

SOUTH CAROLINA

DEPARTMENT OF TRANSPORTATION

Station Offset Text Creation Guide

A brief tutorial of Station Offset Text information creation and the use of the Station Offset Filter.

STATION OFFSET FILTER USER MANUAL

Created August, 2011

Contents

Preface	1
Procedural Overview	2
Station Offset Filter Manager Contact	2
Extracting Survey Data from COGO.....	3
Using the Station Offset Filter.....	7
Survey Codes and Station Offset Inclusion.....	10

Preface

Historically, land surveys for SCDOT roadway design were performed by using a Baseline method, whereas, a centerline alignment was staked in the field and topographic data was collected by measuring distances to the staked alignment. Therefore, the information in the field-book would consist of station and offset and description of all topographic features.

Modern land surveys are collected either by conventional radial surveying (total stations) or various forms of GPS methodology with field computers in which data is stored, or by photogrammetric surveys. Topographic feature data is collected into a database with their positions determined by coordinate geometry.

SCDOT, while graphically depicting surveyed topographic features, includes stations and offset measurement from the pre-construction alignments in all construction plans. Deriving this data for surveyed features is no longer a pre-process action, but a post-process routine using a Coordinate Geometry (COGO) program within a CADD platform.

Procedural Overview

The basic steps required to accurately create a Station Offset Text (SOT) file is combined into two (2) major functions:

- **Extracting Survey Points** from COGO database as referenced to all survey alignment chains
- Using the **Station Offset Filter (SOF)** to eliminate unwanted data.

The instructions present herein are compiled for use with Bentley Geopak V8i. Other version of Geopak, newer or older, may differ significantly in process.



Bentley® GEOPAK® V8i

SELECTseries 2

Protected by US and international copyright laws as described in "About Civil".
Copyright (c) 2009 Bentley Systems, Incorporated. All Rights Reserved.
08.11.07.427

Station Offset Filter Manager Contact

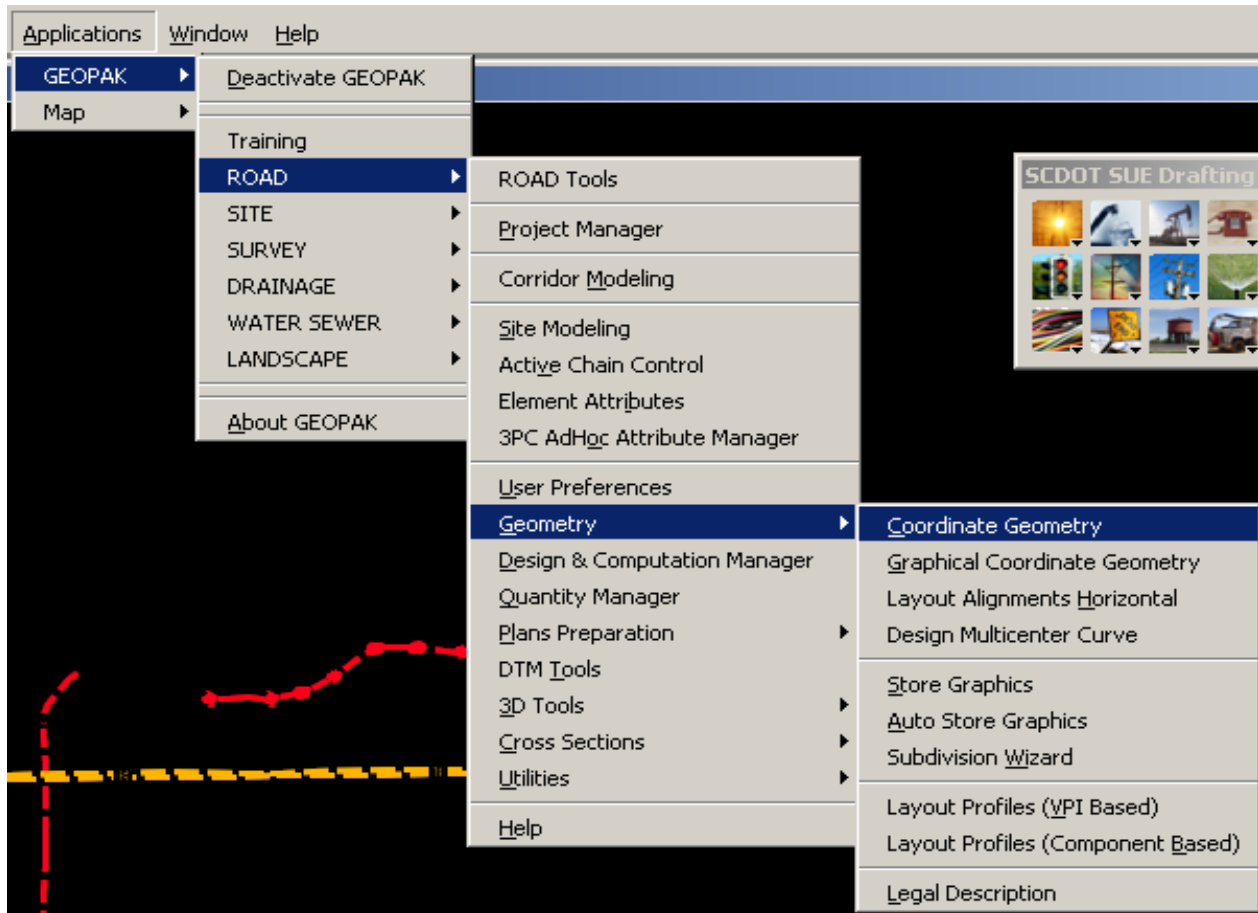
These instructions are intended to be used by personnel with working knowledge of GeoPak and Coordinate Geometry functions as well as Microsoft Excel. Any assistance or trouble shooting of the Station Offset Filter can be obtained by contacting the SOF manager Steven Bailey at 737-2047 or baileysc@scdot.org.

Extracting Survey Data from COGO

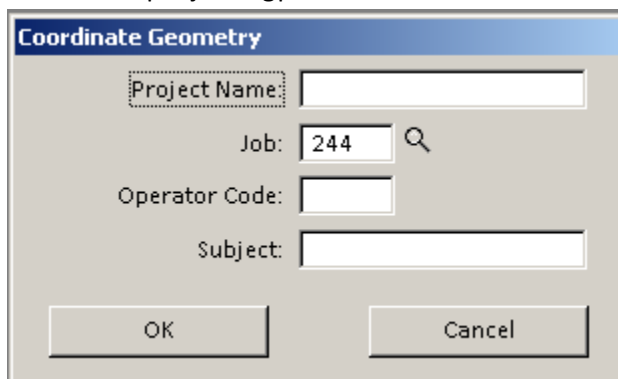
All geometric data created by the survey department is combined into the “gpk” including:

- Topographic data – spot elevations & breaklines
- Planimetric data – topographic feature points and survey chains
- Reference Alignments – best fit existing roadway alignments

To open the COGO menu, go to Applications/GEOPAK/Road/Geometry/Coordinate Geometry

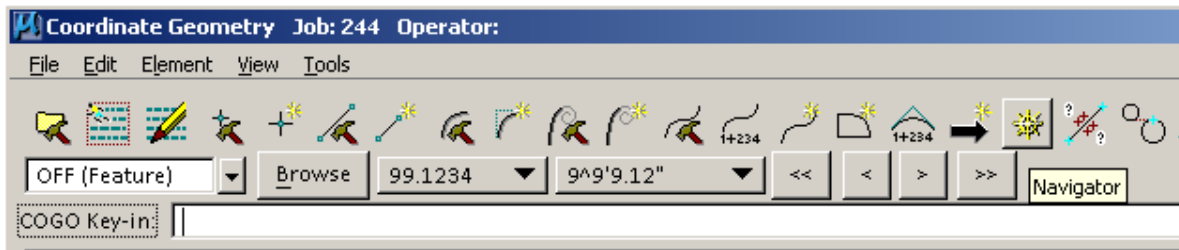


Select the project “gpk” file

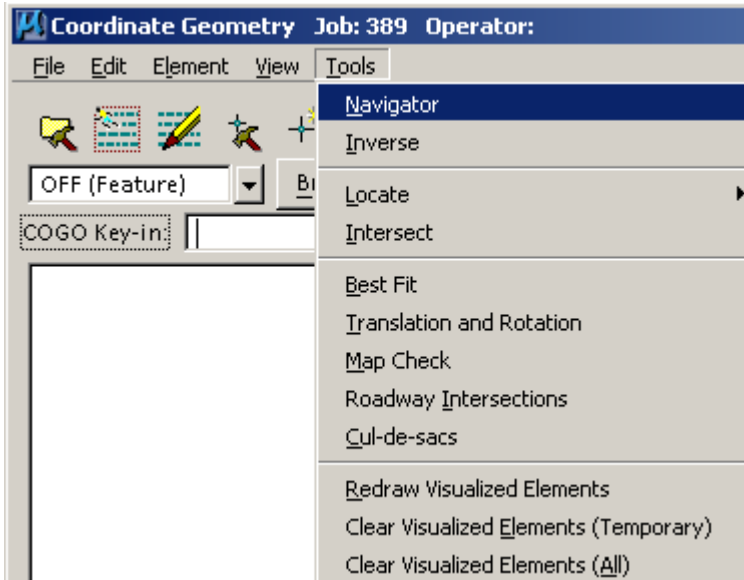


SCDOT Station Offset Text Creation

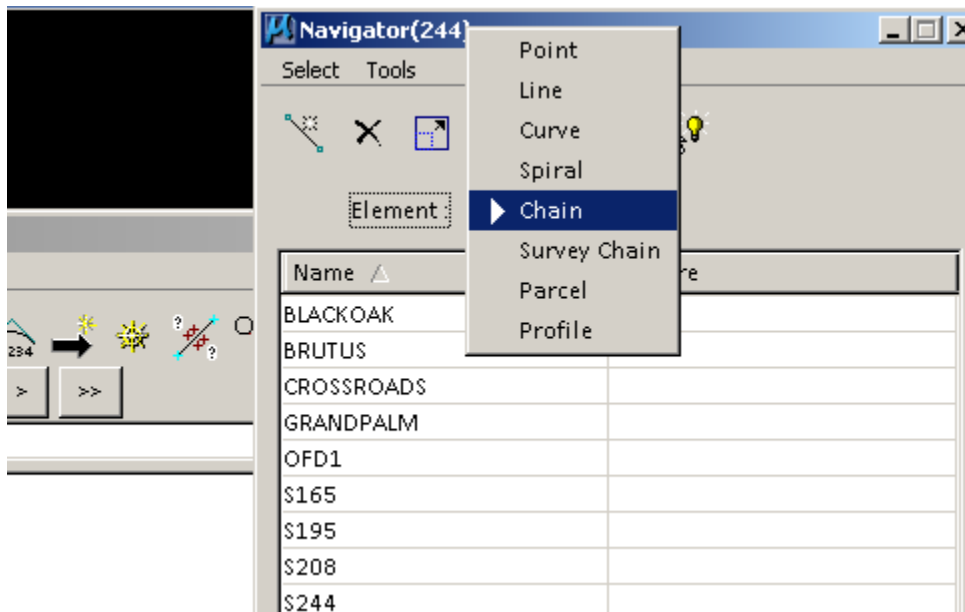
From the COGO menu, select the Navigator function to view the project database



Or open the Navigator through Tools/Navigator

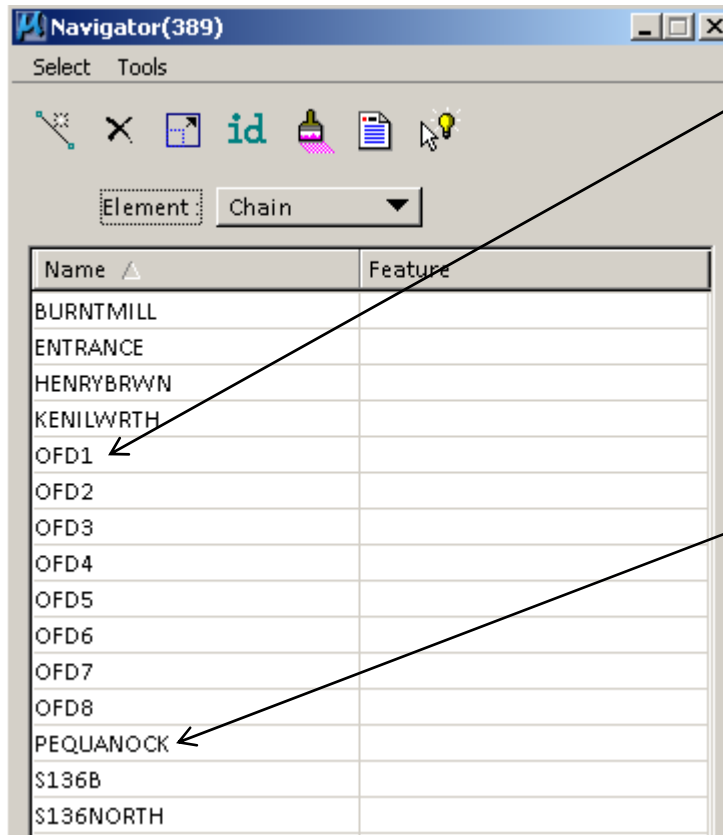


From the Navigator "Element" tab, all of the geometry of the database can be reviewed



SCDOT Station Offset Text Creation

Under the “Chain” tab, all of the project reference alignments are stored. Review chains to determine which alignments will not require station offset information (outfall ditches, small side roads, etc). The Project Engineer determines which alignments will be referenced in the construction plans.

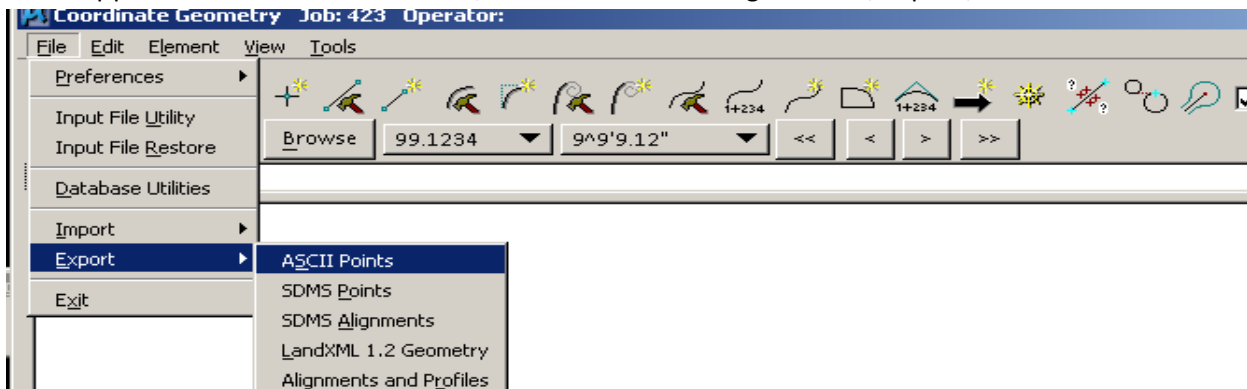


Name	Feature
BURNTMILL	
ENTRANCE	
HENRYBRWN	
KENILWRTH	
OFD1	
OFD2	
OFD3	
OFD4	
OFD5	
OFD6	
OFD7	
OFD8	
PEQUANOCK	
S136B	
S136NORTH	

Outfall Ditch (OFD) alignments usually do not need Station Offset Data

Short alignments may be entrances to parking lots of subdivision.

Once applicable chains are selected, in the COGO menu go to File/Export/ASCII



SCDOT Station Offset Text Creation

Several settings must be adjusted within the Export to ASCII menu. Here are the steps to exporting COGO points from the “gpk” to a comma delineated text file:

1. Change the Output Format to have no Prefixes, place commas for the Suffixes, and place the Text in the following order: **Point#, Station, Offset, Feature, Desc, Elev(Z), North(Y), East(X)**.
2. Toggle **Use Station value stored with Point** to **Compute Station value from Chain**.
3. Select reference chain.
4. Select a file name that corresponds with the Chain name (breezy.txt).
5. Order the Points in the lower window to be listed by Station from lowest to highest.
6. Highlight points that have station values (points away from selected Chain will show “Off Chain”.
7. Select **Apply** at the bottom of the window.
8. Select the next require reference alignment/chain (3) and repeat steps 3 thru 7 for each required Chains. A separate text file needs to be created for each alignment chosen.

The screenshot shows the 'Export GPK Points to ASCII Coordinate File' dialog box. The 'Output Format' section on the left has 'Prefix' set to empty and 'Suffix' set to commas for all fields. The 'Text' column is configured with the following order: Point#, Station, Offset, Feature, Desc, Elev(Z), North(Y), East(X). The 'Output File' is set to 'J:\BaileySC\survey\3_Series\35s\35423\coords.txt'. The 'Replace "No Elevation" With' is set to '0.0000' and 'Replace "No Feature" With' is set to 'DEFAULT'. The 'Use Station value stored with Point' checkbox is unchecked, and 'Compute Station value from Chain' is selected. The reference chain is set to 'BREEZY'. The 'Duplicate Filter Tolerance' is set to '0.000010'. The 'Select Points to Export' table shows 7 points, all with 'Off Chain' status. The 'Include Header' checkbox is unchecked. The 'Apply' button is at the bottom right.

Point#	North(Y)	East(X)	Elev(Z)	Station	Offset	Feature	Desc
1	775804.1594	1882866.0241	569.2200	0+00.00	Off Chain	CP	.../2IN REB...
2	775442.9726	1880931.2416	570.1800	0+00.00	Off Chain	CP	CP 2 PK NAIL
3	774487.6200	1879290.7536	587.6000	0+00.00	Off Chain	CP	C.../8IN REBAR
4	774026.0562	1878221.9261	587.7500	0+00.00	Off Chain	CP	CP 4 PK NAIL
5	773341.3358	1877097.7954	593.2600	0+00.00	Off Chain	CP	C.../8IN REBAR
6	772671.0421	1875681.0885	585.1000	0+00.00	Off Chain	CP	CP 6 MAG ...
7	771644.5059	1873793.6980	613.4500	0+00.00	Off Chain	CP	C.../8IN REBAR

The resulting text file should appear as follows:

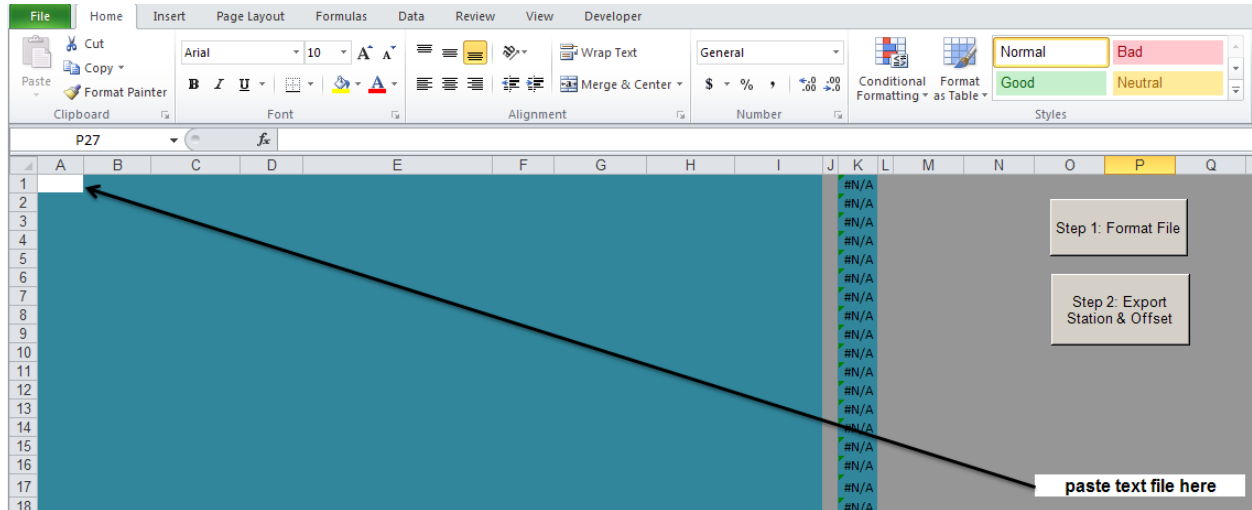
Point#, Station, Offset, Feature, Desc, Elev(Z), Noth(Y), East(X)

28,10+00.00,0.0000,PI,PI 28+52.67/10+00.00,0.0000,428877.9277,2253224.9524

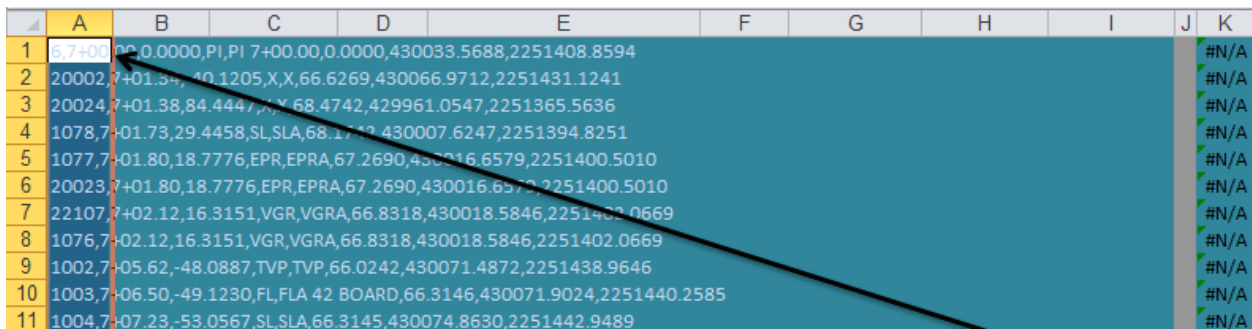
1393,10+00.15,1800.2332,FL,FL,56.0773,430059.6799,2251866.9018

Using the Station Offset Filter

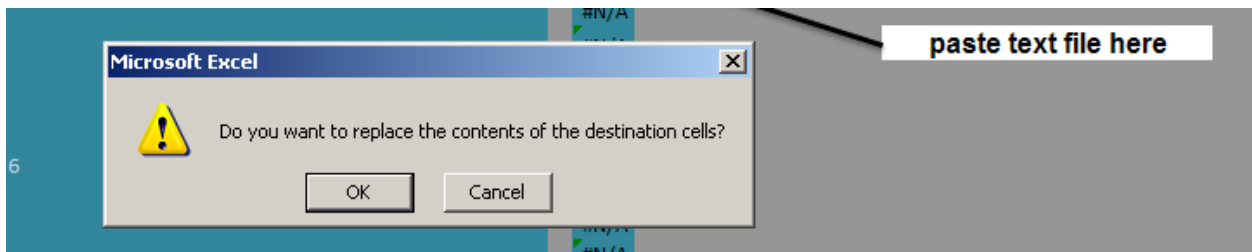
Once the files are prepared, they are ready for the **SOF** program. It is imperative that users not modify the Excel file in anyway and follow the instructions as closely as possible.



The plain, comma delineated text files will be Copied and Pasted into the **SOF** Import sheet starting in the A1 cell. All text will appear light blue.



Select **Step 1: Format File** button on the right portion on the Import Worksheet. This will separate the text file into sortable cells which will be used in **Step 2**. Excel will ask if you want to replace the contents of the destination cells; click OK.



SCDOT Station Offset Text Creation

In Column K shows where the feature codes will be used in the program. Any fields showing #N/A means the feature code is either incorrect or possibly a recently added feature. Contact the **SOF** manager for updates to the **SOF** or assistance in trouble shooting this Feature field.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1		7+00.00		PI	PI 7+00.00		D 430033.5688	2251408.859			O					
2	20002	7+01.37	-40.1205	X	X	66.6269	430066.9712	2251431.124			G					
3	20024	7+01.38	-40.1205	X	X	66.4742	429961.0547	2251365.564			G					
4	1078	7+01.73	29.4458		SLA	68.1742	430007.6247	2251394.825			I					
5	1077	7+01.80	18.7776	EPR	EPRA	67.269	430016.6579	2251400.501			O					
6	20023	7+01.80	18.7776	EPR	EPRA	67.269	430016.6579	2251400.501			O					
7	22107	7+02.12	16.3151	VGR	VGRA	66.8318	430018.5846	2251402.067			O					
8	1076	7+02.12	16.3151	VGR	VGRA	66.8318	430018.5846	2251402.067			O					
9	1002	7+05.62	-48.0887	TVP	TVP	66.024	430071.4872	2251438.965			I					
10	1003	7+06.50	-49.123	FL	FLA 42 BOARD	66.3146	430071.4872	2251440.159			I					
11	1004	7+07.23	-53.0567	SL	SLA	66.3145	430074.863	2251442.949			I					
12	1079	7+21.80	27.532	TVP	TVP	68.3077	429998.6851	2251433.445			I					
13	1006	7+22.69	-52.369	T	T 12 BRADFORD PEAR	65.4654	430066.1394	2251435.724			I					
14	1005	7+42.84	-42.1483	T	T 24 OAK	67.4514	430046.8375	2251467.473			I					
15	1014	7+47.73	-66.776	B	BB	64.698	430065.1967	2251484.602			I					
16	1010	7+47.73	-66.776	B	BA RES	64.698	430065.1967	2251484.602			I					
17	1013	7+47.86	-111.7758	B	B	65.2102	430103.383	2251508.409			I					

Step 1: Format File

Step 2: Export
Station & Offset

paste text file h

Now select the **Step 2: Export Station & Offset** button. A new Excel file will be created with 3 sheets. Sheet 1 will contain Station and Offsets Left of the Alignment, Sheet 2 will contain Station and Offset Right of the Alignment, and Sheet 3 will contain Station and Offset for Drainage features.

Format Painter

Clipboard

Font

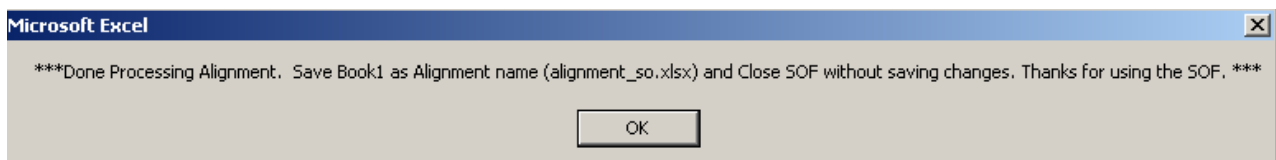
Alignment

F34

fx

	A	B	C	D	E	F	G	H	I
1	PIN:			ALIGNMENT:					
2	STATION	OFFSET	L/R	DESCRIPTION	FEATURE				
3	7+43.6	79.8	Lt		WOODS LINE				
4	7+52.1	149.8	Lt	12" OAK	TREE				
5	8+13.4	147.2	Lt	12" OAK	TREE				
6	8+19.3	87.9	Lt		WOODS LINE				
7	8+54.1	124.0	Lt	72" CHAINLINK	FENCE				

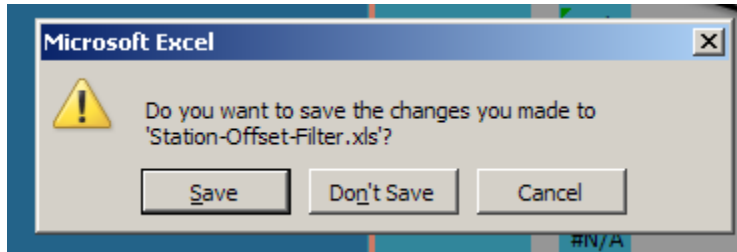
The SOF will display the following message when complete.



Save the newly create excel file after the reference alignment, for example alignment_so.xlsx (breezy_so.xlsx).

SCDOT Station Offset Text Creation

After **Step 2** is complete, all imported data in the **SOF** will be erased. For multiple Station Offset file creations, **SOF** and all other excel files, must be closed and restarted for each new file.



Review the newly created Station Offset file for reasonable accuracies. If, in the Description column, a survey code is not translated from the abbreviated format, make note of the abbreviated codes and email the list to the **SOF** manager. The survey description database will be updated periodically or as needed.

The newly created Excel is ready to be saved and used at the user's discretion. **Never save changes to the SOF when finished.** Any additional Descriptions can be added by contacting **SOF** manager Steven Bailey @ 737-2047 or baileysc@scdot.org.

Survey Codes and Station Offset Inclusion

Survey Code	Survey Item	Station Offset Info	Survey Code	Survey Item	Station Offset Info
AC	A/C UNIT	Included	DTR	DITCH LINE	Excluded
AGT	A/G TANK	Included	EP	EDGE PVMT	Excluded
B	BUILDING	Included	EPL	EDGE PVMT	Excluded
BDL	BERM DITCH	Included	EPP	ELEC PEDESTAL	Included
BDR	BERM DITCH	Included	EPR	EDGE PVMT	Excluded
BL	BREAKLINE	Excluded	ERL	EDGE OF DIRT ORAD	Excluded
BM	BENCH MARK	Excluded	ERR	EDGE OF DIRT ORAD	Excluded
BRC	CONC BRIDGE	Included	ETB	ELEC TRANS BOX	Included
BRW	WOOD BRIDGE	Included	F	FLOWER BED	Included
BS	BOTTOM SLOPE	Excluded	FH	FIRE HYDRANT	Included
BSW	EDGE OF SIDEWALK	Included	FL	FENCE	Included
C	COLUMN	Included	FLAG	FLAG POLE	Included
CAP	FILL CAP - U/G TANK	Included	FLT	FLOOD/GROUND LIGHT	Included
CBN	CATCH BASIN	Included in Drainage	FOL	FIBER OPTIC LINE	Included
CEM	CEMETERY	Included	FR	FENCE	Included
CFL	FACE OF CURB	Excluded	FSS	UNKNOWN	Excluded
CFR	FACE OF CURB	Excluded	GEO	GEODETIC SURVEY MARKER	Excluded
CL	FACE OF CURB	Excluded	GL	GAS LINE	Included
CLP	FACE OF CURB	Excluded	GLT	GAS TEST PNT	Included
CMT	CONC MONUMENT	Included	GM	GAS METER	Included
CNP	CANOPY	Included	GMH	GAS MAN HOLE	Included
CP	SURVEY CONTROL	Excluded	GP	GUY POLE	Included
CPD	CONC PAD	Included	GPI	GAS PUMP ISLAND	Included
CRL	CREEK BANK	Excluded	GR	GUARD RAIL	Included
CRR	CREEK BANK	Excluded	GRV	GRAVE	Included
CRW	ROADWAY CROWN	Excluded	GV	GAS VALVE	Included
CVL	CULVERT	Included in Drainage	GW	GUY WIRE	Included
D	DIRT DRIVEWAY	Excluded	H	HEDGE ROW	Included
DAM	DAM	Included	HW	HEADWALL	Included
DAM1	DAM	Included	ICL	INTERSECTION CENTERLINE	Excluded
DC	CONC DRIVEWAY	Included	IP	PROPERTY CORNER	Included
DC	CONC DRIVEWAY	Included	JB	JUNCTION BOX	Included in Drainage
DCR	CONC DRIVEWAY	Included	LC	UNKOWN LINE	Included
DF	DRAIN FIELD	Included	LP	LIGHT POLE	Included
DI	DROP INLET	Included in Drainage	MAR	MARSH LINE	Included
DP	ASPHALT DRIVEWAY	Included	MCL	MISC CURB	Excluded
DTL	DITCH LINE	Excluded	MCR	MISC CURB	Excluded

Survey Codes and Station Offset Inclusion (cont)

Survey Item	Station Offset Info	Survey Code	Survey Item	Station Offset Info
CONC MEDIAN	Excluded	RRM	RAILROAD MILE POST	Included
DRAIN MH	Included in Drainage	RRS	RAILROAD SIGNAL	Included
SEWER MH	Included	RRT	RAILROAD TRESTLE	Excluded
UTILITY MH	Included	RRX	RAILROAD CROSSING ARM	Included
SERVICE / METER POLE	Included	RSB	RAILROAD SIGNAL BOX	Included
MISC LINE	Included	RWE	EXISTING R/W	Included
MISC PNT	Included	RWM	R/W MONUMENT	Included
NO FEATURE	Excluded	S	SHRUB	Included
OUTFALL DRAIN LINE	Excluded	SAR	UNKNOWN	Excluded
OUTFALL DRAIN LINE	Excluded	SAT	SATELLITE DISH	Included
ORCHARD TREE	Included	SL	SHRUB ROW	Included
ORCHARD TREE LINE	Included	SN	SIGN	Included
ORCHARD TREE LINE	Included	SP	SIGN POST	Included
STORM PIPE	Included in Drainage	SPG	WATER SPIGET	Included
PNT OF CURVE	Excluded	SPK	SPRINKLER	Included
PNT OF CURVE	Excluded	SPL	SERVICE/METER POLE	Included
PNT OF COMPOUND CURVE	Excluded	SPR	SPRING	Included
PNT OF COMPOUND CURVE	Excluded	SS	SANITARY SEWER	Included
PNT OF INTERSECTION	Excluded	SSC	SEWER CLEANOUT	Included
PNT OF INTERSECTION	Excluded	ST	SEPTIC TANK	Included
PK NAIL	Excluded	STP	STEPS	Included
PROPERTY LINE (ON LINE)	Excluded	SVC	UNKNOWN	Excluded
CALC PROPERTY CORNER	Included	SW	SIDEWALK TO THE ROAD	Included
PLANTER	Included	SWL	SIDEWALK	Included
PNT ON CURVE	Excluded	SWP	SWAMP LINE	Included
PNT OF SUB-TANGENT	Excluded	SWR	SIDEWALK	Included
PNT ON TANGENT	Excluded	T	TREE	Included
PNT ON TANGENT	Excluded	TBX	TEL BOX	Included
P.POLE	Included	TC	TOP OF CURB	Excluded
PNT OF REVERSE CURVE	Excluded	TCW	TOWER (RADIO/TV)	Included
PNT OF REVERSE CURVE	Excluded	TG	TELEGRAPH POLE	Included
PNT OF TANGENT	Excluded	THH	TEL HAND HOLE	Included
PNT OF TANGENT	Excluded	TIE	CONTROL TIE	Excluded
RAD PNT	Excluded	TL	WOODS LINE	Included
RAD PNT	Excluded	TL1	WOODS LINE	Included
RAILROAD TRACK	Excluded	TP	T.POLE	Included
RAILROAD TRACK	Excluded	TPP	T. PEDESTAL	Included

Survey Codes and Station Offset Inclusion (cont)

Survey Code	Survey Item	Station Offset Info
TR	WOODS LINE	Included
TS	TOP OF SLOPE	Excluded
TSJ	UNKNOWN	Excluded
TSP	TSP	Included
TVP	CTV PEDESTAL	Included
TW	COMMERCIAL TOWER PERIMETER	Included
UGC	U/G CABLE	Included
UGT	U/G TANK	Included
VGL	VALLEY GUTTER	Excluded
VGR	VALLEY GUTTER	Excluded
VOID	VOID SHOT	Excluded
W	WALL	Included
WE	EDGE OF WATER	Included
WEL	WELL	Included
WET	WETLAND	Included
WH	HIGH WATER MARK	Included
WL	WATER LINE	Included
WM	WATER METER	Included
WMH	WATER MAN HOLE	Included
WMW	WATER MONITORING WELL	Included
WTS	WITNESS MARKER	Included
WV	WATER VALVE	Included
WW	WINGWALL	Included
X	SPOT ELEVATION	Excluded
XL	SPOT ELEVATION	Excluded
XP	SPOT ELEVATION	Excluded
XR	SPOT ELEVATION	Excluded
DEFAULT	DEFAULT	Excluded