POWER QUERY: INTRODUCTION

Crime Data Analyst Svetlana Gubin,
Oakland PD

International Association Crime Analysts

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Instructor & Course Introduction

Svetlana Gubin, Oakland PD

(510)238-2017

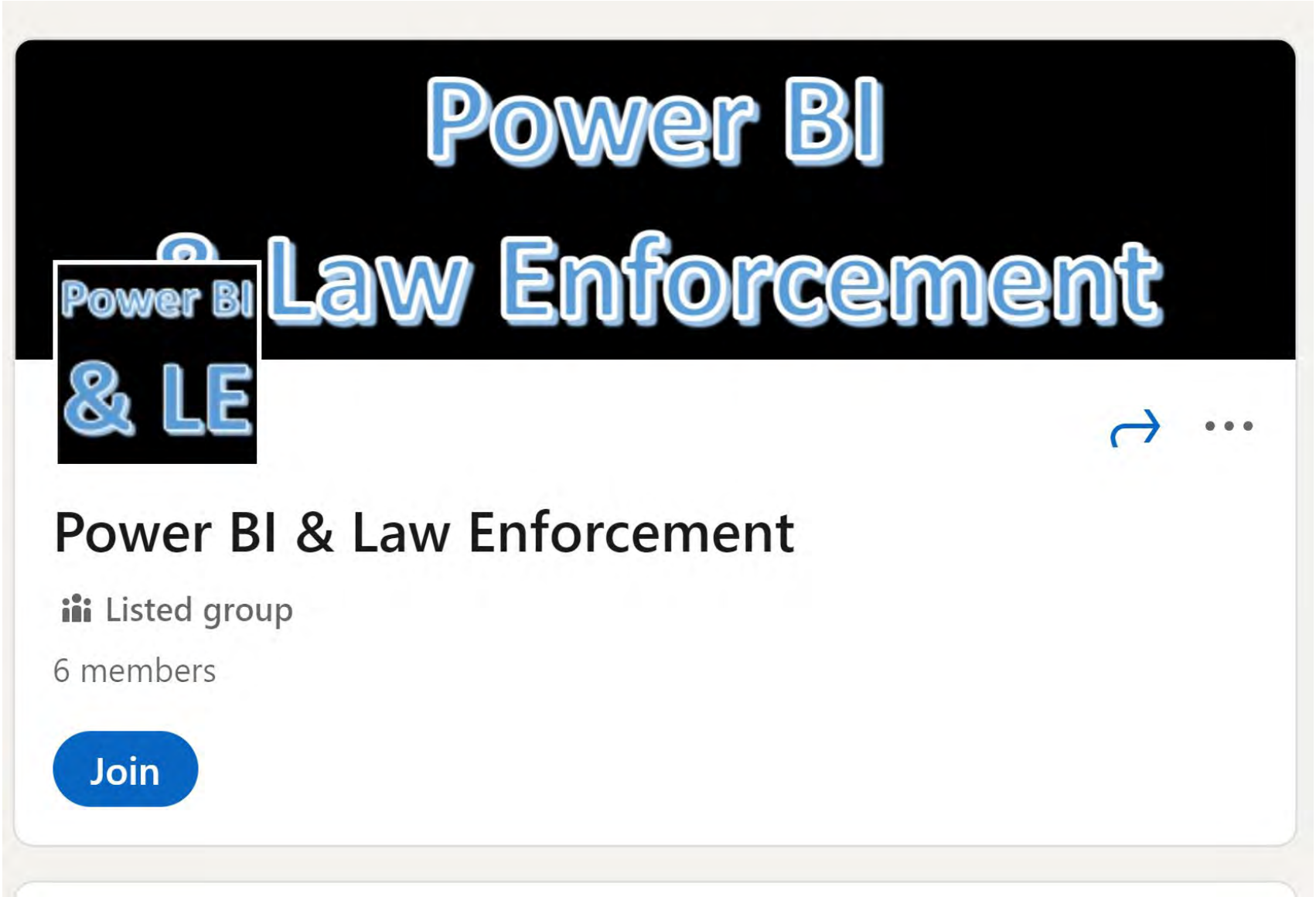
Sgubin@OaklandCA.gov

Power Query

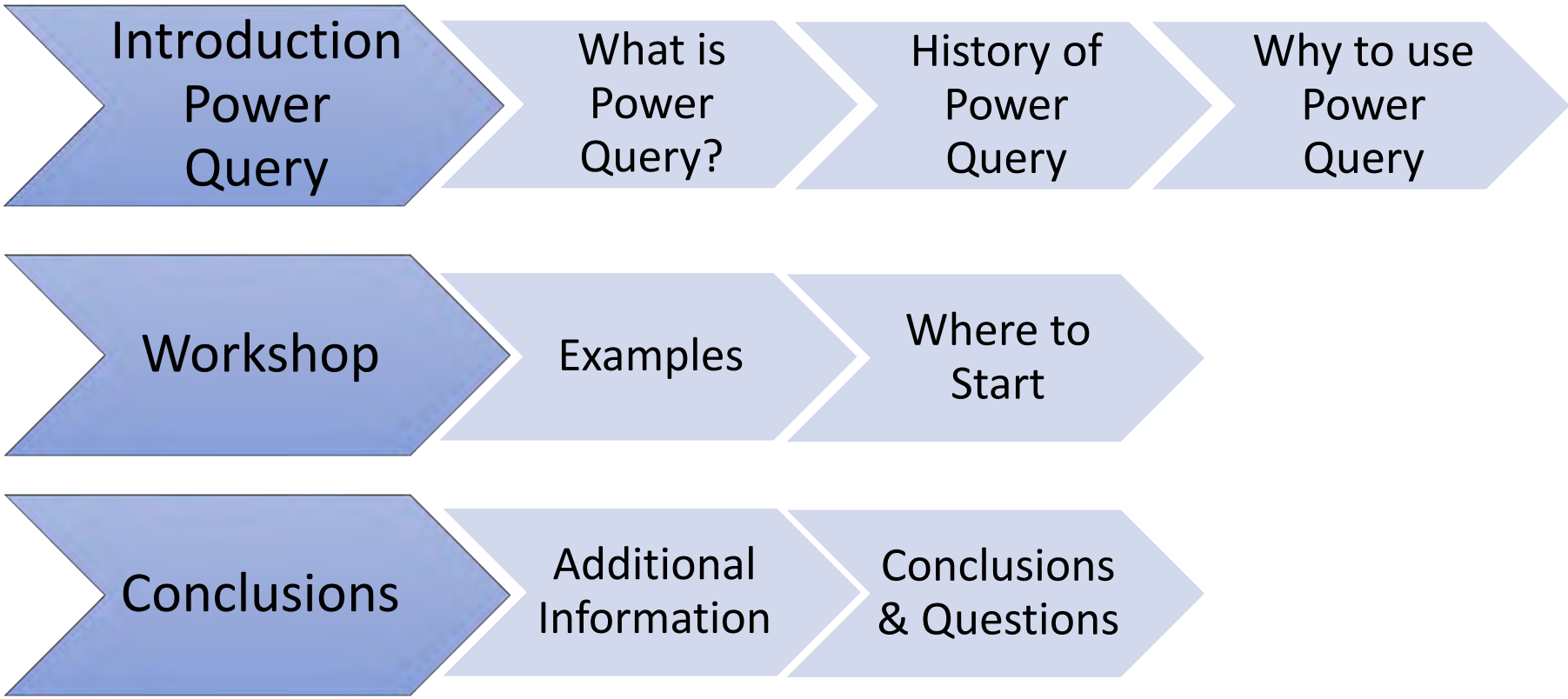
- ✓ Power Query documentation
  https://docs.microsoft.com/en-us/power-query
- ✓ Power Query M Language documentation
  https://learn.microsoft.com/en-us/powerquery-m/power-query-m-language-specification

Power BI Group for Law Enforcement

https://www.linkedin.com/groups/9262068/



Contents


Introduction Power Query
What is Power Query?
History of Power Query
Why to use Power Query
Workshop
Examples
Where to Start
Conclusions
Additional Information
Conclusions & Questions

Power Query - What is Power Query?

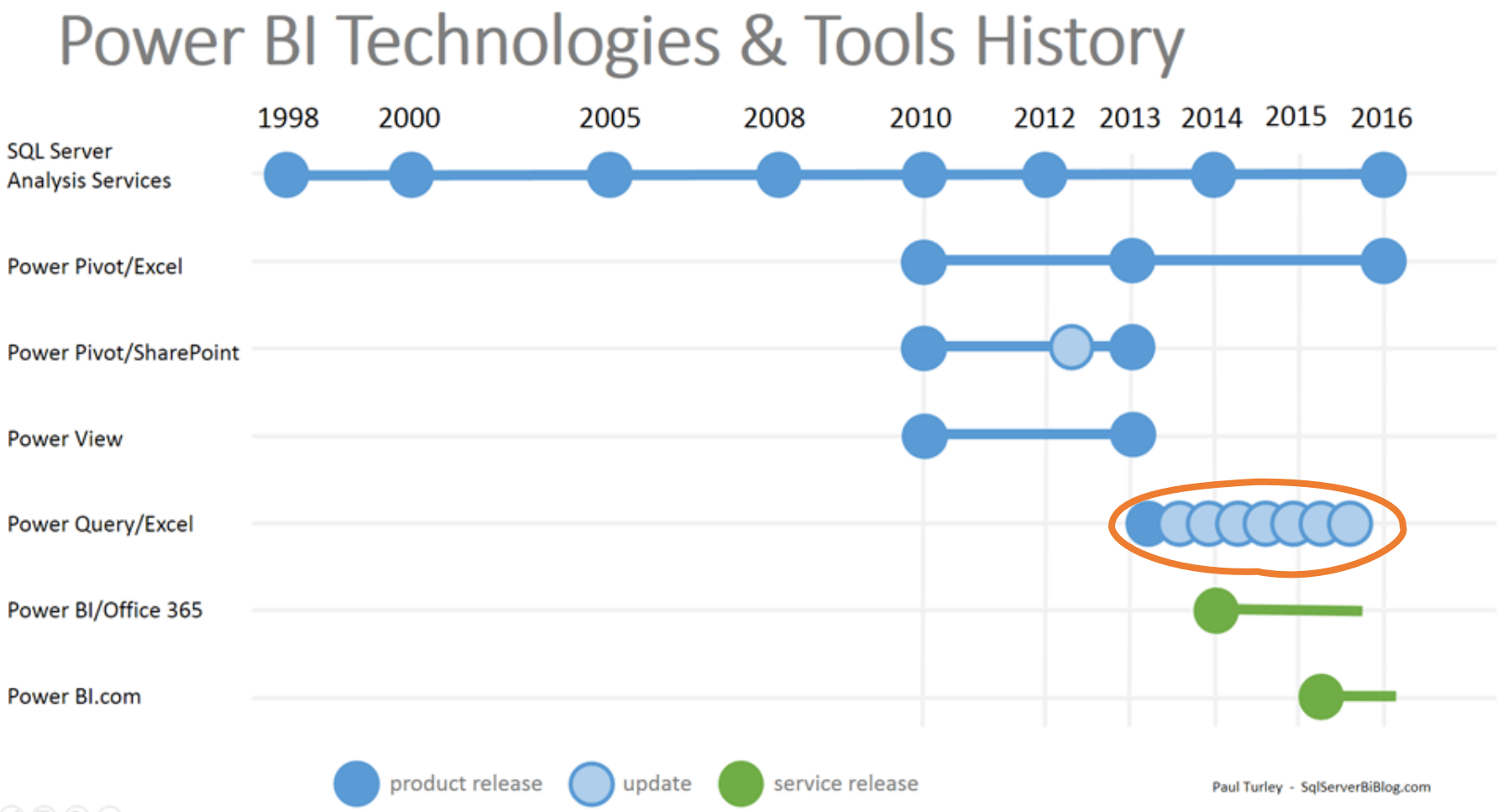
- ✓ Power Query is the most powerful data automation tool found in Excel 2010 and later

- ✓ Power Query is an application for transforming and preparing data:
  - ✓ Import data from any number of sources
  - ✓ Clean data
  - ✓ Transform data,
  - ✓ Reshape data according to your needs

- ✓ The query can be set only once and re-used later by refreshing the data

- ✓ Power Query has several useful features such as:
  - ✓ the appending of data and creating relationships between different data sets such as:
    - ✓ merging of the data sets
    - ✓ grouping and summarizing data

Power Query - History



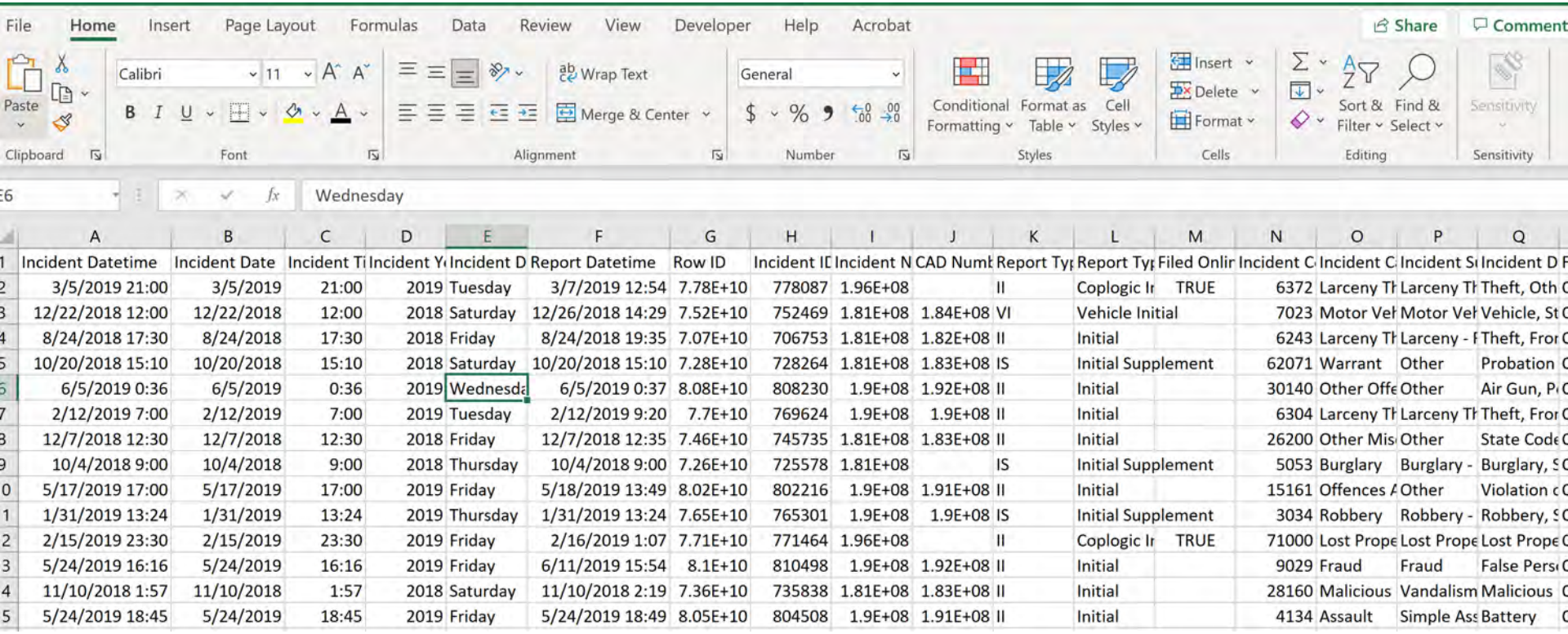
https://sqlserverbi.blog/2015/07/21/power-bi-self-service-and-governed-data-solutions/

Power Query - Why to use Power Query

- ✓ Selection of tools for transforming data and bringing them together to analyze
- ✓ Reducing manual work and saving time
- ✓ Refreshing and updating data quickly
- ✓ Speed and efficiency
- ✓ Does not affect the original file
- ✓ Power Query is reusable
- ✓ Power Query is modified by using the Edit option
- ✓ Power Query can connect to many data sources and retain a connection to them
- ✓ By refreshing the data, all transformation steps can be applied immediately

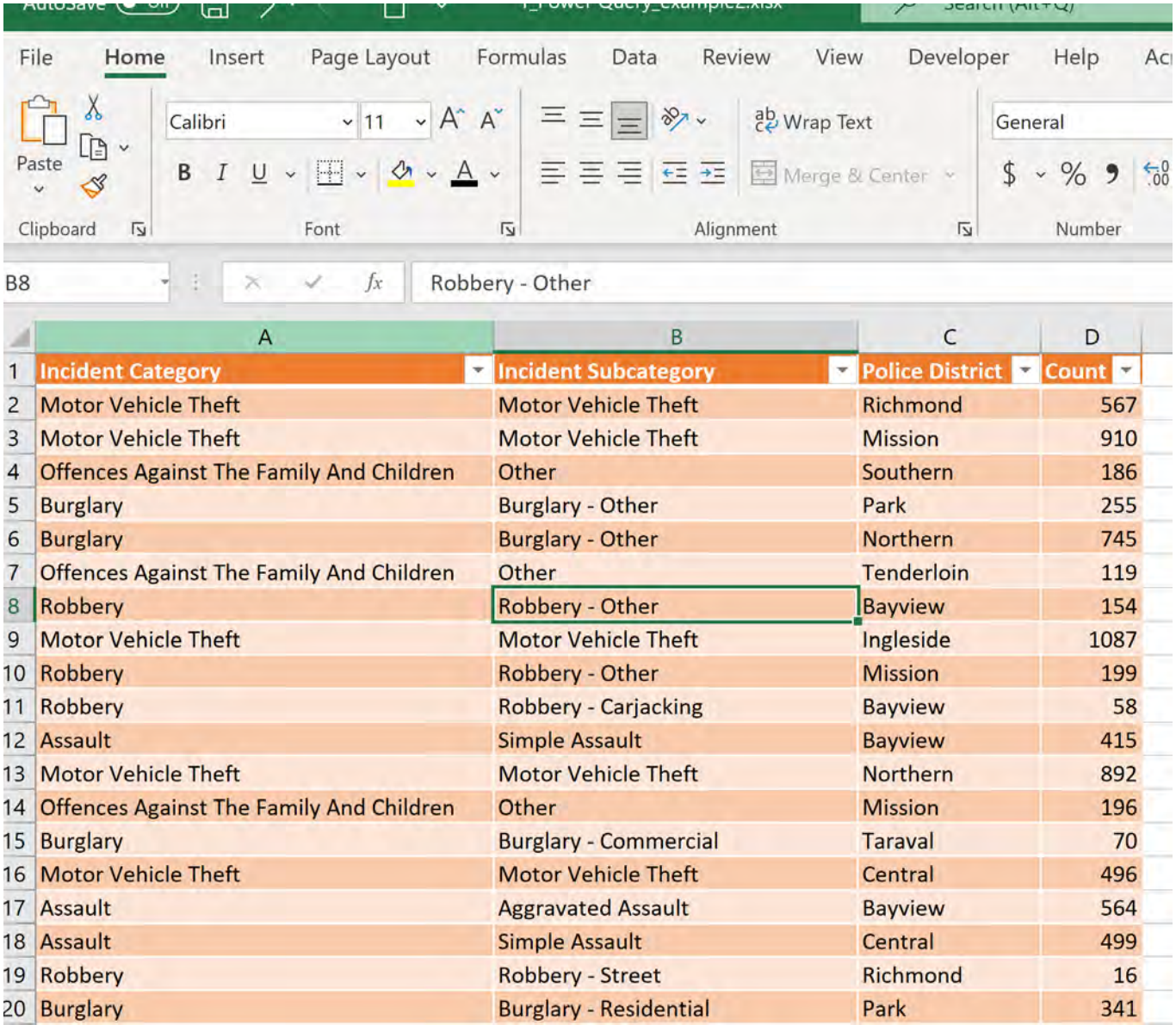
https://excelinexcel.in/ms-excel/articles/power-query-for-excel/

POWER QUERY - EXAMPLES



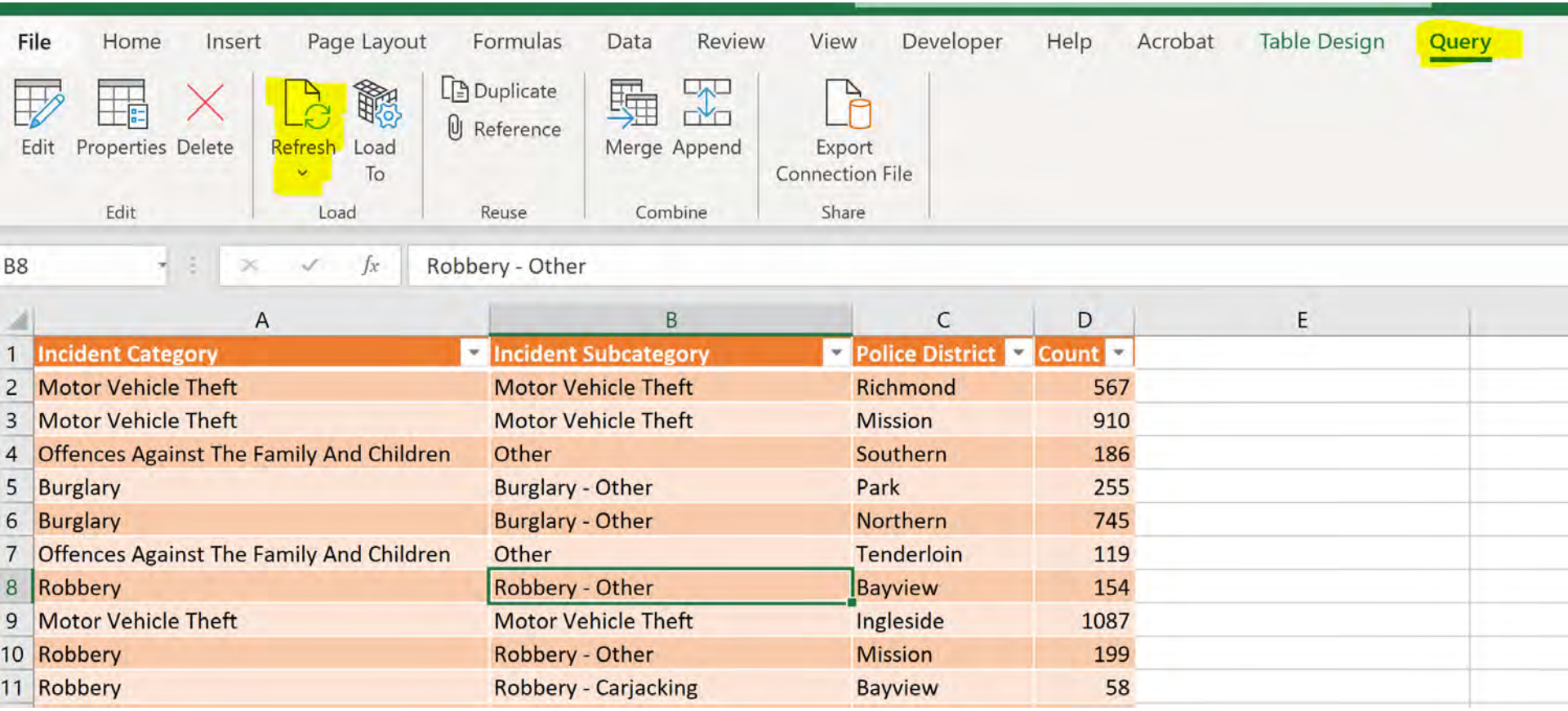
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Incident Datetime	Incident Date	Incident Ti	Incident Y	Incident D	Report Datetime	Row ID	Incident ID	Incident N	CAD Numb	Report Typ	Report Typ	Filed Onlir	Incident C	Incident C	Incident St	Incident D
2	3/5/2019 21:00	3/5/2019	21:00	2019	Tuesday	3/7/2019 12:54	7.78E+10	778087	1.96E+08		II	Coplogic Ir	TRUE	6372	Larceny Th	Larceny Th	Theft, Oth
3	12/22/2018 12:00	12/22/2018	12:00	2018	Saturday	12/26/2018 14:29	7.52E+10	752469	1.81E+08	1.84E+08	VI	Vehicle Initial		7023	Motor Veh	Motor Veh	Vehicle, St
4	8/24/2018 17:30	8/24/2018	17:30	2018	Friday	8/24/2018 19:35	7.07E+10	706753	1.81E+08	1.82E+08	II	Initial		6243	Larceny Th	Larceny - F	Theft, Fror
5	10/20/2018 15:10	10/20/2018	15:10	2018	Saturday	10/20/2018 15:10	7.28E+10	728264	1.81E+08	1.83E+08	IS	Initial Supplement		62071	Warrant	Other	Probation
6	6/5/2019 0:36	6/5/2019	0:36	2019	Wednesda	6/5/2019 0:37	8.08E+10	808230	1.9E+08	1.92E+08	II	Initial		30140	Other Offe	Other	Air Gun, P
7	2/12/2019 7:00	2/12/2019	7:00	2019	Tuesday	2/12/2019 9:20	7.7E+10	769624	1.9E+08	1.9E+08	II	Initial		6304	Larceny Th	Larceny Th	Theft, Fror
8	12/7/2018 12:30	12/7/2018	12:30	2018	Friday	12/7/2018 12:35	7.46E+10	745735	1.81E+08	1.83E+08	II	Initial		26200	Other Mis	Other	State Code
9	10/4/2018 9:00	10/4/2018	9:00	2018	Thursday	10/4/2018 9:00	7.26E+10	725578	1.81E+08		IS	Initial Supplement		5053	Burglary	Burglary -	Burglary, S
10	5/17/2019 17:00	5/17/2019	17:00	2019	Friday	5/18/2019 13:49	8.02E+10	802216	1.9E+08	1.91E+08	II	Initial		15161	Offences A	Other	Violation c
11	1/31/2019 13:24	1/31/2019	13:24	2019	Thursday	1/31/2019 13:24	7.65E+10	765301	1.9E+08	1.9E+08	IS	Initial Supplement		3034	Robbery	Robbery -	Robbery, S
12	2/15/2019 23:30	2/15/2019	23:30	2019	Friday	2/16/2019 1:07	7.71E+10	771464	1.96E+08		II	Coplogic Ir	TRUE	71000	Lost Prope	Lost Prope	Lost Prope
13	5/24/2019 16:16	5/24/2019	16:16	2019	Friday	6/11/2019 15:54	8.1E+10	810498	1.9E+08	1.92E+08	II	Initial		9029	Fraud	Fraud	False Pers
14	11/10/2018 1:57	11/10/2018	1:57	2018	Saturday	11/10/2018 2:19	7.36E+10	735838	1.81E+08	1.83E+08	II	Initial		28160	Malicious	Vandalism	Malicious
15	5/24/2019 18:45	5/24/2019	18:45	2019	Friday	5/24/2019 18:49	8.05E+10	804508	1.9E+08	1.91E+08	II	Initial		4134	Assault	Simple Ass	Battery

Power Query - Examples



	A	B	C	D
1	Incident Category	Incident Subcategory	Police District	Count
2	Motor Vehicle Theft	Motor Vehicle Theft	Richmond	567
3	Motor Vehicle Theft	Motor Vehicle Theft	Mission	910
4	Offences Against The Family And Children	Other	Southern	186
5	Burglary	Burglary - Other	Park	255
6	Burglary	Burglary - Other	Northern	745
7	Offences Against The Family And Children	Other	Tenderloin	119
8	Robbery	Robbery - Other	Bayview	154
9	Motor Vehicle Theft	Motor Vehicle Theft	Ingleside	1087
10	Robbery	Robbery - Other	Mission	199
11	Robbery	Robbery - Carjacking	Bayview	58
12	Assault	Simple Assault	Bayview	415
13	Motor Vehicle Theft	Motor Vehicle Theft	Northern	892
14	Offences Against The Family And Children	Other	Mission	196
15	Burglary	Burglary - Commercial	Taraval	70
16	Motor Vehicle Theft	Motor Vehicle Theft	Central	496
17	Assault	Aggravated Assault	Bayview	564
18	Assault	Simple Assault	Central	499
19	Robbery	Robbery - Street	Richmond	16
20	Burglary	Burglary - Residential	Park	341

POWER QUERY - EXAMPLES



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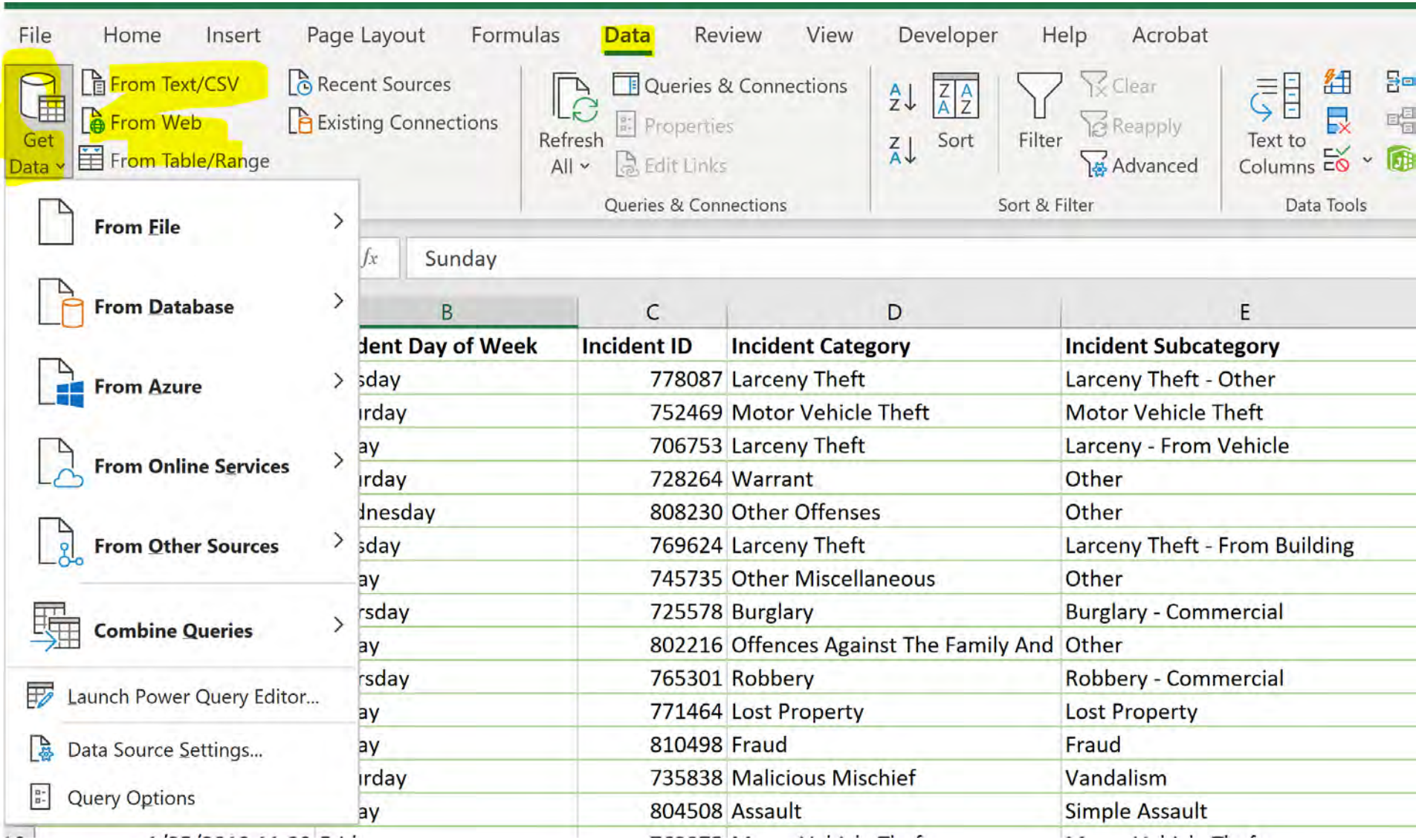
10	Robbery	Robbery - Other	Mission	199	
11	Robbery	Robbery - Carjacking	Bayview	58	

Power Query – Where to Start



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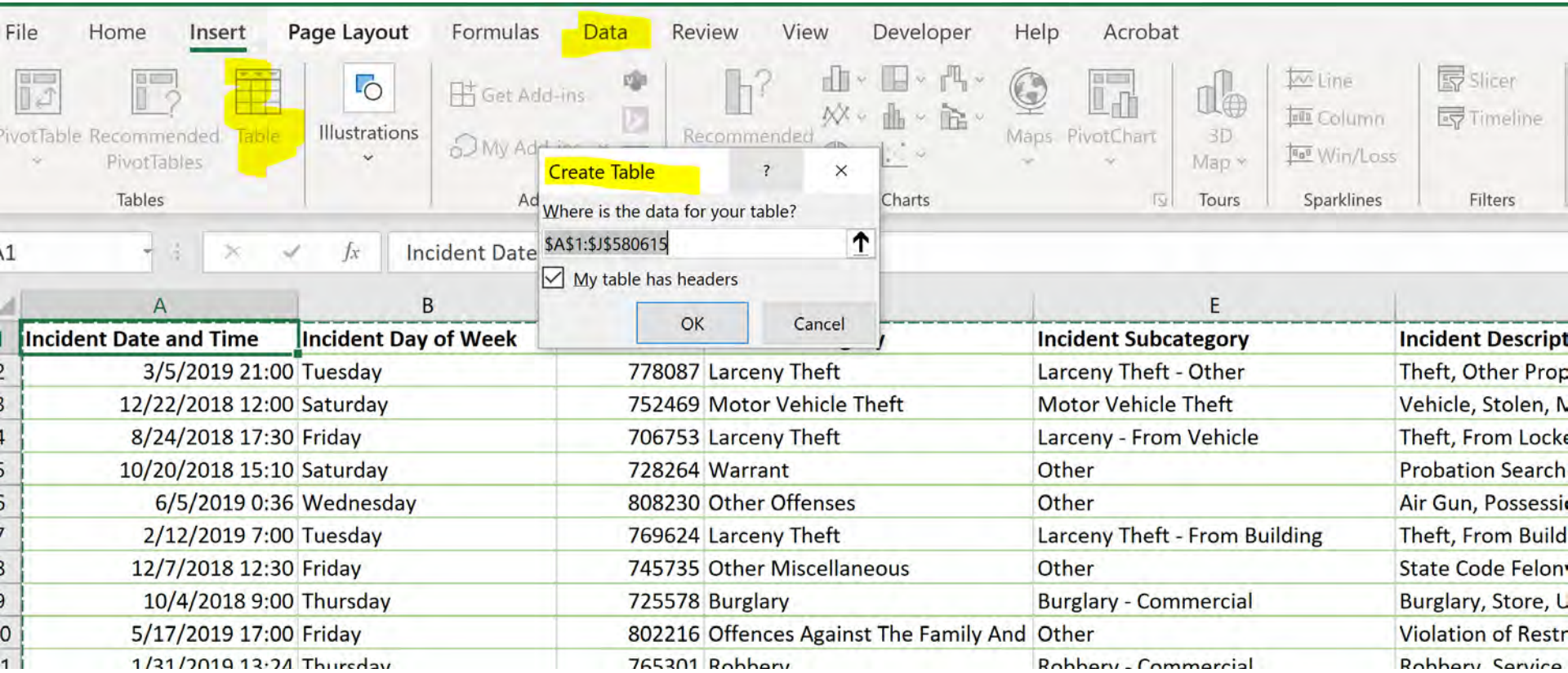
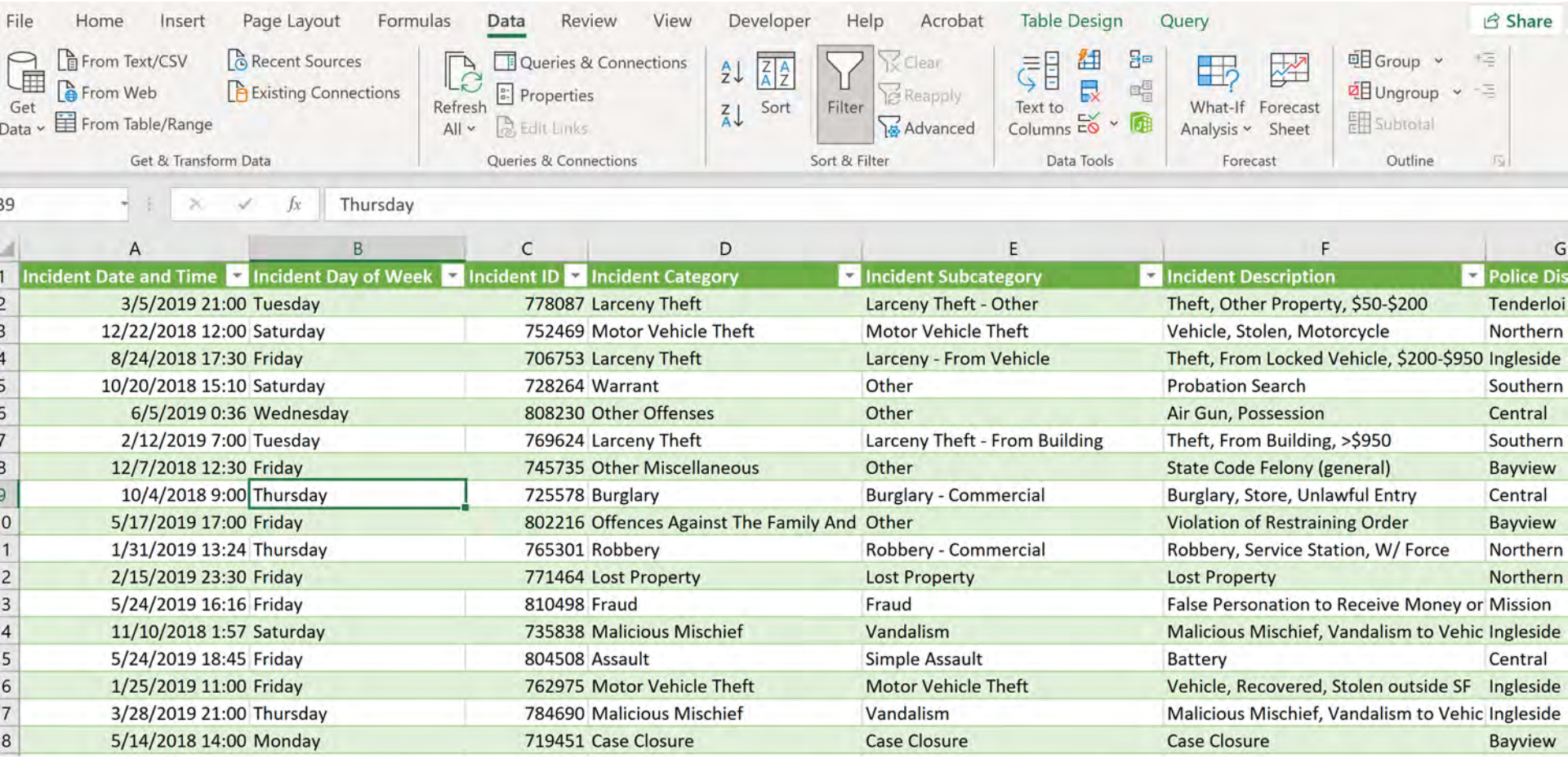
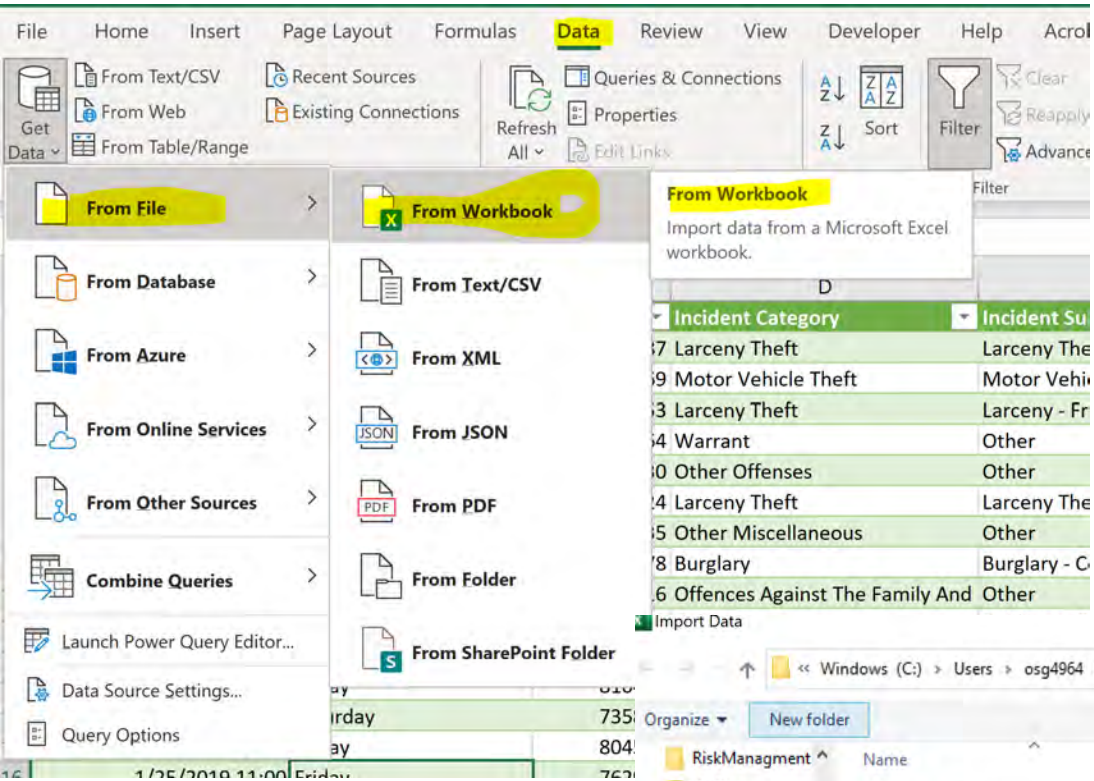


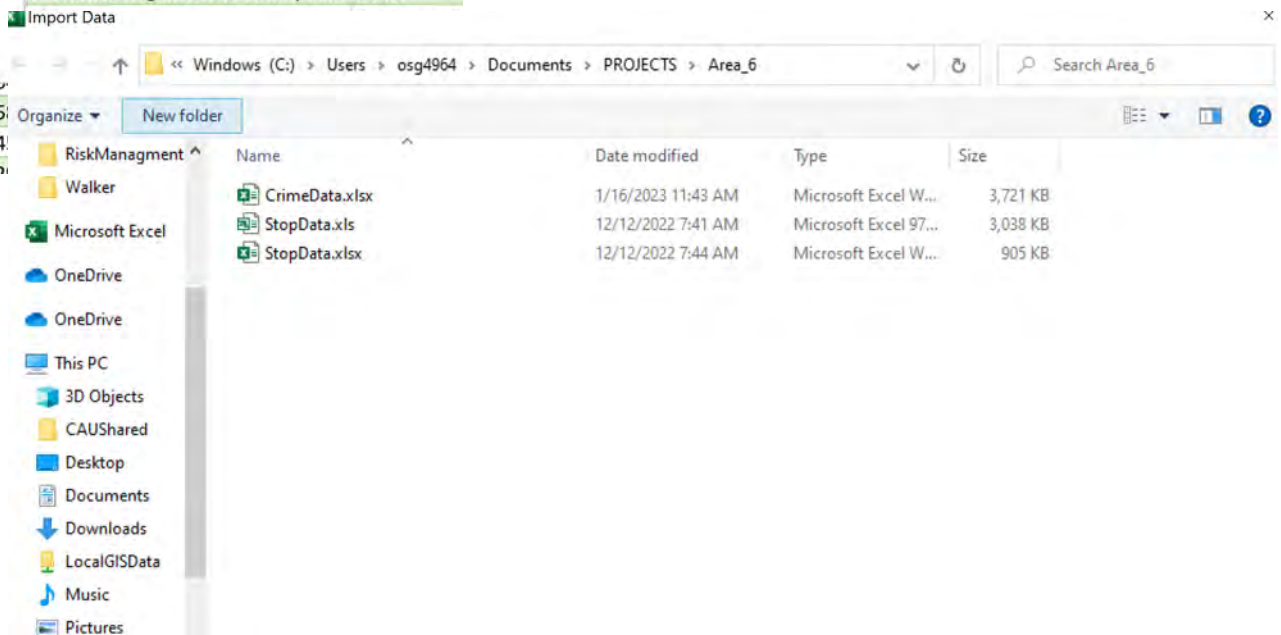
Power Query – Where to Start



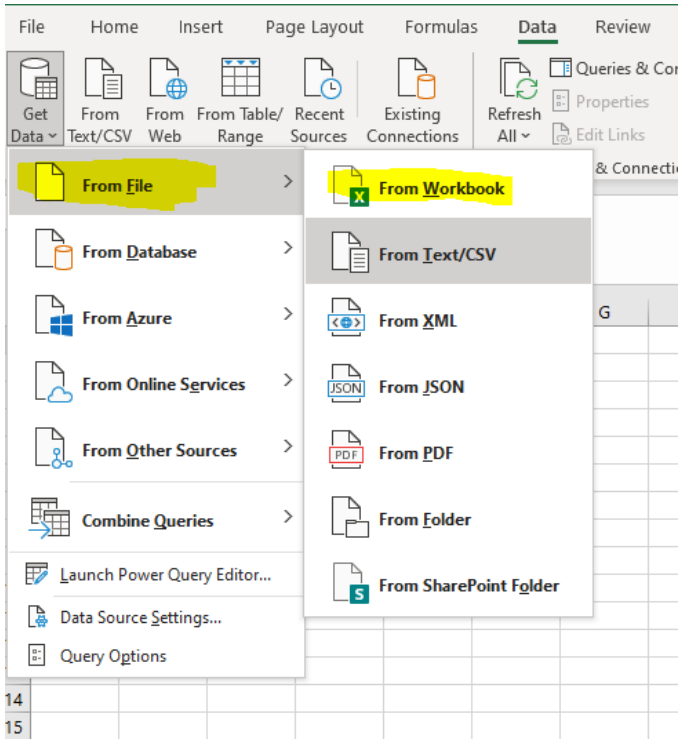
	A	B	C	D	E	F	G
1	Incident Date and Time	Incident Day of Week	Incident ID	Incident Category	Incident Subcategory	Incident Description	Police Dis
2	3/5/2019 21:00	Tuesday	778087	Larceny Theft	Larceny Theft - Other	Theft, Other Property, $50-$200	Tenderloi
3	12/22/2018 12:00	Saturday	752469	Motor Vehicle Theft	Motor Vehicle Theft	Vehicle, Stolen, Motorcycle	Northern
4	8/24/2018 17:30	Friday	706753	Larceny Theft	Larceny - From Vehicle	Theft, From Locked Vehicle, $200-$950	Ingleside
5	10/20/2018 15:10	Saturday	728264	Warrant	Other	Probation Search	Southern
6	6/5/2019 0:36	Wednesday	808230	Other Offenses	Other	Air Gun, Possession	Central
7	2/12/2019 7:00	Tuesday	769624	Larceny Theft	Larceny Theft - From Building	Theft, From Building, >$950	Southern
8	12/7/2018 12:30	Friday	745735	Other Miscellaneous	Other	State Code Felony (general)	Bayview
9	10/4/2018 9:00	Thursday	725578	Burglary	Burglary - Commercial	Burglary, Store, Unlawful Entry	Central
10	5/17/2019 17:00	Friday	802216	Offences Against The Family And	Other	Violation of Restraining Order	Bayview
11	1/31/2019 13:24	Thursday	765301	Robbery	Robbery - Commercial	Robbery, Service Station, W/ Force	Northern
12	2/15/2019 23:30	Friday	771464	Lost Property	Lost Property	Lost Property	Northern
13	5/24/2019 16:16	Friday	810498	Fraud	Fraud	False Personation to Receive Money or	Mission
14	11/10/2018 1:57	Saturday	735838	Malicious Mischief	Vandalism	Malicious Mischief, Vandalism to Vehic	Ingleside
15	5/24/2019 18:45	Friday	804508	Assault	Simple Assault	Battery	Central
16	1/25/2019 11:00	Friday	762975	Motor Vehicle Theft	Motor Vehicle Theft	Vehicle, Recovered, Stolen outside SF	Ingleside
17	3/28/2019 21:00	Thursday	784690	Malicious Mischief	Vandalism	Malicious Mischief, Vandalism to Vehic	Ingleside
18	5/14/2018 14:00	Monday	719451	Case Closure	Case Closure	Case Closure	Bayview

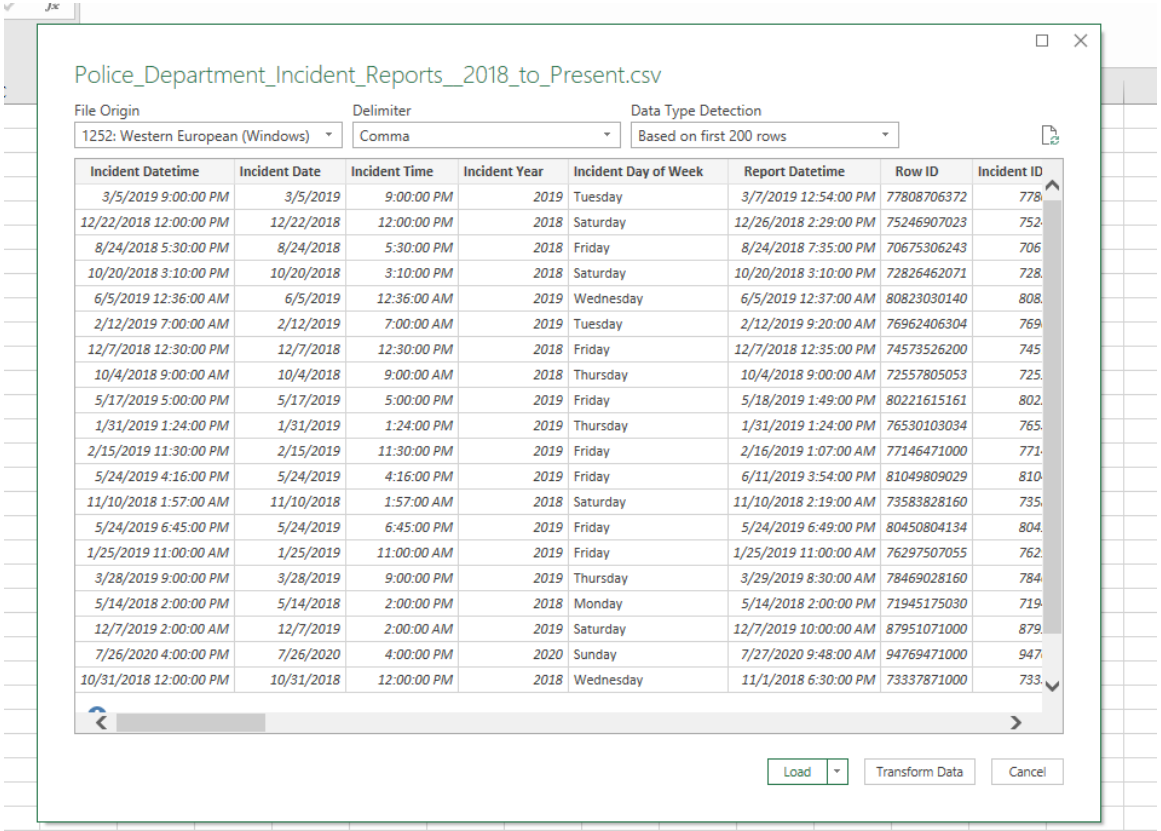
Power Query – Where to Start





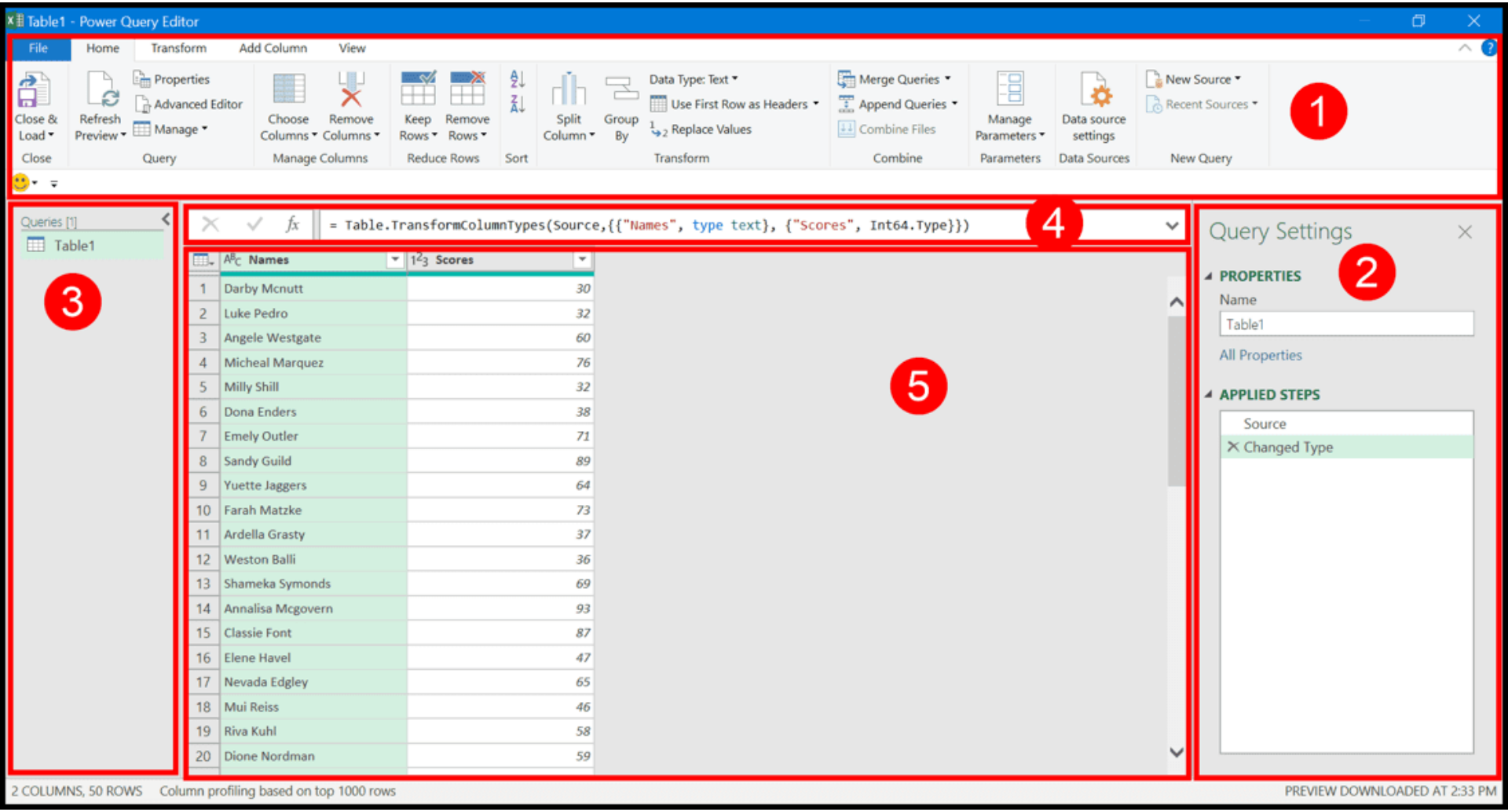
Power Query – Connect to Excel File





Incident Datetime	Incident Date	Incident Time	Incident Year	Incident Day of Week	Report Datetime	Row ID	Incident ID
3/5/2019 9:00:00 PM	3/5/2019	9:00:00 PM	2019	Tuesday	3/7/2019 12:54:00 PM	77808706372	778
12/22/2018 12:00:00 PM	12/22/2018	12:00:00 PM	2018	Saturday	12/26/2018 2:29:00 PM	75246907023	752
8/24/2018 5:30:00 PM	8/24/2018	5:30:00 PM	2018	Friday	8/24/2018 7:35:00 PM	70675306243	706
10/20/2018 3:10:00 PM	10/20/2018	3:10:00 PM	2018	Saturday	10/20/2018 3:10:00 PM	72826462071	728
6/5/2019 12:36:00 AM	6/5/2019	12:36:00 AM	2019	Wednesday	6/5/2019 12:37:00 AM	80823030140	808
2/12/2019 7:00:00 AM	2/12/2019	7:00:00 AM	2019	Tuesday	2/12/2019 9:20:00 AM	76962406304	769
12/7/2018 12:30:00 PM	12/7/2018	12:30:00 PM	2018	Friday	12/7/2018 12:35:00 PM	74573526200	745
10/4/2018 9:00:00 AM	10/4/2018	9:00:00 AM	2018	Thursday	10/4/2018 9:00:00 AM	72557805053	725
5/17/2019 5:00:00 PM	5/17/2019	5:00:00 PM	2019	Friday	5/18/2019 1:49:00 PM	80221615161	802
1/31/2019 1:24:00 PM	1/31/2019	1:24:00 PM	2019	Thursday	1/31/2019 1:24:00 PM	76530103034	765
2/15/2019 11:30:00 PM	2/15/2019	11:30:00 PM	2019	Friday	2/16/2019 1:07:00 AM	77146471000	771
5/24/2019 4:16:00 PM	5/24/2019	4:16:00 PM	2019	Friday	6/11/2019 3:54:00 PM	81049809029	810
11/10/2018 1:57:00 AM	11/10/2018	1:57:00 AM	2018	Saturday	11/10/2018 2:19:00 AM	73583828160	735
5/24/2019 6:45:00 PM	5/24/2019	6:45:00 PM	2019	Friday	5/24/2019 6:49:00 PM	80450804134	804
1/25/2019 11:00:00 AM	1/25/2019	11:00:00 AM	2019	Friday	1/25/2019 11:00:00 AM	76297507055	762
3/28/2019 9:00:00 PM	3/28/2019	9:00:00 PM	2019	Thursday	3/29/2019 8:30:00 AM	78469028160	784
5/14/2018 2:00:00 PM	5/14/2018	2:00:00 PM	2018	Monday	5/14/2018 2:00:00 PM	71945175030	719
12/7/2019 2:00:00 AM	12/7/2019	2:00:00 AM	2019	Saturday	12/7/2019 10:00:00 AM	87951071000	879
7/26/2020 4:00:00 PM	7/26/2020	4:00:00 PM	2020	Sunday	7/27/2020 9:48:00 AM	94769471000	947
10/31/2018 12:00:00 PM	10/31/2018	12:00:00 PM	2018	Wednesday	11/1/2018 6:30:00 PM	73337871000	733

Power Query – Power Query Editor

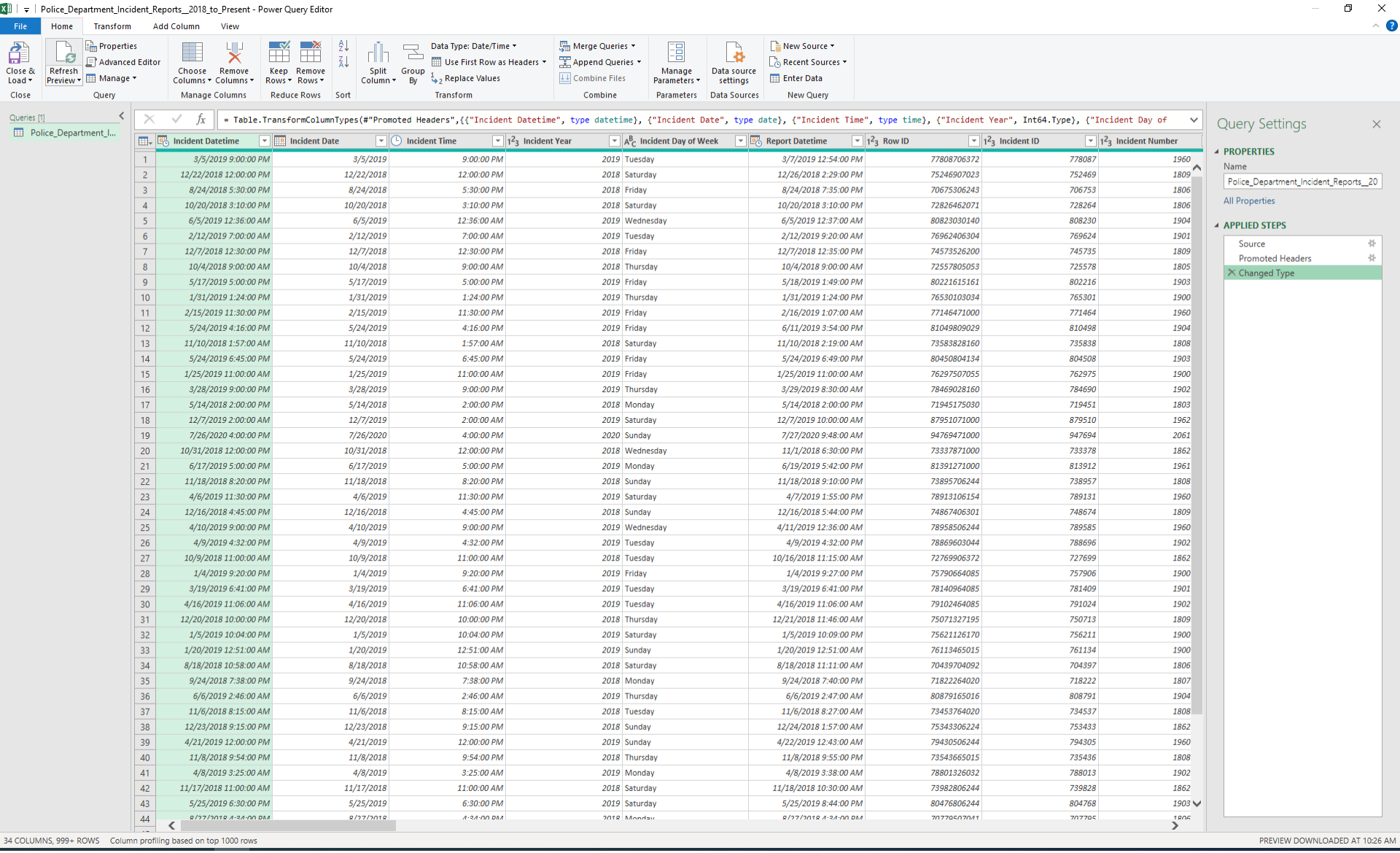


1. Ribbon **2. Applied Steps** **3. Queries**

4. Formula Bar **5. Data Preview**

https://excelchamps.com/power-query/

Power Query – Editing Connected Data



	Incident Datetime	Incident Date	Incident Time	Incident Year	Incident Day of Week	Report Datetime	Row ID	Incident ID	Incident Number
1	3/5/2019 9:00:00 PM	3/5/2019	9:00:00 PM	2019	Tuesday	3/7/2019 12:54:00 PM	77808706372	778087	1960
2	12/22/2018 12:00:00 PM	12/22/2018	12:00:00 PM	2018	Saturday	12/26/2018 2:29:00 PM	75246907023	752469	1809
3	8/24/2018 5:30:00 PM	8/24/2018	5:30:00 PM	2018	Friday	8/24/2018 7:35:00 PM	70675306243	706753	1806
4	10/20/2018 3:10:00 PM	10/20/2018	3:10:00 PM	2018	Saturday	10/20/2018 3:10:00 PM	72826462071	728264	1806
5	6/5/2019 12:36:00 AM	6/5/2019	12:36:00 AM	2019	Wednesday	6/5/2019 12:37:00 AM	80823030140	808230	1904
6	2/12/2019 7:00:00 AM	2/12/2019	7:00:00 AM	2019	Tuesday	2/12/2019 9:20:00 AM	76962406304	769624	1901
7	12/7/2018 12:30:00 PM	12/7/2018	12:30:00 PM	2018	Friday	12/7/2018 12:35:00 PM	74573526200	745735	1809
8	10/4/2018 9:00:00 AM	10/4/2018	9:00:00 AM	2018	Thursday	10/4/2018 9:00:00 AM	72557805053	725578	1805
9	5/17/2019 5:00:00 PM	5/17/2019	5:00:00 PM	2019	Friday	5/18/2019 1:49:00 PM	80221615161	802216	1903
10	1/31/2019 1:24:00 PM	1/31/2019	1:24:00 PM	2019	Thursday	1/31/2019 1:24:00 PM	76530103034	765301	1900
11	2/15/2019 11:30:00 PM	2/15/2019	11:30:00 PM	2019	Friday	2/16/2019 1:07:00 AM	77146471000	771464	1960
12	5/24/2019 4:16:00 PM	5/24/2019	4:16:00 PM	2019	Friday	6/11/2019 3:54:00 PM	81049809029	810498	1904
13	11/10/2018 1:57:00 AM	11/10/2018	1:57:00 AM	2018	Saturday	11/10/2018 2:19:00 AM	73583828160	735838	1808
14	5/24/2019 6:45:00 PM	5/24/2019	6:45:00 PM	2019	Friday	5/24/2019 6:49:00 PM	80450804134	804508	1903
15	1/25/2019 11:00:00 AM	1/25/2019	11:00:00 AM	2019	Friday	1/25/2019 11:00:00 AM	76297507055	762975	1900
16	3/28/2019 9:00:00 PM	3/28/2019	9:00:00 PM	2019	Thursday	3/29/2019 8:30:00 AM	78469028160	784690	1902
17	5/14/2018 2:00:00 PM	5/14/2018	2:00:00 PM	2018	Monday	5/14/2018 2:00:00 PM	71945175030	719451	1803
18	12/7/2019 2:00:00 AM	12/7/2019	2:00:00 AM	2019	Saturday	12/7/2019 10:00:00 AM	87951071000	879510	1962
19	7/26/2020 4:00:00 PM	7/26/2020	4:00:00 PM	2020	Sunday	7/27/2020 9:48:00 AM	94769471000	947694	2061
20	10/31/2018 12:00:00 PM	10/31/2018	12:00:00 PM	2018	Wednesday	11/1/2018 6:30:00 PM	73337871000	733378	1862
21	6/17/2019 5:00:00 PM	6/17/2019	5:00:00 PM	2019	Monday	6/19/2019 5:42:00 PM	81391271000	813912	1961
22	11/18/2018 8:20:00 PM	11/18/2018	8:20:00 PM	2018	Sunday	11/18/2018 9:10:00 PM	73895706244	738957	1808
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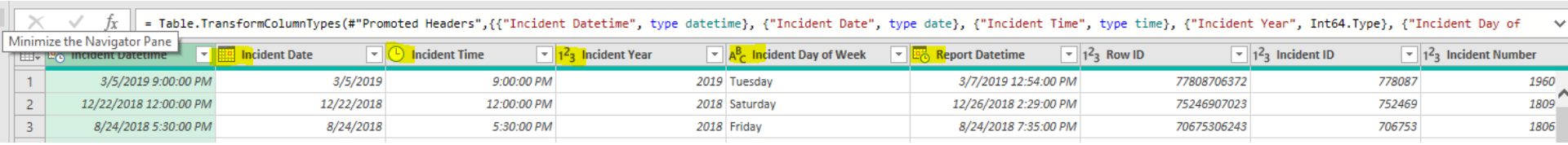
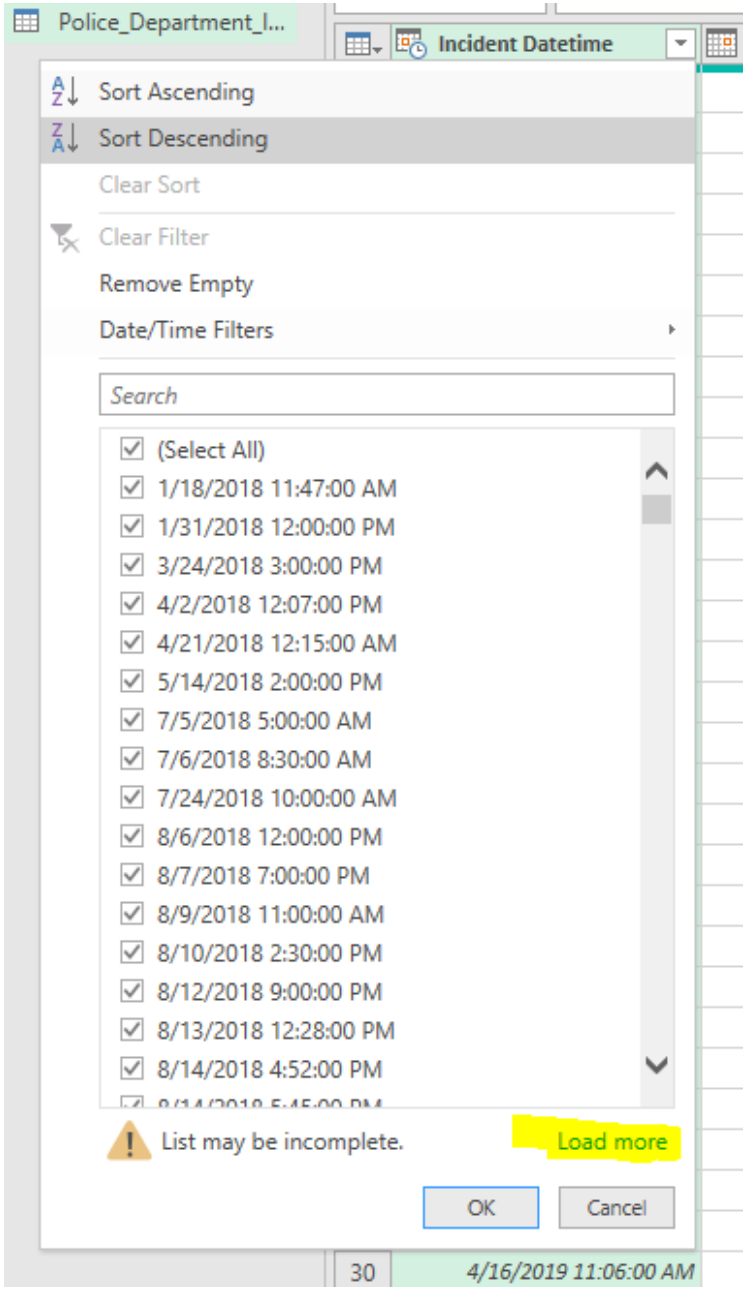
27	10/9/2018 11:00:00 AM	10/9/2018	11:00:00 AM	2018	Tuesday	10/16/2018 11:15:00 AM	72769906372	727699	1862
28	1/4/2019 9:20:00 PM	1/4/2019	9:20:00 PM	2019	Friday	1/4/2019 9:27:00 PM	75790664085	757906	1900
29	3/19/2019 6:41:00 PM	3/19/2019	6:41:00 PM	2019	Tuesday	3/19/2019 6:41:00 PM	78140964085	781409	1901
30	4/16/2019 11:06:00 AM	4/16/2019	11:06:00 AM	2019	Tuesday	4/16/2019 11:06:00 AM	79102464085	791024	1902
31	12/20/2018 10:00:00 PM	12/20/2018	10:00:00 PM	2018	Thursday	12/21/2018 11:46:00 AM	75071327195	750713	1809
32	1/5/2019 10:04:00 PM	1/5/2019	10:04:00 PM	2019	Saturday	1/5/2019 10:09:00 PM	75621126170	756211	1900
33	1/20/2019 12:51:00 AM	1/20/2019	12:51:00 AM	2019	Sunday	1/20/2019 12:51:00 AM	76113465015	761134	1900
34	8/18/2018 10:58:00 AM	8/18/2018	10:58:00 AM	2018	Saturday	8/18/2018 11:11:00 AM	70439704092	704397	1806
35	9/24/2018 7:38:00 PM	9/24/2018	7:38:00 PM	2018	Monday	9/24/2018 7:40:00 PM	71822264020	718222	1807
36	6/6/2019 2:46:00 AM	6/6/2019	2:46:00 AM	2019	Thursday	6/6/2019 2:47:00 AM	80879165016	808791	1904
37	11/6/2018 8:15:00 AM	11/6/2018	8:15:00 AM	2018	Tuesday	11/6/2018 8:27:00 AM	73453764020	734537	1808
38	12/23/2018 9:15:00 PM	12/23/2018	9:15:00 PM	2018	Sunday	12/24/2018 1:57:00 AM	75343306224	753433	1862
39	4/21/2019 12:00:00 PM	4/21/2019	12:00:00 PM	2019	Sunday	4/22/2019 12:43:00 AM	79430506244	794305	1960
40	11/8/2018 9:54:00 PM	11/8/2018	9:54:00 PM	2018	Thursday	11/8/2018 9:55:00 PM	73543665015	735436	1808
41	4/8/2019 3:25:00 AM	4/8/2019	3:25:00 AM	2019	Monday	4/8/2019 3:38:00 AM	78801326032	788013	1902
42	11/17/2018 11:00:00 AM	11/17/2018	11:00:00 AM	2018	Saturday	11/18/2018 10:30:00 AM	73982806244	739828	1862
43	5/25/2019 6:30:00 PM	5/25/2019	6:30:00 PM	2019	Saturday	5/25/2019 8:44:00 PM	80476806244	804768	1903
44	8/27/2018 4:34:00 PM	8/27/2018	4:34:00 PM	2018	Monday	8/27/2018 4:34:00 PM	70779507041	707795	1806

Power Query – Type of Data

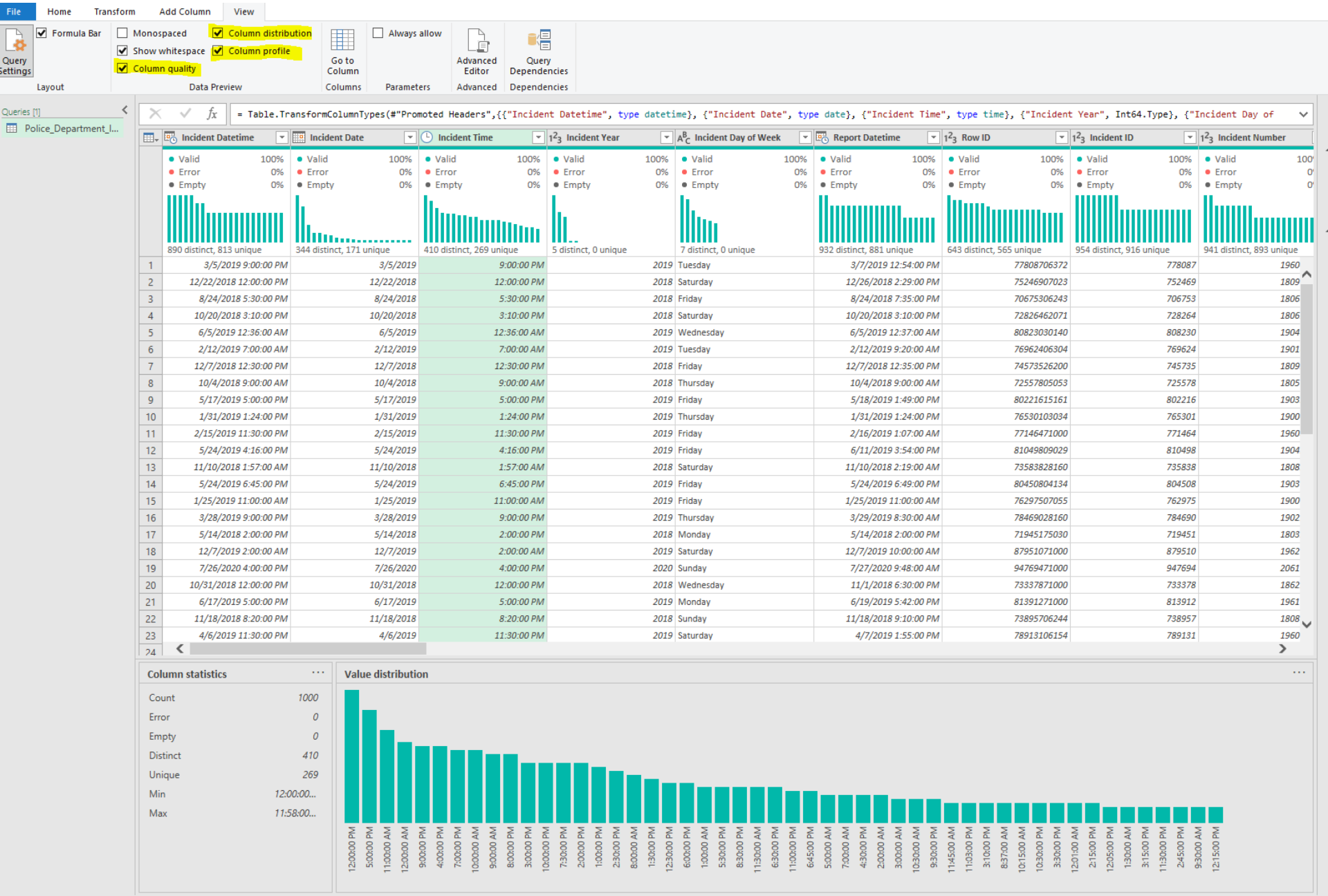


	Incident Datetime	Incident Date	Incident Time	Incident Year	Incident Day of Week	Report Datetime	Row ID	Incident ID	Incident Number
1	3/5/2019 9:00:00 PM	3/5/2019	9:00:00 PM	2019	Tuesday	3/7/2019 12:54:00 PM	77808706372	778087	1960
2	12/22/2018 12:00:00 PM	12/22/2018	12:00:00 PM	2018	Saturday	12/26/2018 2:29:00 PM	75246907023	752469	1809
3	8/24/2018 5:30:00 PM	8/24/2018	5:30:00 PM	2018	Friday	8/24/2018 7:35:00 PM	70675306243	706753	1806

Power Query – Load More Data



Power Query – Where to Start



Additional Information

- ✓ **Books**
  - ✓ *Collect, Combine, and Transform Data Using Power Query in Excel and Power BI* (2018) by Gil Raviv

- ✓ **Websites**
  - ✓ http://datachant.com
  - ✓ https://blog.crossjoin.co.uk
  - ✓ http://excel-inside.pro
  - ✓ https://www.myonlinetraininghub.com/blog
  - ✓ https://excelchamps.com/power-query

Next Webinar

- ✓ **Transforming Data in Power Query**
  - ✓ *Data format*
  - ✓ *Add/remove columns*
  - ✓ *Formatting and extracting time/date*

Conclusions & Questions