

— ArcGIS (ArcMap) tutorial —

By Zoe Anderson Adapted from M.Y. Landingin & S. Burgess



- ArcGIS is a geographic information system (GIS) for working with maps and geographic information, created by Esri.
- **ArcMap** is the main component of Esri's ArcGIS suite of geospatial programs, often used primarily to create, edit, and analyse maps.
- Who uses ArcGIS?
 - Anyone working with geographic data, maps... geospatial specialists, planners, architects...
 - Arch/Planning students often use ArcGIS for spatial context analysis



ArcMap

To view, edit and query geospatial data and create maps.

ArcScene

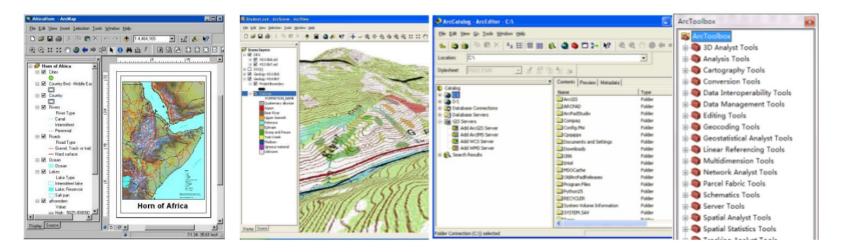
3D visualisation application, allowing you to view GIS data in 3D.

ArcCatalog

A data management application used to browse datasets and files.

ArcToolbox

Conains geoprocessing, data conversion and analysis tools.







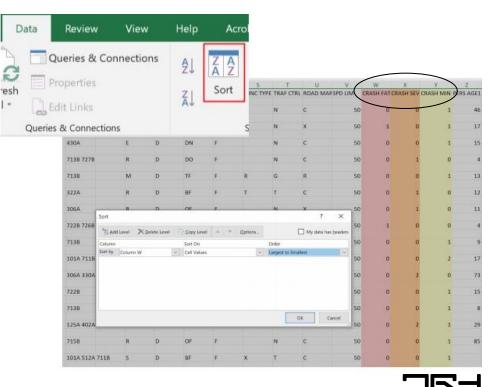
- ArcMap requires different categories of information to be represented in different files.
 - Therefore, the data should be organized from largest to smallest to remove 0 values
 - Then, each category of data must be saved and imported into ArcGIS in separate Excel files.





- What fields need to be separated?
 - For example car crash entries can be separated by the <u>severity of the crash</u>; fatal, severe or minor
- To select all data, press Ctrl + A (Command + A for Mac) twice.
- While highlighted, look at the top bar and select
 Data > Sort.
- In the pop-up window, select Sort by > infill the chosen column (i.e crash fatal) > Largest to Smallest > Click Ok.

Now all the data entries required will be in order from largest to smallest, meaning you can remove entries that have no/ a zero value easily if you wish....





Sorting Excel Data Example (Cont.)

- Separate data and create a Excel Workbook (not multiple sheets) for each category
 - If your map requires values above zero, then select and save them in a separate file.
- After sorting ONE COLUMN (i.e crash fatal from largest to smallest), click + drag from the top left of all the data to the right, down to where the entries are greater than zero
- 2. Do not miss columns to the **right** of the desired entry
- 3. Copy the data **Ctrl + C** (Command + C for Mac)
- Create a new Excel Workbook/ an entirely new spreadsheet File > New > Blank Workbook
- 5. Paste in cell A1 Ctrl + V (Command + V for Mac)
- 6. Check that the column letters and data match the original file

. K	1	M	N	0	p	9		\$	T.	U	V V	1	W		х	Y	Z	AA	AB
VEHICLE	S CAUSES	OBJECTS S	ROAD CU	ILCAD WE	LIGHT	WTHEA	JUNC TYP	PETRAF CTR	AM DADRI	SPD UM	RASH FATAL	CNT CIA	SH SEV CN	T CRASH	MIN CNT	PERS A	GE PERS AG	ELEASTING	NORTHIN
CWIE	7128 7138	7268-839	R	D	DO	F		N	c	54		1		0			4	1756375	
TWIE	115A 7128	7138 7298	R	D	B	F		N.	N	100		1	1	0	3		10	1788800	5908576
CE1E	7138 7278		R	D	67	1		N		60		1	1	a	3		4	1767887	5507775
VNIE	1034 1114	5324 660	M	D	BF	F		N	c	50		1	1	a			12	1765499	5899150
TELE	7118 7128	7268 839	E	D	BF	i F.		N	C	50		1		0			4	1770407	5900363
CW1E	102A 111A	1225A	5	D	00	+		N	c	50		1		0	3		7	1770330	5898235
CSIE	112A 7118	7278 862	R.	D	00	F	T	N.	2	50		1		0	3		2	1753778	591315
CW1E -	682A		R	D.	OF	F		N	C	50		1		0	3		12	1751590	5915252
VS1E	7138 7278	6	R	D	TF	f.		N	N	50		1		0			7	1760267	591348
CWIE	7138 7278	830 902	1	D	DF	1		N	c	50		1		a	3		ð	1760425	5913713
CNIE	7228 7278	lé.	8	D	BF	(F)		N	N	50		1		0			6	1759985	5906965
WE1E	7138 7278	6	R	D	DO	F		N	c	50		1		0			5	1765918	5899597
CSIE	7138 7268	Sur-	R	W.	TE	11		N	N	50		1		a	1		3	1760093	5918167
VWIE	7128 7138	7278	R	D	Bt	F		N	c	50		1		0	3		5	1766284	590518
CSIE	7138 7268	6.00	R	D	DO	E.		N	C	50		1		0	3		5	1757320	5928844
YW1E	112A 712B	7138 7278	IR.	D	TF	1		N	C	50		1		a			5	1762606	5907895
CNIE	7138 7268	É)	R	D	BE	E.		N	c	50		1		0			4	1765125	590542
VSIE	352A 7128	7278 839	R	W	BN.	F		N	N	20		1	1	0	3		3	1756943	590205
VN1E	7138 7198	έ	11	D	DO	F.		N		200		1	1	0	3		11	1744110	592365
VSIE	7128 7138	1	R	D	ON.	F	T	N	C	200		1	/	0	3		11	1734477	598091
VSIE	7138 7298	13	R	D	B	F.		N	C	100		1 /	· · · · · ·	0			8	1747595	594429
CELE	713B		£	D	OF.	F	T	N	N	50		0		0			6	1766828	590064
1	J	K	L	м	N	0	р	Q	R	5	T	/	v	w	×	Y.	Z	AA	AB
CRASH T	TMWWM	VEHICLES	CAUSES	OBJECTS	ROAD	UF ROAD V	VE LIGHT	WTHRa		TRAF CTR	ROAD MA SP	DUM C		ORASH SE	CRASH MI	ERS AG	E: PERS AGE	EASTING N	ORTHIN
CRASH T 203	IN MIVMT	VEHICLES CW1E	CAUSES 7128 7138	OBJECTS 1 7268 839	ROAD	D D	VE LIGHT DO	WTHRa #		e TRAF CTR	ROAD MA SP	20 UM 0		ORASH SE	CRASH MI	ERS AG	E: PERS AGE 4	EASTING N 1756375	ORTHING 5913149
CRASH T 203 153	IN MIVMT I2 NA I0 NB	VEHICLES CW1E TW1E	CAUSES 7128 7138	OBJECTS	ROAD	D D	DO B	WTHRa F		e TRAF CTRI N N	ROAD MA SP C N	50 LIM 0		ORASH SE	CRASH MI	ERS AG	E: PERS AGE. 4 0	EASTING N 1756375 1788800	ORTHING 5913149 5908576
CRASH T 203 153 141	IN MIVMT I2 NA I0 NB I5 NA	VEHICLES CW1E TW1E CE1E	CAUSES 7128 7136 115A 7128 7138 727	OBJECTS 1 7268 839 8 7138 7298	ROAD (R BR R	D D D D	VE LIGHT DO B BF	WTHRa F F		etraf ctri N N N	ROAD MA SP C N R	PO LIM 0 50 100 50	CRASH FA	ORASH SE 0 0 0	CRASH MI 0 0 0	ERS AG	E: PERS AGE 4 0 4	EASTING N 1756175 1788800 1767887	40RTHIN 5913149 5908576 5907775
CRASH T 203 153 141	IN MIVMT I2 NA I0 NB I5 NA	VEHICLES CW1E TW1E CE1E	CAUSES 7128 7136 115A 7128 7138 727	OBJECTS 1 7268 839 8 7138 7298	ROAD (R BR R	D D	DO B	WTHRa F F F		eTRAF CTRI N N N	ROAD MA SP C N R C	50 LIM 0	CRASH FA	ORASH SE 0 0	CRASH MI 0 0 0	ERS AG	E: PERS AGE. 4 0	EASTING N 1756375 1788800	40RTHIN 5913149 5908576 5907775
CRASH T 203 153 141 120 132	IN MIVMIT I2 NA ID NB I5 NA I3 DA IE NB	VEHICLES CW1E TW1E CE1E VN1E TE1E	CAUSES 7128 7136 115A 7128 7138 7276 103A 1110 7118 7128	OBJECTS / 7268 839 8 7138 7298 8 7138 7298 8 7138 7298 8 7138 7298 8 7138 7298	ROAD (R BR R (M E	D D D D D D D	WE LIGHT DO B BF BF BF	WTHRa F F F		eTRAF CTRI N N N N	ROAD MA SP C N R C C	20 LIM 0 50 100 50 50 50	CRASH FA (1 1 1 1 1	DRASH SE 0 0 0 0 0 0	CRASH MI 0 0 0 1 0	ERS AG	E: PERS AGE 4 0 4 2 4	EASTING N 1756175 1788800 1767887 1765499 1770407	408THIN 5913149 5908576 5907775 5899156 5900363
CRASH T 203 153 141 120 132 200	18 MVMT 12 NA 10 NB 15 NA 13 DA 18 NB 10 B8	VEHICLES CW18 TW16 CE18 VN16 TE18 CW16	CAUSES 7128 7138 7138 7139 7138 7277 103A 1112 7118 7138 102A 1112	OBJECTS / 1 7268 819 8 7138 729 4 532A 660 1 7268 819 4 123A	ROAD (R R R M E S	D D D D D D D D D	VE LIGHT DO B B/ BF B/ DO	WTHRa F F F F F	JUNC TYP	ETRAF CTRI N N N N N	ROAD MA SP C N R C C C C	20 LIM 0 50 100 50 50 50 50	(RASH FA (1 1 1 1 1 1	0RASH SE 0 0 0 0 0 0 0 0 0	CRASH MI 0 0 1 0 0 0	ERS AG	E: PERS AGE 4 0 4 2 4 7	EASTING N 1756175 1788800 1767887 1765499 1770407 1770330	ORTHING 5913149 5908576 5907775 5899156 5900363 5898235
CRASH T 203 153 141 120 132 200 204	12 NA 12 NA 10 NB 15 NA 13 DA 15 NB 10 B8 15 NB	VEHICLES CW18 TW16 CE18 VN16 TE18 CW16 CS18	CAUSES 7128 7138 115A 7129 7138 7271 103A 1110 7118 7128 102A 1110 112A 7118	OBJECTS / 7268 839 8 7138 7298 8 7138 7298 8 7138 7298 8 7138 7298 8 7138 7298	ROAD (R R R (M E S R	CUF ROAD V D D D D D D D D D D	VE LIGHT DO B BF BF DO DO DO	WTHRa F F F F F F		etraf ctri N N N N N N	ROAD MA SP C N R C C C C C P	20 LIM 0 50 100 50 50 50 50 50	CRASH FA (1 1 1 1 1 1 1 1	0RASH SE 0 0 0 0 0 0 0 0 0 0 0 0 0	CRASH MI 0 0 1 0 0 0 0	ERS AG	E. PERS AGE. 4 0 4 2 2 4 7 2	EASTING N 1756175 1788800 1767887 1763499 1770407 1770330 1763778	4087HIN0 5913149 5908576 5903775 5899156 5900363 5898235 5913152
CRASH T 203 153 141 120 132 200 204	18 MIVMT 12 NA 10 NB 15 NA 18 DA 18 DA 18 DA 18 NB 10 BB 15 NB 15 NB	VEHICLES CW18 TW1E CE18 VN1E TE18 CW1E CS18 CW1E	CAUSES 7128 7138 115A 7129 7138 7271 103A 1110 7118 7128 102A 1110 112A 7118 682A	OBJECTS 1 17268 839 8 7138 729 4 532A 660 1 7268 839 4 123A 8 7278 862	ROAD (R R R M E S	D D D D D D D D D	VE LIGHT DO B BF BF DO DO OF	WTHRa F F F F F	JUNC TYP	etraf ctri N N N N N N	ROAD MA SP C N R C C C C	20 LIM 0 50 100 50 50 50 50	(RASH FA (1 1 1 1 1 1	0RASH SE 0 0 0 0 0 0 0 0 0	CRASH MI 0 0 1 0 0 0 0	ERS AG	E: PERS AGE 4 0 4 2 2 4 7 2 2 2	EASTING N 1756175 1788800 1767887 1765499 1770407 1770330	4087HIN0 5913149 5908576 5903775 5899156 5900363 5898235 5913152
CRASH T 203 153 141 120 132 200 204 85 203	16 MWMT 12 NA 10 NB 15 NA 15 DA 16 NB 10 B8 15 NB 15 PO 10 NA	VEHICLES CW18 TW16 CE18 VN16 TE18 CW16 CS18 CW16 VS18	CAUSES 7128 7138 7138 7139 7138 727 103A 7110 7118 7131 103A 1110 112A 7110 682A 713B 727	OBJECTS 1 7268 839 8 7138 7298 4 532A 660 1 7268 839 4 123A 8 7278 862	SROAD (R BR R (M E S R R R R R	D D D D D D D D D D D D D D D D D D D	VE LIGHT DO B BF BF DO DO OF TF	WTHRa F F F F F F F F	JUNC TYP	ETRAFCTRI N N N N N N N N	ROAD MA SP C N R C C C C N N	20 LIM 30 30 30 50 50 50 50 50 50 50 50	CRASH FA (1 1 1 1 1 1 1 1	CRASH SE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	CRASH MI 0 0 1 0 0 0 0 0 0 0	ERS AG	E: PERS AGE 4 0 4 2 2 4 7 7 2 2 2 7	EASTING 1756375 1756375 1768800 1767887 1763499 1770407 1770330 1763778 1751590 1760267	IORTHING 5913149 5908576 5903775 5899156 5900363 5898235 5913152 5913252 5913487
CRASH T 203 153 141 120 132 200 204 85 203 163	IK MIVMT 12 NA 10 NB 15 NA 18 DA 18 NB 10 BB 15 NB 15 PO 10 NA 13 NA	VEHICLES CW18 TW1E CE18 VN1E TE18 CW1E CW1E CW1E VS18 CW1E CW1E	CAUSES 7128 7138 7138 7129 7138 7271 103A 1112 7118 7129 102A 1112 112A 7118 682A 7138 7276 7138 7276	OBJECTS 1 7268 839 8 7138 7298 4 532A 660 1 7268 839 4 123A 8 7278 862 8 830 902	SROAD (R BR R (M E S R R R R R R R	D D D D D D D D D D D D D D D D D D D	VE LIGHT DO B BF BF DO DO OF TI BF	WTHRa F F F F F F F F F F F	JUNC TYP	ETRAFCTRI N N N N N N N N N	ROAD MA SP C N R C C C C N C C N C C	20 LIM 0 50 50 50 50 50 50 50 50 50 50 50	RASH FA (1 1 1 1 1 1 1 1 1 1 1 1	CRASH SE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	CRASH MI 0 0 1 0 0 0 0 0 0 0 0 0	ERS AG	E: PERS AGE 4 0 4 2 4 7 2 2 2 7 6	EASTING 1 1758375 1788800 1767887 1763499 1770407 1770330 1763778 1751590 1760267 1760425	408THIN 5913149 5908576 590775 5899156 5900363 5898235 591352 5913252 5913252 5913487 5913711
CRASH T 203 153 141 120 132 200 204 85 203 163 110	18 MWWT 12 NA 10 NB 15 NA 15 DA 15 DA 16 NB 15 NB 15 NB 15 NB 15 NB 15 NB 15 NB 15 NA 13 NA	VEHICLES CW1E TW1E CELE VN1E CW1E CW1E CW1E CW1E CW1E CW1E CW1E CW	CAUSES 7128 7134 1154 7134 7138 7237 1034 1112 7138 7237 1024 1112 1024 1112 1124 7131 682A 7138 7276 7138 7276 7228 7277	OBJECTS / 7268 819 8 7138 729 4 532A 660 1 7268 839 4 123A 8 7278 862 8 830 902	SROAD (R BR R (M E S S R R R R R R R R	D D D D D D D D D D D D D D D D D D D	VE LIGHT DO 8 8/ 8/ 8/ 0/ DO 0/ 0/ 7/ 8/ 8/ 8/ 8/ 8/ 8/ 8/ 8/ 8/ 8/ 1/ 1/ 1/ 1/ 0/ 0/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/	WTHRa F F F F F F F F F F F F F	JUNC TYP	ETRAFCTRI N N N N N N N N N N	ROAD MA SP C N C C C C C C C N C C N C N	20 LIM 0 50 100 50 50 50 50 50 50 50 50 50 50 50 50	CRASH FA (1 1 1 1 1 1 1 1 1 1 1 1	CRASH SE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	CRASH MI 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ERS AG	E: PERS AGE 4 0 4 2 4 7 2 2 7 6 6	EASTING 1 1756375 1788800 1767887 1765499 1770407 1770330 1761378 1751590 1760426 1759986	408714180 5913149 5908576 5907775 5899156 5900361 5898235 5913152 5913252 5913487 5913711 5906969
CRASH T 203 153 141 120 132 200 204 85 203 163 110	18 MWWT 12 NA 10 NB 15 NA 15 DA 15 DA 15 NB 15 NB 15 NB 15 ND 10 NA 10 NA 10 NB	VEHICLES CW18 TW1E CE18 VN1E TE18 CW1E CW1E CW1E CW1E CW1E CN18 VS1E CW1E CN18	CAUSES 7128 7138 1154 7132 7138 7237 1034 1114 7138 7231 1024 1114 1124 7138 6824 7138 7237 7138 7277 7138 7276	OBJECTS / 17268 839 8 7138 7290 4 532A 660 1 7268 839 4 123A 8 7278 862 8 830 902 1	SROAD (R R R K M E S R R R R R R R R R R	D P P P P P P P P P P P P P P P P P P P	VE LIGHT DO B BI/ BF B/ DO DO OF T// BF BF DO	WTHRa # # # # # # # # # # # # #	JUNC TYP	ETRAFCTRI N N N N N N N N N N	ROAD MA SP C N C C C C C C C N C C N C C C C C C	POLIM 500 1000 500 500 500 500 500 500 500 500 500 500 500	RASH FA (1 1 1 1 1 1 1 1 1 1 1 1	CRASH SE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	CRASH MI 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ERS AG	E: PERS AGE 4 0 4 2 4 7 7 2 2 7 6 6 5	EASTING 1 1756175 1788800 1767887 1765499 1770407 1770380 1761778 1751590 1760426 1760426 1759986 1765918	408714186 5913149 5908576 5907775 5899156 5900363 5898235 5913152 5915252 5913487 5913711 5906969 5899597
CRASH T 203 153 141 120 200 204 85 203 163 110 180 170	10 MWWT 12 NA 10 NB 15 NA 13 DA 16 NB 10 08 15 NB 15 NB 15 NB 15 NB 15 NB 15 NB 10 NA 10 NA 10 NA	VEHICLES CW18 TW16 CE18 VN18 TE18 CW18 CW18 CW18 CW18 CW18 CW18 CW18 CW	CAUSES 7128 7134 1154 7132 7138 7237 1034 1114 7138 7131 1024 1114 1024 124 124 1024 124 124 1024 124 124 1024 124 124 1024 124 124 124 1024 124 124 124 124 124 124 124 124 124 1	OBJECTS / 17268 839 8 7138 7296 4 532A 660 1 7268 839 4 123A 8 7278 862 8 830 902 1	SROAD (R R R K M E S R R R R R R R R R R R	D D D D D D D D D D D D D D D D D D D	VE LIGHT DO B BF BF DO DO OF TF BF BF DO TF TF	WTHRa # # # # # # # # # # # # #	JUNC TYP	RTAFCTRI N N N N N N N N N N N N N N	ROAD MA SP C N C C C C C C N C C N C C N N C C N N	POLIM 500 1000 500 500 500 500 500 500 500 500 500 500 500 500 500	CRASH FA (1 1 1 1 1 1 1 1 1 1 1 1 1	CRASH SE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	CRASH MI 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ERS AG	E: PERS AGE 4 0 4 2 2 4 7 2 2 7 6 6 6 5 3	EASTING 1756375 1756375 1765499 1770407 1770407 177030 176330 1761378 1751590 1760425 175988 1769318 176093	408714186 5913149 5908576 5907775 5899156 5900363 5898235 5913152 5915252 5913487 5913711 5906969 5899597 5918167
CRASH T 203 153 141 120 132 200 204 85 203 163 110 180 180 180	10 MVWT 12 NA 10 NB 15 NA 13 DA 15 NB 16 NB 15 PO 10 NA 13 NA 10 NA 10 NA 10 NA 10 NA	VEHICLES CW1E TW1E CE1E VN1E CE1E CW1E CW1E CW1E CW1E CN1E CN1E CN1E CN1E CN1E CN1E CN1E CN	CAUSES 7128 7136 7138 7271 7138 7271 103A 111/ 7138 7271 102A 111/ 7138 7271 7138 7277 7138 7277 7138 7277 7138 7276 7138 7276 7138 7276	OBJECTS / 17268 839 8 7138 7296 4 532A 6600 1 7268 839 4 123A 8 7278 862 8 830 902 8 9 7278	ROAD (R R R R R R R R R R R R R R R R R R R	D D D D D D D D D D D D D D D D D D D	VE LIGHT DO B BF DO DO DO OF TF BF BF DO TF BF BF	WTHRa P F P F F F F F F F F F F F F F	JUNC TYP	R TRAF CTRI N N N N N N N N N N N N N N N N	ROAD MA SP C N C C C C C C N C C N C C N C C C C	0 LIM 6 50 100 50 50 50 50 50 50 50 50 50 50 50 50 5	CRASH FA (1 1 1 1 1 1 1 1 1 1 1 1 1	CRASH SE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	CRASH MI 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ERS AG	E: PERS AGE. 4 0 4 2 2 4 7 7 2 2 7 6 6 6 6 5 5 5 5 5 5	EASTING N 1756175 1768800 1767887 1763880 1770380 1770380 1770380 1751590 1760267 1760267 1760425 1759888 1759888 1759888 1759888 1759888 1759888 1759888	408714180 5913149 5908576 5993576 5899156 5900563 5898235 5913152 5913487 5913247 5913711 5905569 5899597 5918167 5905188
CRASH T 203 153 141 120 132 200 204 85 203 163 110 180 180 180 182	IN MVMT 12 NA 10 NB 15 NA 13 DA 15 DA 16 NB 10 DB 15 NB 15 PO 10 NA 13 NA 10 NA 10 NA 10 NB 10 NB	VEHICLES CW18 TW1E CL18 CW1E CW1E CW1E CW1E CW1E CW1E CW1E CW1E	CAUSES 7128 7136 115A 7129 7138 7271 103A 1112 7138 7271 103A 1112 102A 112 102A 112 100A 112 100A 112	OBJECTS / 17268 839 8 7138 7298 4 532A 660 1 7268 839 4 123A 6 7278 862 8 830 902 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ROAD (R R R R R R R R R R R R R R R R R R R	D D D D D D D D D D D D D D D D D D D	VE LIGHT DO B BF DF DO DO DO DO OF TF BF BF BF DO TF BF DO	WTHRa F F F F F F F F F F F F F	JUNC TYP	RTRAF CTRI N N N N N N N N N N N N N N N N N	ROAD MA SP C N R C C C C C C C N C C N C C C C C C	0 LIM 50 50 50 50 50 50 50 50 50 50 50 50 50 5	CRASH FA (1 1 1 1 1 1 1 1 1 1 1 1 1	CRASH SE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	CRASH MI 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ERS AG	E: PERS AGE 4 0 4 2 2 4 4 7 2 2 7 6 6 6 5 5 5 5 5 5	EASTING N 1756175 1788800 1767887 1763499 1770407 1770330 1761778 1760425 1760425 1760425 1760938 1760958 1	408714180 5913149 5908576 5993576 5997775 5899156 590583 5913152 5913487 5913487 5913487 5913487 5904503 5904503 5904503 5918167 5905188 5928846
CRASH T 203 153 141 120 200 204 85 203 163 163 180 180 180 180 182	IN MVMT 12 NA 10 NB 15 NA 15 NA 16 DA 16 NB 15 PO 10 NA 13 NA 10 NB 10 NB 10 NB 10 NB 10 NB 10 NB	VEHICLES CW18 TW1E CE18 CW1E CW1E CW1E CW1E CW1E CW1E CS18 CS18 CS18 CS18 CS18 CW1E CS18 CS18 CW18 CS18	CAUSES 7128 7136 7138 727 7138 727 7138 727 1034 111/ 7138 727 7138 7276 7138 7276 7138 7276 7138 7276 7138 7276 7138 7276 7138 7266 7138 7266 7138 7266 7138 7266 7138 7266 7138 7266	OBJECTS / 1 7268 839 8 7136 7298 4 532A 6600 1 7268 839 4 123A 8 7278 862 1 8 830 902 1 9 7278 8 9 7278 8 9 7278 8 9 7278 8 9 7278	5ROAD (8 8 8 8 8 8 6 6 8 8 8 8 8 8 8 8 8 8 8	D D D D D D D D D D D D D D D D D D D	VE LIGHT DO B B BF DO DO DO OF DO OF BF BF DO TF BF DO TF	WTHRa F F F F F F F F F F F F F	JUNC TYP	RTAFCTRI N N N N N N N N N N N N N N N N N N	ROAD MA SP C N R C C C C C C C C C C C C C C C C C	0 LIM 6 50 50 50 50 50 50 50 50 50 50 50 50 50	CRASH FA 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0RASH SE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	CRASH MI 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ERS AG	E: PERS AGE 4 0 4 2 2 4 7 2 2 7 6 6 5 5 5 5 5 5	EASTING 1 1758175 178807 178887 1763499 1770407 1770407 1770370 176129 176129 176129 176129 176029 176029 176918 176029 176029 1760284 175320 1756284	406714180 5913149 5908576 590775 5899156 5900363 5898235 5913525 5913252 5913252 5913487 5913711 590588 5899597 5914167 5905188 59028246 5907895
CRASH T 203 153 141 120 132 200 204 85 203 163 110 180 180 180 180 180 182 190 112	IN MVMT 12 NA 10 NB 15 NA 15 NA 15 NA 16 DA 16 NB 16 NA 10 NA 10 NB 10 NB 10 NB 10 NB 10 NB 15 NB 15 NB	VEHICLES CW18 TW16 CE18 CW18 CW18 CW18 CW18 CW18 CW18 CW18 CW	CAUSES 7128 7134 115A 7122 7138 727 103A 1112 7138 727 103A 1112 102A 1112 102A 1112 102A 1112 102A 1112 102A 1112 7138 7277 7138 7276 7138 7260 7138 7260 7138 7260 7138 7260	OBJECTS / 17268 839 8 7136 7296 4 5324 6600 7 7268 839 4 1234 8 7276 862 8 830 902 1 8 830 902 1 9 7278 8 830 902 1 9 7278 8 830 902 1 9 7278 8 830 902	5ROAD (8 8 8 8 8 8 6 8 8 8 8 8 8 8 8 8 8 8 8	D D D D D D D D D D D D D D D D D D D	VE LIGHT DO B B BF DO DO OF DO OF TF BF DO TF BF DO TF BF	WTHRa F F F F F F F F F F F F F	JUNC TYP	ETRAFCTRI N N N N N N N N N N N N N N N N N N N	ROAD MA SP C N R C C C C C C N C C N C C C C C C C	POLIM 6 50 50 50 50 50 50 50 50 50 50 50 50 50	CRASH FA (1 1 1 1 1 1 1 1 1 1 1 1 1	08ASH SE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	CRASH MI 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ERS AG	E: PERS AGE 4 0 4 2 2 4 4 7 7 6 6 5 5 3 3 5 5 5 5 5 4	EASTING N 1756375 178807 1787807 176499 1770407 1770380 1760497 1770380 1760497 1760407 1760407 1760407 1760407 1760408 1760408 17609888 1760988 17709888 17709888 1770988	408714180 5913149 5908576 5907775 5899356 5902563 5903235 5913525 5913525 5913525 5913487 5913711 5906969 5898997 5918167 590588 5907895 5905428
CRASH T 203 153 141 120 132 200 203 163 110 180 170 180 180 180 180 180 182 190 182 194	IN MVMIT 12 NA 10 NB 13 NA 13 DA 15 NA 13 DA 15 NB 15 NB 10 NA 10 NA 10 NB 10 NB 10 NB 10 NB 15 NB 15 NB 15 NB 15 NB	VEHICLES CW18 TW16 CE18 VN16 CE18 CW18 CW18 CW18 CW18 CW18 CW18 CS18 VE18 CS18 VW18 CS18 VW18 CS18 VW18 CS18 VW18 CS18	CAUSES 7128 7134 115A 7122 7138 727 103A 1112 7138 7271 102A 1112 102A 1112 102A 1112 102A 1112 112A 7136 7138 7276 7138 7276 7138 7266 7138 7277 7138 7277	OBJECTS 1 7268 839 8 7138 7291 4 532A 660 1 7268 839 4 123A 8 7278 862 8 830 902 1 7278 862 1 8 7138 7279 8 7138 7279 8 7138 7278	5ROAD (R 5R 8R 8R 8 8 8 8 8 8 8 8 8 8 8 8 8	D D D D D D D D D D D D D D D D D D D	VE LIGHT DO B B BF BF DO DO DO OF T7 T9 BF BF DO DO T6 BF BF BF BF BR BN	WTHR8 P F P F F F F F F F F F F F F F	JUNC TYP	ETRAFCTRI N N N N N N N N N N N N N N N N N N N	ROAD MA SP C N R C C C C C C N C C N C C N C C N C C N N C	X0 LIM (50 100 50 50 50 50 50 50 50 50 50	CRASH FA 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	CRASH SE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	CRASH MI 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ERS AG	E: PERS AGE 4 0 4 2 2 4 4 7 7 2 2 2 7 6 6 6 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	EASTING 1 1758175 178807 178807 178787 1785499 1770407 1770407 17705499 1770407 1770549 1770518 1770598 1760593 17605918 17605918 1760593 1760593 1760593 1760593 1760593	408714180 5913149 5903576 5991515 5990563 5898235 5913152 5913252 5913252 5913252 5913271 590588 5899597 5918167 590588 590588 590588 590588 59058428 5902057
CRASH T 201 153 141 120 132 200 203 163 110 180 170 180 180 182 190 182 190 112	III MVMIT 12 NA 10 NB 13 NA 13 DA 15 NA 15 NA 15 NB 15 NB 15 NB 15 NB 16 NA 10 NA 10 NB 10 NA 10 NB 10 NA 10 NB 15 NA 15 NA 15 NA 15 NA 15 NA 15 NA 15 NA 15 NA	VEHICLES CW18 TW16 CR18 VN16 TE18 CW18 CW18 CW18 CW18 CW18 CW18 CW18 CS18 VE18 VE18 VE18 VE18 VE18 VE18 VE18 VE	CAUSES 7128 7134 115A 7129 7138 727 103A 111J 7138 727 103A 111J 7138 7231 102A 111J 102A 111J 102A 111J 102A 111J 103A 111J 7138 7277 7138 7276 7138 7277 7138 7276 7138 7277 7138 7277	OBJECTS / 17268 839 8 7138 7291 4 532A 660 1 7268 839 4 123A 8 7278 862 8 830 902 1 8 7138 7278 8 7138 7278 1 8 7278 639 1 6	5ROAD (R 8R 8 8 8 8 8 8 8 8 8 8 8 8 8	D P P P P P P P P P P P P P P P P P P P	VE LIGHT DO B B BF BF DO DO DO DO DO DO DO DO TT BF BF BF BN DO DO TF BF BN DO	WTHR8 P F P F F F F F F F F F F F F F	JUNC TYP	E TRAF CTRI N N N N N N N N N N N N N N N N N N N	ROAD MA SP C N R C C C C C C N C C N C C C C C C C	0 LIM 6 50 100 50 50 50 50 50 50 50 50 50 50 50 50 5	CRASH FA (1 1 1 1 1 1 1 1 1 1 1 1 1	CRASH SE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	CRASH MI 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 1 1	E: PERS AGE 4 0 4 2 2 4 4 7 2 2 2 7 6 6 6 6 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	EASTING 1 1758175 178807 178787 1765499 1770407 1770407 1770407 1770378 1751590 1760287 1760287 1760598 1760598 17605918 1770407 177040000000000	4087141NC 5913149 5903576 5907775 5899356 5900361 5898235 5913252 5913252 5913252 5913487 5913711 5905488 599591 591388 5928846 5907895 5902857 5902658
CRASH T 203 153 141 120 2200 2204 85 2203 163 110 180 180 180 182 190 112 134 231	IN MVMIT 12 NA 10 NB 15 NA 13 DA 14 NB 15 NB 15 NB 15 NB 15 NB 10 NA 10 NA 10 NA 10 NB 15 NB 15 NA 17 NA 15 NA 17 NA 15 PO 10 NB	VEHICLES CW18 TW16 CE18 VN16 CE18 CW18 CW18 CW18 CW18 CW18 CW18 CS18 VE18 CS18 VW18 CS18 VW18 CS18 VW18 CS18 VW18 CS18	CAUSES 7128 7134 115A 7122 7138 727 103A 1112 7138 7271 102A 1112 102A 1112 102A 1112 102A 1112 112A 7136 7138 7276 7138 7276 7138 7266 7138 7277 7138 7277	OBJECTS 1 7268 839 8 7136 7291 4 532A 660 1 7268 839 4 123A 8 7276 862 8 830 902 8 7278 830 9 7278 8 7278 839 1 E	5ROAD (R 5R 8R 8R 8 8 8 8 8 8 8 8 8 8 8 8 8	D D D D D D D D D D D D D D D D D D D	VE LIGHT DO B B BF BF DO DO DO OF T7 T9 BF BF DO DO T6 BF BF BF BF BR BN	WTHR8 P F P F F F F F F F F F F F F F	JUNC TYP	ETRAFCTRI N N N N N N N N N N N N N N N N N N N	ROAD MA SP C N R C C C C C C N C C N C C N C C N C C N N C	X0 LIM (50 100 50 50 50 50 50 50 50 50 50	CRASH FA 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	CRASH SE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	CRASH MI 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	E: PERS AGE 4 0 4 2 2 4 4 7 2 2 2 7 6 6 6 6 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	EASTING 1 1758175 178807 178807 178787 1785499 1770407 1770407 17705499 1770407 1770549 1770518 1770598 1760593 17605918 17605918 1760593 1760593 1760593 1760593 1760593	4087141NC 5913149 5908576 5907775 58993266 5900563 5898235 5913487 5913471 5913471 5913471 5913471 5913471 5913471 5913471 5913471 5913471 5913475 5913467 5905188 590280428 59028057 5902655 5902057



- Save the Excel Workbook with a relevant title
 - Means when you input into ArcGIS, you know what data you are working with
- **1. Title** each Workbook clearly, including the sheet (i.e Fatal crashes)
- Always save to a clear folder on your USB (File> Save as)
- 3. Save as an older version of Excel to ensure compatibility (97-2003 Workbook is suitable)

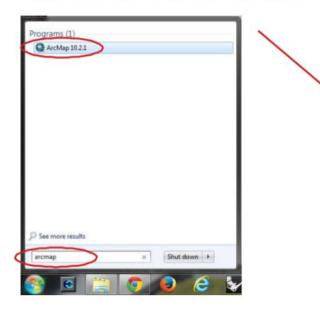
Repeat the whole sort > new workbook process for each category of information you want to input into ArcGIS (i.e crash severe and crash minor)







Open ArcMap by searching "arcmap" in the Start Menu and selecting it.

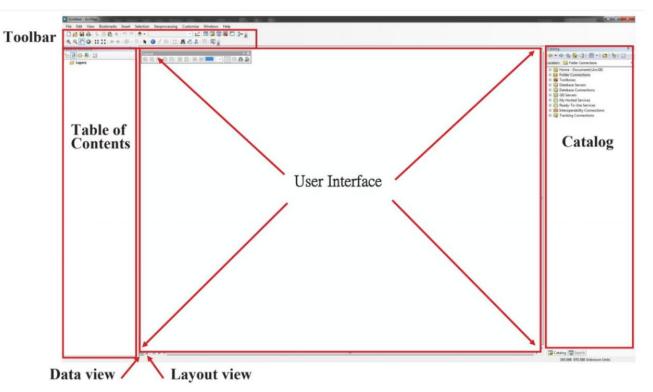


Select *My Templates* from the lefthand menu that pops up, and select *Blank Map*. Click OK.











- **1.** Retrieve and prepare your geospatial data
 - e.g. basemap data, object of study (e.g. statistics, crash data)
- **2.** Import the data into ArcMap (Data view)
- 3. Visually configure spatial data (Data view)
 - e.g. design map showing different points of interest
- 4. Prepare for presentation/printing (Layout View)



Useful sources of geospatial data:

- Auckland GeoMaps specific to Auckland <u>https://geomapspublic.aucklandcouncil.govt.nz/</u>
- GeoDataHub (only for UoA)
 https://geodatahub.library.auckland.ac.nz/
- Land Information New Zealand Data Service
 <u>https://data.linz.govt.nz/</u>
- Stats NZ
- ...And many more with a little Google search!

"Geospatial data"

- Is information related to geography (e.g. physical or human).
- Can be spatially expressed (e.g. map).
- Uses a geographic reference (e.g. coordinates,eastings etc.)



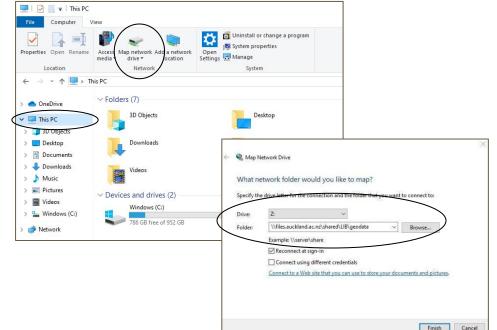
Access the GeoDataHub on University Computers:

- Open File Explorer from bottom task bar (on Windows setup)
- 2. Right-click This PC from the left pane
- 3. Select Map network drive.
- **4.** On the pop-up window, select a drive letter (e.g. Z:) and insert the following link:

\\files.auckland.ac.nz\shared\LIB\geodata

5. Select Finish.

GeoDataHub should now appear under your linked networks under This PC.





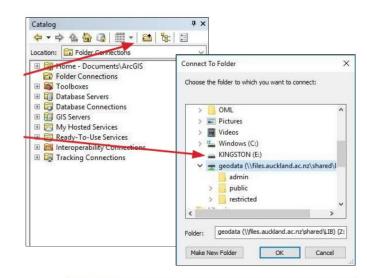


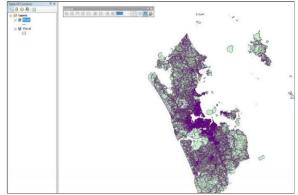
Importing GeoDataHub into ArcMap:

- 1. On ArcMap, go to **Catalog** (right side of screen).
- 2. Select Folder Connections. In the pop-up window, find the folder link to GeoDataHub.
- Once selected, the GeoDataHub should appear in your Catalog under Folder Connections.
- **4.** Drag and drop geospatial data you wish to include the centre of the screen.

For example, add parcel data:

- In your GeoDataHub folder, navigate to restricted > Auckland > AucklandCouncil_data > property > 2013_property_address
- **2.** Drag the Parcel.shp file into the centre of the screen.









Add Data

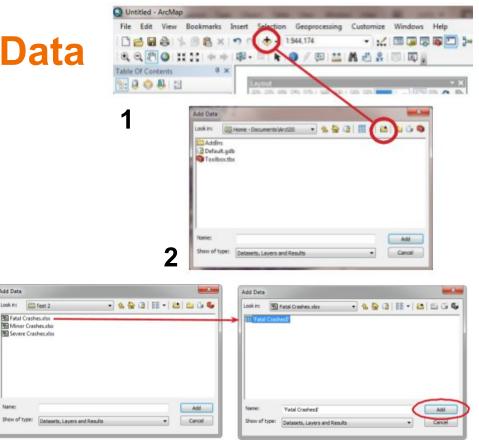
Look in:

Name:

3

Note: In order to have separate symbols for different categories of data in ArcMap, they must be in separate Excel files. They must be saved in the .xlsx (Excel Workbook) file format.

- 1. Select the Add Data button located in the menu bar
- 2. Click **Connect to Folder**, and navigate to the place you saved the Excel Workbook(s)
- 3. **Double click** one Workbook
- 4. Select the **only** sheet that appears (only one should appear)

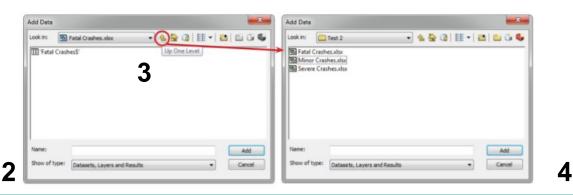


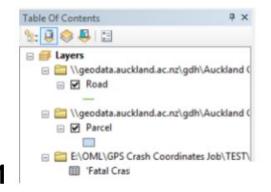
Δ

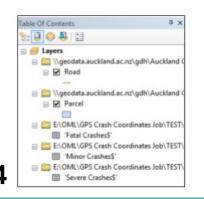




- 1. The sheet will now appear in your **Table of Contents**. From now on these sheets are referred to as tables
- 2. **Repeat** the steps from the previous slide for however many workbooks you have
- **3. TIP:** Use the UP arrow to get to the previous folder to select another workbook.
- **4.** What your table of contents might look like when complete









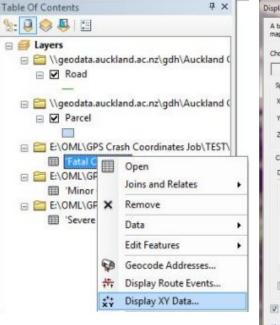
Plotting XY points (placement of data)

1. Right click on one of the tables and select Display XY Data

ArcGIS

- In the pop-up window, select EASTING for the X Field. Select NORTHING for the Y Field
- **3.** You must also select the **Coordinate System** we want the data to use (differs worldwide)
- It is likely that the coordinate system will already be set, as the Parcel.shp and Road.shp files set a default system shown (far right)...
- If not, select Edit... and navigate to Projected
 Coordinate Systems > National Grids >
 New Zealand > Select NZGC 2000 New
 Zealand Transverse Mercator

Repeat these steps for each table that requires points on the map. They will each appear once complete.



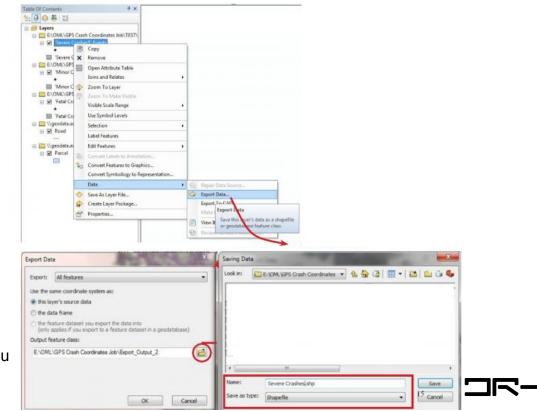
hoose a tabl	e from the map or browse for a	nother table:
Aucklan	d_Severe_Crashes	*
Specify the	fields for the X, Y and Z coordin	ates:
X Field:	LASTING	-
Y Field:	NORTHING	24
Z Field:	<none></none>	
Description Projected Name: N Geograph	Coordinate System: ZGD_2000_New_Zealand_Trans ic Coordinate System:	werse_Mercat
Description Projected Name: N Geograph	: Coordinate System: 2GD_2000_New_Zealand_Trans	werse_Mercat
Description Projected Name: N Geograph	: Coordinate System: 2GD_2000_New_Zealand_Trans ic Coordinate System:	werse_Mercat
Description Projected Name: N Geograph	s Coordinate System: 2GD_2000_New_Zealand_Trans ic Coordinate System: CS_NZGO_2000 111	werse_Mercat



Exporting the Points as Shapefiles

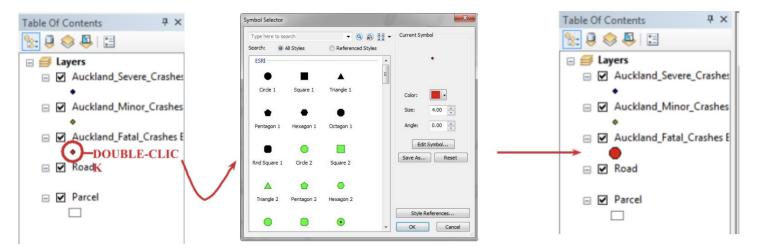
Note: In order to use the data you've already plotted and to ensure you can re-access it, it is vital to export and save the files as shapefiles **(.shp).**

- Right click on a layer in the Table of Contents, select Data > Export Data...
- Browse to select the **folder** you want to save the shapefile to (keep it on your USB again)
- 3. Rename file and ensure Save type is Shapefile.
- When asked if you would like to add the exported layer to the map, select yes.You can then delete the 'table' layer if you wish to keep the Table of Contents tidy.



ArcGIS Visually configure spatial data

- You can configure the appearance of spatial data. Editing the symbology is critical in determining how information is visualised- legibility & impact.
- 1. In the Table of Contents, double-click on the small symbol icon under the layer name
- 2. Adjust in the pop-up window
- 3. Click OK to apply the changes

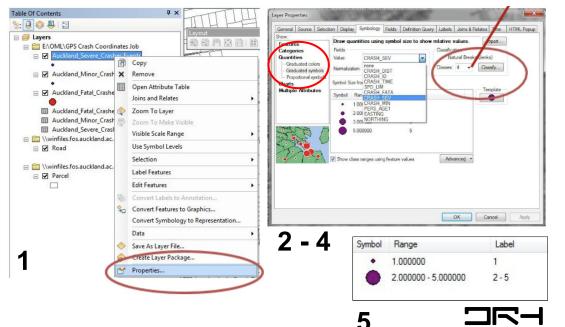


Visually configure spatial data (cont.)

- You can also create 'Graduated Symbols'
- This makes higher data values appear larger (i.e the more serious the car crash, the bigger the symbol)
- Right click on the chosen layer in the Table of Contents > Select Properties
- 2. In the pop-up window, select Symbology

ArcGIS

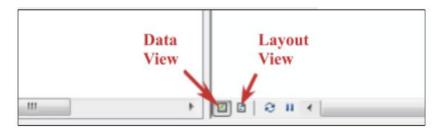
- 3. Right hand side, select Quantities> Graduated Symbols
- 4. In value, select the relevant layer
- 5. Under classification, classes refers to the number of the different types of dots (i.e if you have 5 different brackets of minor crashes, you could put 5 so each is represented by a different size dot. Alternatively, you could put 2, and will appear as a scale (see right).





Key tips:

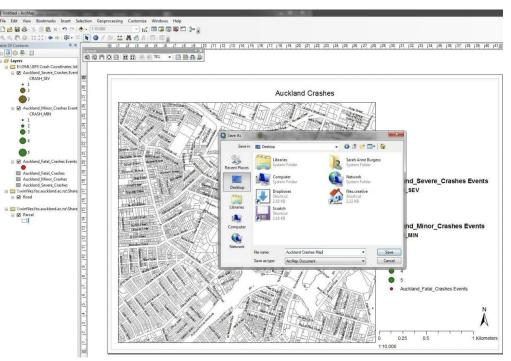
- In the top menu, navigate to File > Page and Print Setup to change paper size and orientation
- In ArcMap, there are two different views, which are accessed by buttons on the bottom left corner of the screen: **Data View** (where all our editing has been done) and the **Layout View** (where you create a map- shows frame).
- In the top menu, navigate to Insert to add features e.g. title, legend, scale





Key tips:

- File > Save As...
- Recommend that you export the map as a .pdf:
 File > Export > PDF
- Open the .pdf one you've saved to print





For more about TR- drh.nz 0 drh.nz