANNO	Civil: Site: Annotation	Proposed site annotation/dimensions/labels
C-SITE-ASPH	Civil: Site: Edge of asphalt	Proposed site edge-of-asphalt line/arc geometry
C-SITE-BRCK	Civil: Site: Edge of brick	Proposed site edge-of-brick line/arc geometry
C-SITE-CONC	Civil: Site: Edge of concrete	Proposed site edge-of-concrete line/arc geometry
C-SITE-EWAT	Civil: Site: Edge of water	Proposed site edge-of-water line/arc geometry
C-SITE-FENC	Civil: Site: Fence	Proposed site fence line/arc geometry
C-SITE-GRAL	Civil: Site: Guard rail	Proposed site guard rail line/arc geometry
C-SITE-GRVL	Civil: Site: Edge of gravel	Proposed site edge-of-gravel wall line/arc geometry
C-SITE-NODE	Civil: Site: Node	Proposed site cogo points/blocks
C-SITE-RTWL	Civil: Site: Retaining wall	Proposed retaining wall line/arc geometry
C-SITE-VEGE	Civil: Site: Edge of vegetation	Proposed vegetation line/arc geometry
C-SITE-WETL	Civil: Site: Edge of wetland	Proposed wetland line/arc geometry
C-SSWR-ANNO	Civil: Sanitary sewer: Annotation	Proposed sewer annotation/dimensions/labels
C-SSWR-FORC	Civil: Sanitary sewer: Forcemain	Proposed sewer forcemain line/arc geometry
C-SSWR-MAIN	Civil: Sanitary sewer: Main	Proposed sewer main line/arc geometry
C-SSWR-NODE	Civil: Sanitary sewer: Node	Proposed sewer cogo points/blocks
C-SSWR-PIPE	Civil: Sanitary sewer: Pipe (Pipe Network)	Existing sewer pipe network pipe line/arc geometry
C-SSWR-PIPE-N	Civil: Sanitary sewer: Pipe (Pipe Network): New	Proposed sewer pipe network pipe line/arc geometry
C-SSWR-SERV	Civil: Sanitary sewer: Service	Proposed sewer service line/arc geometry
C-SSWR-STRC	Civil: Sanitary sewer: Structure (Pipe Network)	Existing sewer pipe network structure line/arc geometry
C-SSWR-STRC-N	Civil: Sanitary sewer: Structure (Pipe Network): New	Proposed sewer pipe network structure line/arc geometry
C-STRM-ANNO	Civil: Storm sewer: Annotation	Proposed storm annotation/dimensions/labels
C-STRM-CULV	Civil: Storm sewer: Culvert	Proposed storm culvert line/arc geometry
C-STRM-FORC	Civil: Storm sewer: Forcemain	Proposed storm forcemain line/arc geometry

C-STRM-HWAL	Civil: Storm sewer: Headwall	Proposed storm headwall line/arc geometry
C-STRM-LATL	Civil: Storm sewer: Lateral pipe	Proposed storm lateral line/arc geometry
C-STRM-MAIN	Civil: Storm sewer: Main	Proposed storm main line/arc geometry
C-STRM-NODE	Civil: Storm sewer: Node	Proposed storm cogo points/blocks
C-STRM-PIPE	Civil: Storm sewer: Pipe (Pipe Network)	Existing storm pipe network pipe line/arc geometry
C-STRM-PIPE-N	Civil: Storm sewer: Pipe (Pipe Network): New	Proposed storm pipe network pipe line/arc geometry
C-STRM-RRAP	Civil: Storm sewer: Riprap	Proposed storm riprap line/arc geometry
C-STRM-STRC	Civil: Storm sewer: Structure (Pipe Network)	Existing storm pipe network structure line/arc geometry
C-STRM-STRC-N	Civil: Storm sewer: Structure (Pipe Network): New	Proposed storm pipe network structure line/arc geometry
C-TINN-BNDY	Civil: Triangular irregular network: Boundary	Proposed tin surface boundary line/arc geometry
C-TINN-BNDY-WKSF	Civil: Triangular irregular network: Boundary: Worksurface	Proposed tin comparison surface boundary line/arc geometry
C-TINN-NODE	Civil: Triangular irregular network: Node	Proposed tin surface cogo points
C-TINN-NODE-WKSF	Civil: Triangular irregular network: Node: Worksurface	Proposed tin comparison surface cogo points
C-TINN-VIEW	Civil: Triangular irregular network: Triangles	Proposed tin surface face line geometry
C-TINN-VIEW-WKSF	Civil: Triangular irregular network: Triangles: Worksurface	Proposed tin comparison surface face line geometry
C-TOPO-ANNO	Civil: Topographic feature: Annotation	Proposed tin surface annotation/dimensions/labels
C-TOPO-ANNO-WKSF	Civil: Topographic feature: Annotation: Worksurface	Proposed tin comparison surface annotation/dimensions/labels
C-TOPO-BKLN	Civil: Topographic feature: Breakline	Proposed tin surface breakline line/arc geometry
C-TOPO-CONT-TEXT	Civil: Topographic feature: Contour: Text	Proposed tin surface contour annotation/dimensions/labels
C-TOPO-ELEV	Civil: Topographic feature: Elevation Bands (Surface)	Proposed tin surface elevation band hatch geometry
C-TOPO-ELEV-WKSF	Civil: Topographic feature: Elevation Bands (Surface): Worksurface	Proposed tin comparison surface elevation band hatch geometry
C-TOPO-FEAT	Civil: Topographic feature: Feature line	Proposed tin surface feature line/arc geometry
C-TOPO-FLHA	Civil: Topographic feature: Flood hazard area	Proposed tin surface flood plain line/arc geometry
C-TOPO-GRAD	Civil: Topographic features: Grading	Proposed grading features geometry
C-TOPO-GRAD-CUTS	Civil: Topographic features: Grading: Cut	Proposed grading features cut geometry
C-TOPO-GRAD-FILL	Civil: Topographic features: Grading: Fill	Proposed grading features fill geometry
C-TOPO-GRID	Civil: Topographic feature: Grid	Proposed tin surface grid line/arc geometry
C-TOPO-GRID-WKSF	Civil: Topographic feature: Grid: Worksurface	Proposed tin comparison surface grid line/arc geometry

C-TOPO-MAJR	Civil: Topographic feature: Major contour	Proposed tin surface major contour line/arc geometry
C-TOPO-MAJR-WKSF	Civil: Topographic feature: Major contour: Worksurface	Proposed tin comparison surface major contour line/arc geometry
C-TOPO-MINR	Civil: Topographic feature: Minor contour	Proposed tin surface minor contour line/arc geometry
C-TOPO-MINR-WKSF	Civil: Topographic feature: Minor contour: Worksurface	Proposed tin comparison surface minor contour line/arc geometry
C-TOPO-NODE	Civil: Topographic feature: Node	Proposed tin cogo points/blocks
C-TOPO-USER	Civil: Topographic feature: User defined contour	Proposed tin surface user defined line/arc geometry
C-TOPO-USER-WKSF	Civil: Topographic feature: User defined contour: Worksurface	Proposed tin comparison surface user defined line/arc geometry
C-TOPO-WSHD	Civil: Topographic feature: Watershed	Proposed tin surface watershed line/arc geometry
C-TRAL-ANNO	Civil: Trail: Annotation	Proposed trail annotation/dimensions/labels
C-TRAL-CNTR	Civil: Trail: Centerline	Proposed trail line/arc geometry
C-TRAL-NODE	Civil: Trail: Node	Proposed trail cogo points/blocks
C-WATR-ANNO	Civil: Water supply: Annotation	Proposed water annotation/dimensions/labels
C-WATR-HYDR	Civil: Water supply: Hydrant lateral	Proposed water hydrant lateral line/arc geometry
C-WATR-MAIN	Civil: Water supply: Main	Proposed water main line/arc geometry
C-WATR-NODE	Civil: Water supply: Node	Proposed water cogo points/blocks
C-WATR-PIPE	Civil: Water supply: Main (Pipe Network)	Proposed water pipe network pipe line/arc geometry
C-WATR-PROT	Civil: Water supply: Fire protection	Proposed water fire protection line/arc geometry
C-WATR-SERV	Civil: Water supply: Service lateral	Proposed water service line/arc geometry
C-WATR-STRC	Civil: Water supply: Structure (Pipe Network)	Proposed water pipe network structure line/arc geometry
C-WATR-TANK	Civil: Water supply: Tank	Proposed water tank line/arc geometry
C-WATR-TRAN	Civil: Water supply: Transmission	Proposed water transmission main line/arc geometry

General Use Layers

<i>Layer Name</i>	<i>Layer Description</i>	<i>Layer Contents</i>
G-ANNO	General: Annotation	General annotation
G-ANNO-AERI	General: Annotation: Aerial	Aerial imagery (importation layer)
G-ANNO-DIMS	General: Annotation: Dimensions	General dimensions (details)
G-ANNO-LEGN	General: Annotation: Legend	Legend block line/arc geometry
G-ANNO-LOGO	General: Annotation: Logo	Logo block line/arc geometry
G-ANNO-MARK	General: Annotation: Markers, break marks, leaders	General marker symbols
G-ANNO-MATC	General: Annotation: Match lines	Standard match line geometry
G-ANNO-MATC-ANNO	General: Annotation: Match lines: Annotation	Standard match line geometry annotation
G-ANNO-NPLT	General: Annotation: Non-plotting graphics (non-plot)	Non-plotting graphics layer
G-ANNO-PATT	General: Annotation: Hatch pattern	General hatch layer

G-ANNO-PATT-OTLN	General: Annotation: Hatch pattern: Outline (non-plot)	General hatch outline layer
G-ANNO-STMP	General: Annotation: Professional stamp	Professional stamp block
G-ANNO-TABL	General: Annotation: Data tables	Standard data table layer
G-ANNO-TTBL	General: Annotation: Titleblock	Standard titleblock line/arc/annotation
G-ANNO-VWFR	General: Annotation: Viewframes (non-plot)	Standard viewframe arc geometry
G-ANNO-VWFR-ANNO	General: Annotation: Viewframes: Annotation (non-plot)	Standard viewframe annotation layer (non-printing)
G-ANNO-VWPT	General: Annotation: Viewport (non-plot)	Standard viewport layer

Land Surveying Layers

<i>Layer Name</i>	<i>Layer Description</i>	<i>Layer Contents</i>
V-BLDG-ANNO	Survey: Building: Annotation	Existing bulding annotation/dimensions/labels
V-BLDG-NODE	Survey: Building: Node	Existing building cogo points/blocks
V-BLDG-OTLN	Survey: Building: Outline	Existing building footprint line/arc geometry
V-BNDY	Survey: Boundary	Existing generic boundary line/arc geometry
V-BNDY-ANNO	Survey: Boundary: Annotation	Existing generic boundary annotation/dimensions/labels
V-BNDY-ANNO-N	Survey: Boundary: Annotation: New	Proposed generic boundary annotation/dimensions/labels
V-BNDY-CORP	Survey: Boundary: Corporation	Existing corporate boundary line/arc geometry
V-BNDY-CORP-N	Survey: Boundary: Corporation: New	Proposed corporate boundary line/arc geometry
V-BNDY-N	Survey: Boundary: New	Proposed generic boundary line/arc geometry
V-BNDY-NODE	Survey: Boundary: Node	Existing generic boundary cogo points/blocks
V-BNDY-NODE-N	Survey: Boundary: Node: New	Proposed generic boundary cogo points/blocks
V-BNDY-SUBD	Survey: Boundary: Subdivision	Existing subdivision boundary line/arc geometry
V-BNDY-SUBD-N	Survey: Boundary: Subdivision: New	Proposed subdivision boundary line/arc geometry
V-BORE	Survey: Borings	Existing bore geometry
V-BORE-ANNO	Survey: Borings: Annotation	Existing bore annotation/dimensions/labels
V-BORE-NODE	Survey: Borings: Node	Existing bore cogo points/blocks
V-BRDG-ABUT	Survey: Bridge: Abutment	Existing bridge abutment line/arc geometry
V-BRDG-ANNO	Survey: Bridge: Annotation	Existing bridge annotation/dimensions/labels
V-BRDG-CNTR	Survey: Bridge: Center	Existing bridge centerline line/arc geometry
V-BRDG-DECK	Survey: Bridge: Deck	Existing bridge deck line/arc geometry
V-BRDG-NODE	Survey: Bridge: Node	Existing bridge cogo points/blocks
V-CATV-ANNO	Survey: Cable television system: Annotation	Existing catv annotation/dimensions/labels
V-CATV-NODE	Survey: Cable television system: Node	Existing catv cogo points/blocks

V-CATV-OVHD	Survey: Cable television system: Overhead	Existing catv overhead line/arc geometry
V-CATV-UGND	Survey: Cable television system: Underground	Existing catv underground line/arc geometry
V-COMM-FIBR	Survey: Communications: Fiber optics cable	Existing fiber optic line/arc geometry
V-COMM-FIBR-ANNO	Survey: Communications: Fiber optics cable: Annotation	Existing fiber optic annotation/dimensions/labels
V-COMM-FIBR-CNDT	Survey: Communications: Fiber optics cable: Conduit	Existing fiber optic line/arc/polygon conduit geometry
V-COMM-FIBR-NODE	Survey: Communications: Fiber optics cable: Node	Existing fiber optic cogo points/blocks
V-CRTL-LINE-DIRC	Survey: Control points: Traverse lines	Existing survey figure traverse line/arc geometry
V-CRTL-LINE-NETW	Survey: Control points: Traverse network	Existing survey figure network line/arc geometry
V-CRTL-LINE-SHOT	Survey: Control points: Traverse sideshot	Existing survey figure sideshot line/arc geometry
V-CRTL-NODE	Survey: Control points: Node	Existing survey figure cogo points/blocks
V-CRTL-TRAV-ERRO	Survey: Control points: Traverse error	Existing survey figure network error marker geometry
V-CTRL-ANNO	Survey: Control points: Annotation	Existing survey figure annotation/dimensions/labels
V-DTCH	Survey: Ditch	Existing ditch line/arc geometry
V-DTCH-ANNO	Survey: Ditch: Annotation	Existing ditch annotation/dimensions/labels
V-DTCH-NODE	Survey: Ditch: Node	Existing ditch cogo points/blocks
V-ESMT-LINE	Survey: Easements: Line	Existing easement line/arc geometry
V-ESMT-LINE-ANNO	Survey: Easements: Line: Annotation	Existing easement annotation/dimensions/labels
V-ESMT-LINE-ANNO-N	Survey: Easements: Annotation: New	Proposed easement annotation/dimensions/labels
V-ESMT-LINE-N	Survey: Easements: Line: New	Proposed easement line/arc geometry
V-ESMT-NODE	Survey: Easements: Node	Existing easement cogo points/blocks
V-ESMT-NODE-N	Survey: Easements: Node: New	Proposed easement cogo points/blocks
V-FUEL-ANNO	Survey: Fuel Systems: Annotation	Existing fuel system annotation/dimensions/labels
V-FUEL-MAIN	Survey: Fuel Systems: Main	Existing fuel system mains line/arc geometry
V-FUEL-NODE	Survey: Fuel Systems: Node	Existing fuel system cogo points/blocks
V-FUEL-SERV	Survey: Fuel Systems: Service	Existing fuel system services line/arc geometry
V-FUEL-TANK	Survey: Fuel Systems: Tank	Existing fuel system storage tank line/arc geometry
V-IRRG-ANNO	Survey: Irrigation: Annotation	Existing irrigation annotation/dimensions/labels
V-IRRG-LATL	Survey: Irrigation: Lateral	Existing irrigation services line/arc geometry

V-IRRG-MAIN	Survey: Irrigation: Main	Existing irrigation mains line/arc geometry
V-IRRG-NODE	Survey: Irrigation: Node	Existing irrigation cogo points/blocks
V-MISC	Survey: Miscellaneous (non-plot)	(Non-Production) generic survey elements
V-NGAS-ANNO	Survey: Natural gas systems: Annotation	Existing natural gas annotation/dimensions/labels
V-NGAS-MAIN	Survey: Natural gas systems: Main	Existing natural gas mains line/arc geometry
V-NGAS-NODE	Survey: Natural gas systems: Node	Existing natural gas cogo points/blocks
V-NGAS-SERV	Survey: Natural gas systems: Service	Existing natural gas services line/arc geometry
V-NGAS-TRAN	Survey: Natural gas systems: Transmission	Existing natural gas transmission line/arc geometry
V-NODE	Survey: Node	Existing cogo points/blocks
V-NODE-ANNO	Survey: Node: Annotation	Existing cogo point label annotation (set in point styles)
V-PHON-ANNO	Survey: Telephone line: Annotation	Existing telephone annotation/dimensions/labels
V-PHON-NODE	Survey: Telephone line: Node	Existing telephone cogo points/blocks
V-PHON-OVHD	Survey: Telephone line: Overhead	Existing telephone overhead line/arc geometry
V-PHON-UGND	Survey: Telephone line: Underground	Existing telephone underground line/arc geometry
V-POWR-ANNO	Survey: Power: Annotation	Existing power annotation/dimensions/labels
V-POWR-NODE	Survey: Power: Node	Existing power cogo points/blocks
V-POWR-OVHD	Survey: Power: Overhead	Existing power overhead line/arc geometry
V-POWR-UGND	Survey: Power: Underground	Existing power underground line/arc geometry
V-PROP-ANNO	Survey: Property: Annotation	Existing property annotation/dimensions/labels
V-PROP-ANNO-N	Survey: Property: Annotation: New	Proposed property annotation/dimensions/labels
V-PROP-LINE	Survey: Property: Line (ownership)	Existing property (ownership) line/arc geometry
V-PROP-LINE-N	Survey: Property: Line (ownership): New	Proposed property (ownership) line/arc geometry
V-PROP-NODE	Survey: Property: Node	Existing property cogo points/blocks
V-PROP-NODE-N	Survey: Property: Node: New	Proposed property cogo points/blocks
V-PROP-PRCL	Survey: Property: Parcel	Existing property (parcel) line/arc geometry
V-PROP-PRCL-N	Survey: Property: Parcel: New	Proposed property (parcel) line/arc geometry
V-PROP-QRTS	Survey: Property: Quarter section	Existing PLSS quarter section line/arc geometry
V-PROP-SBCK	Survey: Property: Setback lines	Existing property setback line/arc geometry

V-PROP-SBCK-N	Survey: Property: Setback lines: New	Proposed property setback line/arc geometry
V-PROP-SECT	Survey: Property: Section	Existing PLSS section line/arc geometry
V-PROP-SXTS	Survey: Property: Sixteenth section	Existing PLSS sixteenth line/arc geometry
V-PROP-TSHP	Survey: Property: Township/range line	Existing PLSS township/range line/arc geometry
V-RAIL-ANNO	Survey: Railroad: Annotation	Existing railroad annotation/dimensions/labels
V-RAIL-CNTR	Survey: Railroad: Center	Existing railroad centerline line/arc geometry
V-RAIL-NODE	Survey: Railroad: Node	Existing railroad cogo points/blocks
V-RAIL-TRAK	Survey: Railroad: Track	Existing railroad rail line/arc geometry
V-ROAD-ANNO	Survey: Roadways: Annotation	Existing road annotation/dimensions/labels
V-ROAD-CNTR	Survey: Roadways: Center	Existing road centerline line/arc geometry
V-ROAD-CURB	Survey: Roadways: Top back or curb	Existing top-back-of-curb line/arc geometry
V-ROAD-EDGE	Survey: Roadways: Edge	Existing edge-of-travelway line/arc geometry
V-ROAD-NODE	Survey: Roadways: Node	Existing road cogo points/blocks
V-ROAD-SWLK	Survey: Roadways: Back of walk	Existing back-of-sidewalk line/arc geometry
V-SITE-ANNO	Survey: Site: Annotation	Existing site annotation/dimensions/labels
V-SITE-ASPH	Survey: Site: Edge of asphalt	Existing site edge-of-asphalt line/arc geometry
V-SITE-BRCK	Survey: Site: Edge of brick	Existing site edge-of-brick line/arc geometry
V-SITE-CONC	Survey: Site: Edge of concrete	Existing site edge-of-concrete line/arc geometry
V-SITE-EWAT	Survey: Site: Edge of water	Existing site edge-of-water line/arc geometry
V-SITE-FENC	Survey: Site: Fence	Existing site fence line/arc geometry
V-SITE-GRAL	Survey: Site: Guard rail	Existing site guard rail line/arc geometry
V-SITE-GRVL	Survey: Site: Edge of gravel	Existing site edge-of-gravel wall line/arc geometry
V-SITE-NODE	Survey: Site: Node	Existing site cogo points/blocks
V-SITE-RTWL	Survey: Site: Retaining wall	Existing retaining wall line/arc geometry
V-SITE-VEGE	Survey: Site: Edge of vegetation	Existing vegetation line/arc geometry
V-SITE-WETL	Survey: Site: Edge of wetland	Existing wetland line/arc geometry
V-SSWR-ANNO	Survey: Sanitary sewer: Annotation	Existing sewer annotation/dimensions/labels
V-SSWR-FORC	Survey: Sanitary sewer: Forcemain	Existing sewer forcemain line/arc geometry
V-SSWR-MAIN	Survey: Sanitary sewer: Main	Existing sewer main line/arc geometry
V-SSWR-NODE	Survey: Sanitary sewer: Node	Existing sewer cogo points/blocks

V-SSWR-SERV	Survey: Sanitary sewer: Service	Existing sewer service line/arc geometry
V-STRM-ANNO	Survey: Storm sewer: Annotation	Existing storm annotation/dimensions/labels
V-STRM-CULV	Survey: Storm sewer: Culvert	Existing storm culvert line/arc geometry
V-STRM-FORC	Survey: Storm sewer: Forcemain	Existing storm forcemain line/arc geometry
V-STRM-HWAL	Survey: Storm sewer: Headwall	Existing storm headwall line/arc geometry
V-STRM-LATL	Survey: Storm sewer: Lateral pipe	Existing storm lateral line/arc geometry
V-STRM-MAIN	Survey: Storm sewer: Main	Existing storm main line/arc geometry
V-STRM-NODE	Survey: Storm sewer: Node	Existing storm cogo points/blocks
V-STRM-RRAP	Survey: Storm sewer: Riprap	Existing storm riprap line/arc geometry
V-TINN-BNDY	Survey: Triangular irregular network: Boundary	Existing tin surface boundary line/arc geometry
V-TINN-NODE	Survey: Triangular irregular network: Node	Existing tin surface cogo points
V-TINN-VIEW	Survey: Triangular irregular network: Triangles	Existing tin surface face line geometry
V-TOPO-ANNO	Survey: Topographic feature: Annotation	Existing tin surface annotation/dimensions/labels
V-TOPO-BKLN	Survey: Topographic feature: Breakline	Existing tin surface breakline line/arc geometry
V-TOPO-CONT-TEXT	Survey: Topographic feature: Contour: Text	Existing tin surface contour annotation/dimensions/labels
V-TOPO-ELEV	Survey: Topographic feature: Elevation Bands (Surface)	Existing tin surface elevation band hatch geometry
V-TOPO-FLHA	Survey: Topographic feature: Flood hazard area	Existing tin surface flood plain line/arc geometry
V-TOPO-GRID	Survey: Topographic feature: Grid	Existing tin surface grid line/arc geometry
V-TOPO-MAJR	Survey: Topographic feature: Major contour (Surface)	Existing tin surface major contour line/arc geometry
V-TOPO-MINR	Survey: Topographic feature: Minor contour (Surface)	Existing tin surface minor contour line/arc geometry
V-TOPO-NODE	Survey: Topographic feature: Node	Existing tin cogo points/blocks
V-TOPO-USER	Survey: Topographic feature: User defined contour	Existing tin surface user defined line/arc geometry
V-TOPO-WSHD	Survey: Topographic feature: Watershed	Existing tin surface watershed line/arc geometry
V-TRAL-ANNO	Survey: Trail: Annotation	Existing trail annotation/dimensions/labels
V-TRAL-CNTR	Survey: Trail: Center	Existing trail line/arc geometry
V-TRAL-NODE	Survey: Trail: Node	Existing trail cogo points/blocks
V-WATR-ANNO	Survey: Water supply: Annotation	Existing water annotation/dimensions/labels
V-WATR-HYDR	Survey: Water supply: Hydrant lateral	Existing water hydrant lateral line/arc geometry
V-WATR-MAIN	Survey: Water supply: Main	Existing water main line/arc geometry
V-WATR-NODE	Survey: Water supply: Node	Existing water cogo points/blocks

V-WATR-PROT	Survey: Water supply: Fire protection	Existing water fire protection line/arc geometry
V-WATR-SERV	Survey: Water supply: Service lateral	Existing water service line/arc geometry
V-WATR-TANK	Survey: Water supply: Tank	Existing water tank line/arc geometry
V-WATR-TRAN	Survey: Water supply: Transmission	Existing water transmission main line/arc geometry

<i>minimum required layers</i>

Conditions of Use:

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