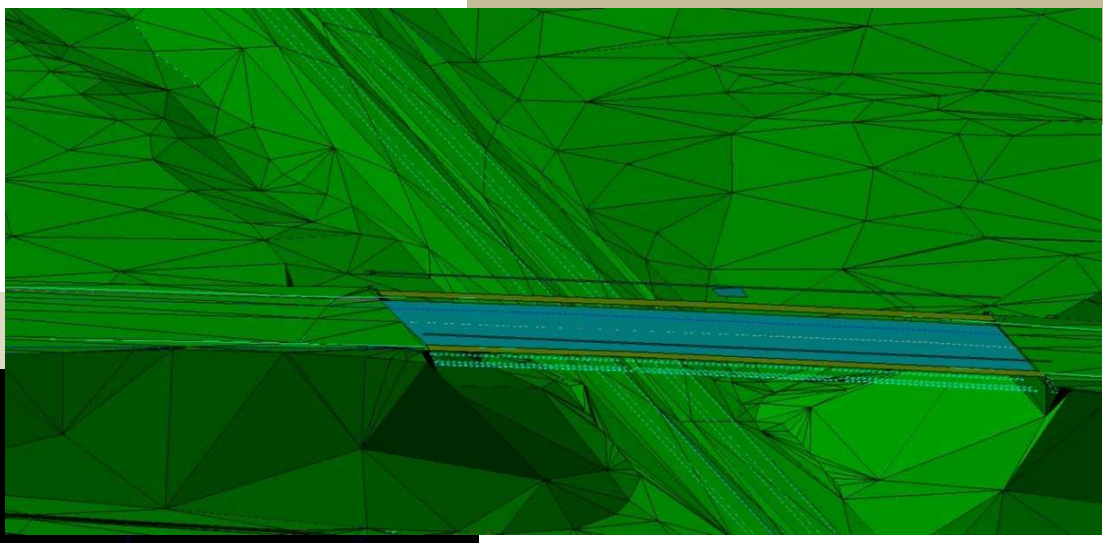
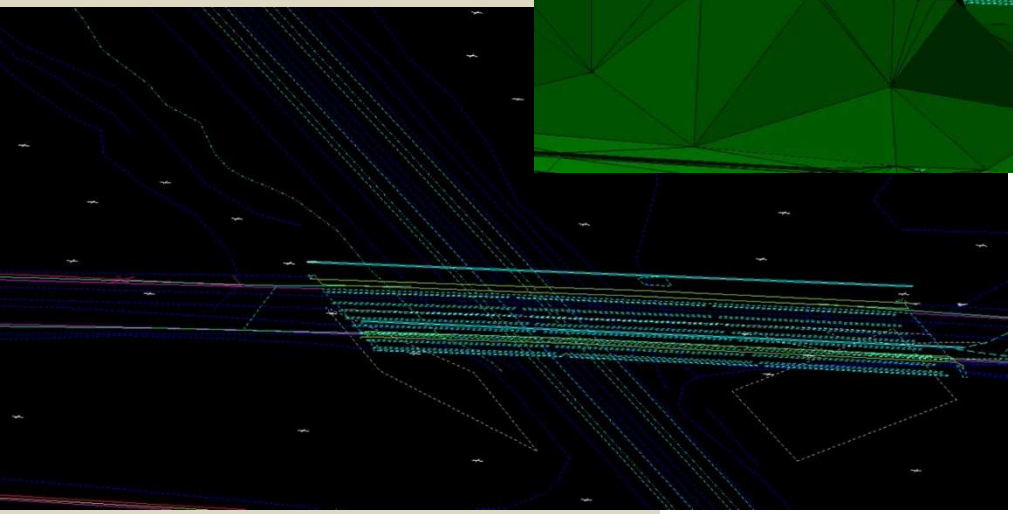
Georgia Department of Transportation

OpenRoads Survey Data Processing Guidelines

OpenRoads Designer Connect Edition





OpenRoads Survey Data Processing Guidelines

1/30/2020
Revision 1.01 (11-20-2020)
Atlanta, Georgia 30308

This document was developed as part of the continuing effort to provide guidance within the Georgia Department of Transportation in fulfilling its mission to provide a safe, efficient, and sustainable transportation system through dedicated teamwork and responsible leadership supporting economic development, environmental sensitivity and improved quality of life. This document is not intended to establish policy within the Department, but to provide guidance in adhering to the policies of the Department.

Your comments, suggestions, and ideas for improvements are welcomed.

Please send comments to:

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DISCLAIMER

The Georgia Department of Transportation maintains this printable document and is solely responsible for ensuring that it is equivalent to the approved Department guidelines.

Revision Summary

Date	Revision Number	Sections	Description
XX-XX-XX	1.00		Draft
11-20-20	1.01	1	Table 1.2 was edited to remove PROP.dgn as one of the standard naming conventions. Revised the definitions in Table 1.9.

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Preface

Survey Data Processing consists of verifying, coordinating, formatting and processing full field survey data, field mapping enhancement data, additional survey data and existing right of way and property data. This data is then submitted to end users as OpenRoads Designer Connect Edition (DGN) files that may also contain Topographic 3D Digital Terrain Models and Geometry. The digital field/mapping data is used as a database in the development of highway project plans.

These Survey Data Processing Guidelines have been developed as part of the statewide GDOT implementation of OpenRoads Designer Connect Edition, aka ORD. The intent of this document is to provide guidelines and standards for processing survey data in ORD. These guidelines must be followed in detail in order to conform to the current GDOT standards for producing the required survey data deliverables. Updates to this document will be made periodically when minor revisions, additional information, and/or enhancements are added.

If there is any approved deviation from the standard file and data naming/feature style conventions as prescribed by this document - a detailed description of the deviation(s) and approved reasons for the deviation(s) shall be documented and included with the project files in electronic format.

Contact Information

To submit any comments or questions regarding the information contained in this document, please contact the **Office of Design Policy & Support** by email at the following address:

SolutionsCenter@dot.ga.gov

In the Email Subject Header, please reference the **OpenRoads Survey Data Processing Guidelines**

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Table of Contents

Overview

These Guidelines cover the GDOT standards for processing Survey Data by use of ORD software. These guidelines delineate the Standard Conventions required in the generation of DGN files that provide graphic representations of existing terrain models, existing property and existing utilities in accordance with GDOT formatting requirements. The DGN files generated as recommended in these guidelines are to be submitted as deliverables to the Project Manager for dissemination to the appropriate design staff.

For detailed Survey Data Processing instructions please refer to Bentley Learn Server related Training Materials. Listed below are recommended learning paths to follow before working in ORD.

To become familiarized with the general ORD Designer Ribbon Interface, all users should go through the *QuickStart – Navigating the Interface* training in the **00 – OpenRoads Designer – Roadway Design & Modeling – Fundamentals** *Learning Path*: https://learn.bentley.com/app/Public/ViewLearningPathWithMasterCourseExpanded?lpId=113539&mcId=102986.

Document Content

Below is a list of topics covered in this document:

- Standard Conventions
- Survey Data Project Deliverables

Related Documents

Below is a list of documents that contain additional information that is pertinent to the production of the previously mentioned deliverables:

- OpenRoads Field Survey Feature Codes
- OpenRoads Photogrammetric Features

Standard Conventions - Contents

Standard Conventions

This section provides an overview of the GDOT standard Project, File and Object naming conventions. The standard Feature Types for Terrain Model are discussed in this section. Feature Code Tables which provide the standard Feature Codes/Feature Definitions to utilize for Photogrammetric and/or Field Survey Projects are also listed.

This section covers the following topics:

- Project, File and Object Naming Conventions
- Standard Terrain Model Feature Object Names
- Standard Terrain Model Feature Types
- Standard Geometry Object Names
- Standard File Information
- GDOT Standard ORD Photogrammetry Feature Codes
- GDOT Standard ORD Field Survey Feature Codes

1.1 Project, File and Object Naming Conventions

As mentioned previously - in order to ensure Project and File Naming consistency – standard Project, File and Object Naming conventions have been established.

This section details the following Standard Naming Conventions:

- Standard Project Naming Conventions
- Standard File Naming Conventions
- Standard Object Naming Conventions

**** Important Conventions regarding CSV File Import:**

ORD contains file importing functionality that facilitates importation of CSV file(s) with the appropriate formatting for use in ORD. The .CSV file is imported based on a **Point Number, Northing, Easting, Elevation, Feature Code** and **Attribute** format set automatically in the GDOT Workspace by the GDOT default TIW file as follows:

POINT NUMBER	NORTHING	EASTING	ELEVATION	ALPHA CODES & LINK CODES FOR CHAINS	ATTRIBUTE NAME	ATTRIBUTE VALUE
A	B	C	D	E	F	G
1	1356882.4580	1957745.6640	1133.252	SDCD	ATTRNAME	901
2	1359249.3370	1957315.5150	1105.361	SDCD	ATTRNAME	902
3	1361397.0270	1956171.2890	1093.928	SDCD	ATTRNAME	903
4	1358972.5490	1958951.0030	1158.218	SDCD	ATTRNAME	904
5	1360933.5130	1958829.7430	1125.200	SDCD	ATTRNAME	905
6	1360048.2510	1960258.5990	1160.113	SDCD	ATTRNAME	906
7	1362929.5690	1958553.5400	1152.080	SDCD	ATTRNAME	907
8	1362744.5290	1959138.6430	1126.800	SDCD	ATTRNAME	908
9	1362462.4340	1960072.4220	1087.741	SDCD	ATTRNAME	909
10	1362103.7410	1961471.8660	1095.498	SDCD	ATTRNAME	910
11	1361762.2710	1962408.0340	1131.949	SDCD	ATTRNAME	911
12	1361082.3830	1959590.7500	1150.310	SDCD	ATTRNAME	256
16	1358675.5530	1957411.6230	1092.367	APOT	ATTRNAME	
17	1357315.5960	1957687.0500	1107.892	APOT	ATTRNAME	
18	1357998.7630	1957517.9450	1057.299	DCEF1 ST	ATTRNAME	
19	1357953.7730	1957585.4320	1058.225	DCEF1	ATTRNAME	
20	1357797.6700	1957639.1890	0.000	PCF	ATTRNAME	
21	1357994.0840	1957669.6090	0.000	PCF	ATTRNAME	
22	1358016.4160	1957688.9250	0.000	PCF	ATTRNAME	
23	1357892.8430	1957897.5580	1083.484	SDCD	ATTRNAME	23
24	1358189.5710	1957534.2950	1076.791	SDCD	ATTRNAME	24
27	1357899.4240	1958020.5340	0.000	PCF	ATTRNAME	
28	1357801.5020	1958015.4400	0.000	PCF	ATTRNAME	
31	1358250.4830	1957534.8650	1063.137	DPC2 ST	ATTRNAME	30"
32	1358251.1680	1957532.1330	1066.776	DHWB3 ST	ATTRNAME	
33	1358246.5970	1957536.4480	1067.107	DHWB3	ATTRNAME	
34	1358193.8740	1957466.7840	1061.343	DPC2	ATTRNAME	30"

After the CSV file(s) are imported into the Field Book, the data can then be used to generate a Terrain Model, annotated and exported to create a separate UTLE file.

1.1.1 Standard Project Naming Conventions

The standard folder structure for ORD projects in ProjectWise is as follows:

pw:\\gdot-go-pwis01.gdot.ad.local:ProjectWise\Documents\Projects\PI# - County – Description\PE (Preconstruction)\Location Database\Survey\SLB District Surveys\SLB DGN-CE\

An example is as follows:

pw:\\gdot-go-pwis01.gdot.ad.local:ProjectWise\Documents\Projects\0013379 - Butts - Op Improvements - SR 36 Conn\PE (Preconstruction)\Location Database\Survey\SLB District Surveys\SLB DGN-CE\

The SLB DGN-CE folder is the folder location where the core of the Survey File data is stored. When submitting project deliverables for use by the Design Office a link to the appropriate file(s) in the SLB DGN-CE folder must be submitted to the Project Manager.

Table 1.1	
Standard Project Naming Conventions	
ORD ProjectWise Project Structure	pw:\\gdot-go-pwis01.gdot.ad.local:ProjectWise\Documents\Projects\PI# - County – Description\PE (Preconstruction)\Location Database\Survey\SLB District Surveys\SLB DGN-CE\
ORD ProjectWise Project Structure (Example)	pw:\\gdot-go-pwis01.gdot.ad.local:ProjectWise\Documents\Projects\0013379 - Butts - Op Improvements - SR 36 Conn\PE (Preconstruction)\Location Database\Survey\SLB District Surveys\SLB DGN-CE\

1.1.2 Standard File Naming Conventions

ORD relies on several different types of files to generate the required deliverables but much of the work done by the SDE will involve CSV files (input data delivered to the SDE) and DGN files (delivered to the designer by the SDE). Following are the applicable file naming conventions (See *Table 1.2*)

	Table 1.2	
	Standard File Naming Conventions	
	File Type	**File Name**
	CSV –Field Survey File **1st (Original) Field Survey CSV** **2nd Enhancement Field Survey CSV** **3rd Enhancement Field Survey CSV, Etc.**	 PI#A.csv PI#B.csv PI#C.csv, Etc.

Table 1.2	
Standard File Naming Conventions	
File Type	**File Name**
Processed DGN Files	PI#MAP.dgn PI#SURV.dgn PI#TOPO.dgn PI#UTLE.dgn

1.1.3 Standard Object Naming Conventions

ORD contains several different object types such as Terrain Model Feature Points and Alignments. Following are the applicable object naming conventions (See *Tables 1.3 – 1.5*).

Table 1.3 Example Standard Object Names		
Object Type	**Object Name**	**Object Name Convention**
Feature Points	Example: 1789 --- (No Prefix)	Point Number
Baseline Alignments	Example: SR10-US78 Example: CR201 Example: CS112 Example: Main St Example: North Ave	SR10-US78 CR201 CS112 Main St North Ave
Non-Baseline Alignments	Example: SV23--- (SV Prefix)	SV Prefix + Number

Table 1.4 Example Exterior Boundary Naming Conventions		
Exterior Boundary Type	**Feature Name**	**Feature Style**
Mapping Exterior Boundary	XBOUNDARY	TOPO_E_TLIML
Full Field Survey Boundary	XBOUNDARY	TOPO_E_TLIML

NOTE: An exterior boundary workflow is demonstrated at the following link: https://communities.bentley.com/products/road___site_design/w/road_and_site_design__wiki/22718/video-boundary-options

Table 1.5 Point & Alignment Specifications	
Points	Point number only, with no prefix and no range limit.
Alignments (baseline)	Alignments will have no range limit and will always be assigned names that coincide with the name of the roadway delineated by the alignment (SR10-US78 and MainSt for example).
Alignments (non-baseline)	Non-baseline Linear Geometry will have no range limit and will always have the SV Prefix.

1.2 Standard Terrain Model Feature Objects

Names Mapping and Field Data:

Upon receiving the PI#MAP.dgn file from Photogrammetry the file must be copied and renamed to PI#SURV.dgn. The PI#SURV.dgn file should then be used to create the Terrain Model and store the existing geometry. The GDOT Location graphical filter is available for implementation in creating the terrain model via the Create Terrain by Graphical Filter Tool.

The CSV (Field Data Collector) files are imported directly into ORD by right clicking on the appropriate field book and selecting the Import, File options. After the CSV file is imported into the Field Book, the data can then be used to create/enhance existing Terrain Models, view existing topography, view existing utility resources, view property related items, and perform other related tasks as needed.

As the CSV data is imported the alpha codes are used to assign the feature names/definitions to the feature objects – **Example**: TPBL1, TPBL2, TPBL3, etc. for Field Survey terrain model data. The internal Terrain Model points are numbered consecutively in the Feature Objects - Example: 1, 2, 3, etc. Each Feature can be made up of one or many points. The Feature definition is based on the associated Alpha codes and is assigned during the CSV Import process. The Feature Type determines if the Feature will be included in the triangulation process.

The Feature Type affects how the DTM triangles are formed. The Feature Type can be a breakline, spot, contour, void or boundary and is determined based on a setting in the corresponding Feature Definition. The attribute of the Terrain Model Feature and the triangulation effect is also determined by feature definition.

The Standard Object Names for the Terrain Model Features are determined by the Feature Code– this is an automated process so that the Standard Object Names are already defined for the user.

1.3 Standard Terrain Model Feature Types

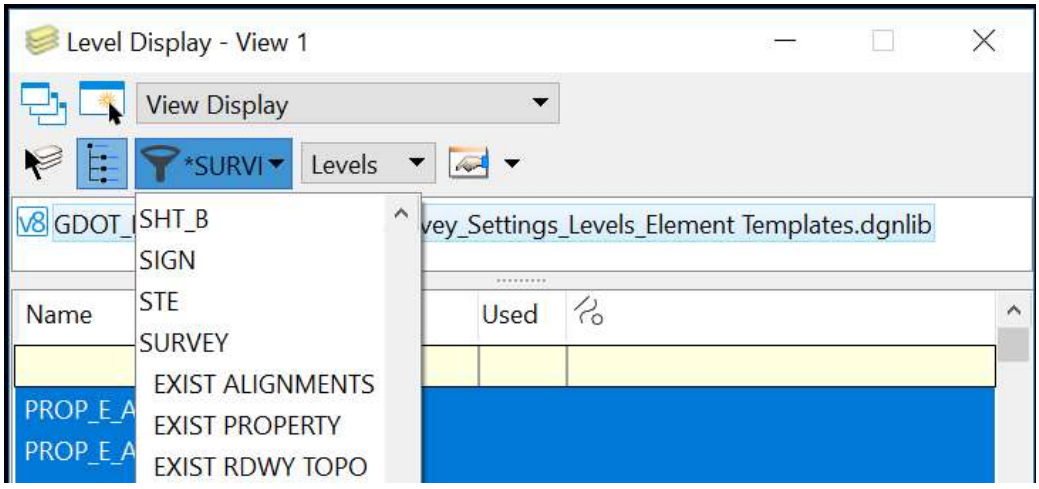
The five ORD Feature Types designated for use on GDOT projects are **Breakline, Spot, Contour, Void** and **Boundary**. These Feature Point Types are set as part of the GDOT Workspace. As mentioned previously, the Feature Point Type determines how Terrain Model triangles are formed when the points are connected. When the data in the CSV file is imported the correct Feature Type is automatically assigned by the Feature Definition and to the Feature Object which is imported into the Terrain Model. Following are examples of the Feature Types: (See *Table 1.6*)

Table 1.6	
Example Terrain Model Feature Types	
Feature Type	**Description**
Breakline	Linear connected points that represent discontinuities in a surface
Spot	Randomly spaced points that are independent of other points
Contour	Connected points that form a linear segment based on elevation
Void	Interior connected points that represent areas in a Terrain Model that are undefined or obscured
Boundary	Exterior connected points that represent the outer limits of a Terrain Model surface and can be used to trim extraneous triangulated data

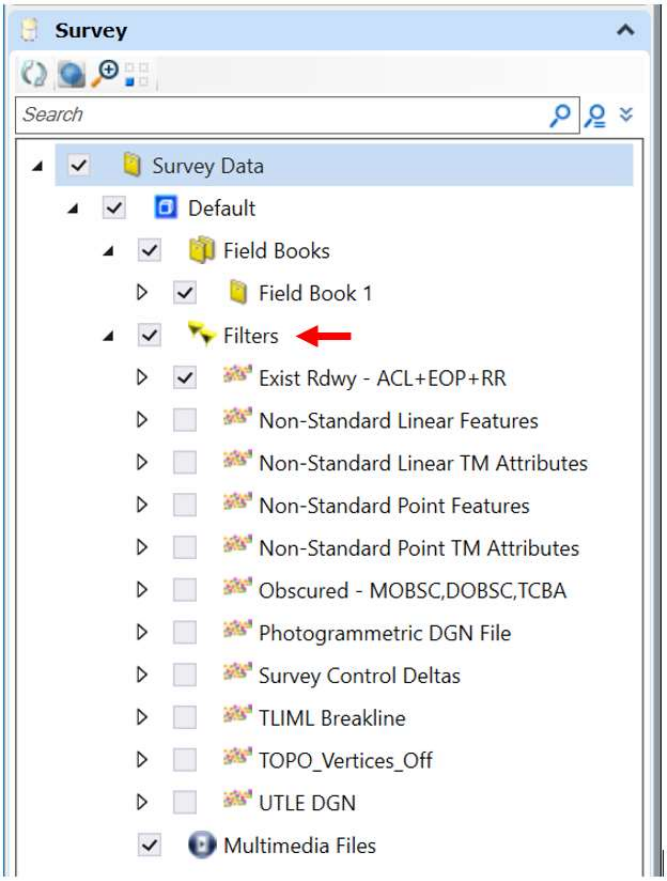
1.4 Standard Geometry Object Names

As mentioned previously – The CSV (Field Data Collector) files are imported directly into ORD by right clicking on the appropriate field book and selecting the Import, File options. The Geometry related survey data including the Property data, Existing Right of Way, Alignment data and etc. are included in the ORD Model.

LEVEL Filters consisting of the EXIST ALIGNMENTS, EXIST PROPERTY and EXIST RDWY TOPO filters have been included for the purpose of simplifying tasks that involve viewing and isolating existing alignment, property and topographical items



SURVEY Filters for use in quality checks and other tasks have been included in the GDOT ORD Workspace via the GDOT_ORD_3D seed file. In future releases these filters will be supported via DGNLIB file. When the GDOT_ORD_3D seed file is used to create the DGN file and survey data has been imported into a field book the filters will be available in the Survey Tab of the Explorer and can be navigated to by selecting the down arrows as follows:



Each filter turns on specific features. The functionality of these filters is most easily tested by turning off all features and turning each filter on and off one at a time.

A. Geometry Object Names:

The Geometry Objects consist of points, linear geometry and alignments. Existing property data is imported from the Field Survey CSV file. The SDE then utilizes deeds, plats, existing plans or tax maps if required to assist in the input of the parcel and alignment data. The SDE will store property data by utilizing the existing points imported from the CSV file and by storing additional points, linear geometry and alignments computed by use of information from deeds, plats and etc. as needed.

Please Note:

The points/chains imported from the CSV file will contain No prefixes. The SDE will also store any computed points with No prefixes. Any baseline (PROP_E_ACL) alignments will be assigned names that coincide with the name of the roadway delineated by the alignment (SR10/US78 and MainSt for example). Other computed (non-baseline) alignments will be stored with an SV prefix + number to represent survey stored Linear Geometry features such as property, existing R/W, Land Lot Lines, etc. Points will be stored with nothing more than the point number (no prefix).

*The reason that Survey (field collected and computed points) do not contain pre-pended prefixes is to help differentiate between survey and design data. Designers will name their computed points and alignments with a pre-pended **DE** prefix in order to differentiate between Survey and Design points/alignments.

The above Naming Scheme is utilized in order to differentiate between Survey Data and Design Data. The Naming Scheme is also used to assist in adding Additional Survey Enhancement information to a database. This information can then be submitted to the Designer so that the Designer's Points and Alignments will not be overwritten when additional enhancements are added to the Designer's Geometry Project Database. (See *Table 1.7*)

Table 1.7
Example Standard Object Names

Baseline Alignments	Example: SR10-US78 Example: CR201 Example: CS112 Example: Main St Example: North Ave	Road/Street Name/Number Road/Street Name/Number Road/Street Name/Number Road/Street Name/Number Road/Street Name/Number
Non-Baseline Alignments	Example: SV23--- (SV Prefix)	SV Prefix + Point Number
Points	Example: 1477--- (No Prefix)	Point Number only (no prefix)

B. Feature Definitions required for use in storing Points and Alignments:

The Standard Feature Definitions to use when storing Points and Alignments for the Existing Baseline Alignments, Existing R/W, Property, etc. will be named according to the type of Point or Alignment which is to be stored. The following Table lists the applicable Feature Style(s) to utilize when storing the Point and Alignment data: (See *Table 1.8*)

Table 1.8
Feature Styles for Points and Alignments

Existing/Computed Points	PROP_E_ACL-PC-PT PROP_E_APC PROP_E_API PROP_E_APOC PROP_E_APOT PROP_E_APT PROP_E_PCF PROP_E_RWE-LTD-ACCESS	PROP_E_PPC PROP_E_PPOL PROP_E_RWC PROP_E_RWE PROP_E_RWM PROP_E_RWRR PROP_E_RWU PROP_E_LTD-ACCESS
Existing Baseline Alignment	PROP_E_ACL	
Existing R/W Alignment	PROP_E_RWE	
Existing Property (Parcel) Alignment	PROP_E_PAR	
Existing R/W & Limited Access Alignment	PROP_E_RWE-LTD-ACCESS	
Existing Limited Access Alignment	PROP_E_LTD-ACCESS	

1.5 Standard File Information

Following is a brief overview of the most common file types the SDE will process and generate: (See *Table 1.9*)

Table 1.9

Standard File Information Overview

CSV

The .CSV files are comma delimited ASCII format files and contain Field Survey Data collected utilizing Data Collectors in the field (Topography, Property, Drainage, etc.). The .CSV file is imported into the ORD Field Book.

PI#SURV.dgn

This DGN file contains the mapping data imported from the PI#MAP.dgn file provided by the Photogrammetry Office. This file is also the base file used by the SDE's to add field enhancements and property information before separating out the PI#TOPO.dgn and PI#UTLE.dgn files.

PI#TOPO.dgn

This DGN file contains the Topographical, Drainage, Property and Terrain Model information generated from Mapping and Full Field Survey.

PI#UTLE.dgn

This DGN file contains all the Utility information generated from Field Survey Data and Mapping. This file contains ONLY existing utility information.

1.6 GDOT Standard OpenRoads Photogrammetric Feature Codes

To see the most current GDOT OpenRoads Photogrammetric Features and the Levels used for them, please see the OpenRoads Photogrammetric Features document, found on the GDOT ROADS webpage.

1.7 GDOT Standard OpenRoads Field Survey Feature Codes

To see the most current GDOT OpenRoads Survey Feature Codes/Styles, please see the OpenRoads Field Survey Feature Codes document, found on the GDOT ROADS webpage.

Survey Data Project Deliverables - Contents

Survey Data Project Deliverables

This section provides an overview of the Survey Data Project Deliverables which will be submitted to the Office of Design Policy and Support/Location Bureau (Engineering Management / Operations Manager). This data will then be forwarded to the Designer.

2.1 Processing of the Mapping and/or Full Field Survey Surface (Terrain Model)

Once the Terrain Model has been created (either by use of the Graphical Filter, 'GDOT_Location' for Mapping Projects or by creation from the Field book for Full Field Survey Projects) it should be reviewed for errors. The following items should be checked to ensure a correct Terrain Model is submitted.

Terrain Model Review Checklist:

- ☐ Verify that only GDOT Naming Conventions and Feature Definitions are used
- ☐ Make sure that all crossing segments and crossing overlaps are resolved
- ☐ Check to ensure there are no erroneous (bad) point elevations
- ☐ Verify that the Terrain Model contains no erroneous "Spikes"
- ☐ Verify the Terrain Model is assigned the Feature Definition of Existing Boundary
- ☐ For Full Field Survey projects, ensure there is only one Exterior Boundary and that it is assigned a feature definition of TLIML with model attribute = Boundary
- ☐ For Mapping projects, the Edge Method must be used to create the XBOUNDARY and set to Max Triangle Length with a Maximum Triangle Side Length of 100.00'.
- ☐ Verify that all Interior Boundaries are closed shape entities
- ☐ Make sure to compress the DGN file before submittal.

2.2 Processing of the Geometry

Once the Geometry has been created it should be reviewed for errors. The following items should be checked to ensure no errors are submitted.

Geometry Review Checklist:

- ☐ Verify that only GDOT Naming Conventions and Feature Definitions are used
- ☐ Point Prefixes shall not be utilized by the Surveyor/SDE.
- ☐ All roadway alignments are named correctly utilizing the name of the road.
- ☐ All alignments other than roadway alignments have an **SV** Prefix followed by incrementing numbers.
- ☐ All parcels must be stored clockwise, and the alignments must close (first and last point number must be the same).

2.3 Generation of the Topographical, Property and Utility DGN File(s)

After the final processing of the PI#SURV.dgn, the PI#TOPO.dgn and PI#UTLE.dgn will be generated for submission to Design. In the end the PI#TOPO.dgn shall contain only topo and property information and no utility information. The PI#UTLE.dgn shall contain only utility information and no topo or property information.

Table 2.1	
Standard DGN File Names	
Survey DGN File Name	PI#SURV.dgn
Topographical DGN File Name	PI#TOPO.dgn
Utility DGN File Name	PI#UTLE.dgn

Before submitting the DGN Files – perform the following steps

For each DGN File - **"Fit the Active View"** so that all the data appears in the ORD View Window.

The process of generating the PI#TOPO.dgn and PI#UTLE.dgn is briefly summarized as follows:

1. While the PI#SURV.dgn file is active select **File>Save As** from the ORD Ribbon in the PI#SURV.dgn file.
2. Save the DGN File (Example: ***1234567TOPO.dgn,*** indicated in table 2.1) to the appropriate folder.
3. In the [ORD Software] –

   Select **File>Tools>Compress Options>Compress>Ok** from the ORD Ribbon. Leave the Include References box unchecked but check all others (This will compress and reduce the size of the file size).
4. Select **File>Save As** from the ORD Ribbon in the PI#TOPO.dgn file.

   Save the DGN File (Example: ***1234567UTLEXPORT.dgn***) to the appropriate folder.
5. In the ***1234567UTLEXPORT.dgn*** file:

   Turn off all UTLE levels, turn on all non-UTLE levels and select/delete all non-UTLE items. Turn the UTLE levels back on.

   Right click on the fieldbook, select the Export to DGN Graphics option, enter the PI#UTLE.dgn (1234567UTLE.DGN) in the file name field and select the Save option.

   Review the PI#UTLE.dgn file, **"Fit the Active View"** and save the settings. After successfully reviewing the **PI#UTLE.dgn** file the 1234567UTLEXPORT.dgn file can be deleted.
6. In the ***1234567TOPO.dgn*** file: remove all utility information.

When all associated DGN files are ready, the **SDE** is instructed to contact the **Project Manager** and make copies available on **ProjectWise**. For projects not in **ProjectWise**, a request shall be made to the **Office of Design Policy & Support** to add the project to **ProjectWise**. All files shall be saved in locations according to established **ProjectWise** procedures. The **Project Manager** will inform the designer when the files are available for use in **ProjectWise**.

Important: In order to be approved by GDOT, ALL Survey Databases shall be reviewed prior to submittal using the OpenRoads Survey Data Processing QA Checklist available for download from the GDOT ROADS webpage. http://www.dot.ga.gov/PS/DesignSoftware/OpenRoads

2.4 Listing of the SDE Project Deliverables

After the Terrain Model and Geometry have been processed and thoroughly reviewed using the OpenRoads Survey Data Processing QA Checklist, along with all other Project Deliverables, and have been approved by GDOT, the files will be sent to the **Project Manager**. This data will then be forwarded to the Designer.

The Final Deliverables include the following:

- PI#TOPO.dgn (Existing Topo features, and existing property information)
- PI#UTLE.dgn (Existing Utility features)
- PI#PSR.xls (Property Statistics Report)
- PI#Misc.txt (Miscellaneous information SDE deems important. This file may not be included.)
- A Survey Data Processing ORD Quality Assurance Checklist Document
- Property Research (scanned PDF of deeds, plats, tax maps, etc.)
- Survey Control package
- Hydraulic Engineering Field Report
- Bridge Hydraulics Study (if applicable)
- Septic Tank Report
- Any comments addressing potential issues of the survey

PLEASE NOTE:

A Survey Data Processing OpenRoads QA Checklist will be documented by the District SDE and/or Office of Design Policy and Support/Location Bureau and/or the Consultant Firm performing the Survey Data Processing work. This document lists several areas including the Survey Data, Terrain Model, Geometry Data and Final Deliverables which need to be verified before Project Submittal. This Document is a required Deliverable and must be submitted with the previously listed Deliverables.